



IHMA PATENT NEWSLETTER

Limited circulation patent news bulletin for the Holography Industry

APRIL 2021 – 124 PATENTS

Published and granted patents

**The IHMA PATENT NEWSLETTER
is exclusively dedicated to IHMA MEMBERS.**

HONNORAT RECHERCHES & SERVICES
23 rue Président Favre – 74 000 ANNECY – FRANCE
Tel.: 33 4 50 45 83 32 – Mobile: 33 6 61 52 73 59
Email: contact-hrs@numericable.fr – Web site: www.honorat-rs.fr

**Reproducing the IHMA PATENT NEWSLETTER via any means
(Electronic, mechanical, photocopying or recording) is an illegal infringement of copyright.**

TABLE OF CONTENTS

Please click on the links (titles) to go to

		page	
ABOUT IHMA PATENT NEWSLETTER			3
APPLICANTS OF THE MONTH		p.	4
PATENT OF THE MONTH		p.	5
<u>SECURITY HOLOGRAMS</u>	(23 patents)	p.	6 – 19
<u>SECURITY & OPTICAL EFFECTS</u>	(34 patents)	p.	20 – 43
Various optical effects in Security			
<u>HOLOGRAPHY TECHNIQUE</u>	(9 patents)	p.	44 – 51
<u>HOLOGRAPHY PROCESS</u>	(1 patent)	p.	52
Manufacturing equipment and process			
<u>RECORDING & MEMORY</u>	(4 patents)	p.	53 – 55
Recording material – Storage medium – Optical disk & process			
<u>DISPLAYS</u>	(39 patents)	p.	56 – 85
Displays devices – Digital holography – TV – Video			
<u>HOLOGRAPHY & MICROSCOPY</u>	(4 patents)	p.	86 – 88
<u>VARIOUS</u>	(11 patents)	p.	89 – 96
<u>TABLES WITH REFERENCES</u>		p.	97 – 102

Click on the title to return to table of contents

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 H-R&S patent surveillance newsletters, some errors or oversights could have occurred. H-R&S is 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. H-R&S collects 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

p. 4

Click on the title to return to table of contents

1. ALISE DEVICES - UNIVERSIDAD POLITECNICA DE MADRID
2. BEIHANG UNIVERSITY OF AERONAUTICS &
ASTRONAUTICS
3. BEIJING UNIVERSITY OF TECHNOLOGY
4. CELLBIG
5. CENTRAL CHINA NORMAL UNIVERSITY
6. CHANGYUAN TEFA TECHNOLOGY
7. CHINA BANKNOTE PRINTING & MINT
8. CHINA BANKNOTE PRINTING & MINT - ZHONGCHAO
SPECIAL SECURITY TECHNOLOGY
9. COLLEGE OF TOURISM & CULTURE YUNNAN UNIVERSITY
10. CORNING
11. DAI NIPPON PRINTING
12. DALIAN MORDEN TECHNOLOGY
13. DE LA RUE INTERNATIONAL
14. DUALITA - TOURE RITA J
15. FACEBOOK TECHNOLOGIES
16. FUJIAN AGRICULTURE & FORESTRY UNIVERSITY
17. FUJIAN NORMAL UNIVERSITY
18. GIESECKE & DEVRIENT CURRENCY TECHNOLOGY
19. GUANGZHOU GRAVITATIONAL WAVE TECHNOLOGY
INNOVATION DEVELOPMENT
20. GUANGZHOU TIMES PRINTING FACTORY
21. GUIZHOU DUOBAOLE AMUSEMENT EQUIPMENT
22. HARBIN ENGINEERING UNIVERSITY
23. HENAN WEIQUN TECHNOLOGY DEVELOPMENT
24. HUBEI YI EMMETT HOLOGRAPHIC TECHNOLOGY
25. HUECK FOLIEN
26. HUNAN UNIVERSITY
27. IMEC-INTERUNIVERSITAIR MICRO ELECTRONICA
CENTRUM VZW
28. INDIANA UNIVERSITY
29. IZMIR YUKSEK TEKNOLOJİ ENSTITUSU
30. JEONG, JI WON - LEE, JUN HEOK - JANGMINKI - KIM, JIN-
WOO
31. JI HUA LABORATORY
32. JIANGNAN UNIVERSITY
33. JIANGSU JINHENG NEW PACKAGING MATERIAL
34. JIANGSU SHENGHUI OPTOELECTRONIC
35. JIANGSU WEIGE NEW MATERIAL SCIENCE & TECHNOLOGY
- SVG TECHNOLOGY
36. JIANGYIN TONGLI OPTOELECTRONIC TECHNOLOGY
37. JINGMEN TANMENG TECHNOLOGY
38. KIM, DONG WOOK
39. KITAMI INSTITUTE OF TECHNOLOGY
40. KOREA ELECTRONICS TECHNOLOGY INSTITUTE
41. KOREA UNIVERSITY INDUSTRIAL & ACADEMIC
COLLABORATION FOUNDATION
42. KUNMING UNIVERSITY OF SCIENCE & TECHNOLOGY
43. KYODO PRINTING
44. LEONHARD KURZ STIFTUNG
45. LG CHEM
46. MIDIAGNOSTICS
47. NANJING UNIVERSITY OF SCIENCE & TECHNOLOGY
48. NANJING YAXU ELECTRONIC TECHNOLOGY
49. NANO BRICK
50. NUCTECH - TSINGHUA UNIVERSITY
51. OPTRICAL
52. ORIENTAL ANIME ELECTRONIC TECHNOLOGY
53. PENG LIANG
54. PEOPLE S PRINTING PLANT OF GUANGZHOU
55. PUTIAN HUAIJATENG ELECTRONIC TECHNOLOGY
56. QU YONGQING
57. RUAN JINQIN
58. SAMSUNG ELECTRONICS
59. SEOUL NATIONAL UNIVERSITY R&DB FOUNDATION
60. SHAANXI YICHENG ANTI COUNTERFEITING PRINTING
61. SHANDONG TAIBAO INFORMATION TECHNOLOGY GROUP
62. SHANGHAI INSTITUTE OF MICROSYSTEM & INFORMATION
TECHNOLOGY CHINESE ACADEMY OF SCIENCES
63. SHANGHAI QULI INFORMATION TECHNOLOGY
64. SHANGHAI SECURITY PRINTING
65. SHANGHAI WANXING HEALTH MANAGEMENT
CONSULTING
66. SHANGHAI YIRAN DIGITAL TECHNOLOGY
67. SHANGHAI ZHENGWEI PRINTING
68. SHENZHEN HONG YUAN CONSTRUCTION PROJECT
69. SHENZHEN JINJIA
70. SHENZHEN JIWOKOS TECHNOLOGY
71. SHENZHEN YONGFENGJI TECHNOLOGY
72. SHENZHEN ZHENXIANG TECHNOLOGY
73. SHINSUNG UNIVERSITY
74. SICHUAN UNIVERSITY
75. SINO SINGAPORE INTERNATIONAL JOINT RESEARCH
INSTITUTE
76. SKRIPKIN ALEKSANDR A,SU
77. SKYLINE TECHNOLOGY
78. SON, GUNHO
79. SONG JIANMING
80. SUZHOU HENGCHUANG CULTURE COMMUNICATION
81. SUZHOU IMAGE LASER TECHNOLOGY
82. TIANMA MICROELECTRONICS
83. TOPPAN INFOMEDIA
84. TOPPAN PRINTING
85. TSINGHUA SHENZHEN INTERNATIONAL GRADUATE
SCHOOL
86. UGOLINO CRISHTIAN
87. UNIVERSITY OF XIAMEN
88. VIAVI SOLUTIONS
89. WUHAN HUAGONG IMAGE TECHNOLOGY &
DEVELOPMENT
90. WUXI QUNHUAN PACKING MATERIAL
91. ZHANG SHIDI - WANG CHENYU - ZHENG YUNHUAN -
ZHUANG SHANLIN - CHEN XINYU
92. ZHEJIANG PRISM CULTURE MEDIA
93. ZHEJIANG UNIVERSITY

*Click on the title to return to table of contents***P33338****SECURITY HOLOGRAMS AND SECURITY & OPTICAL EFFECTS' COLUMNS
RELIEF – MICROLENS****CN112562489****WUHAN HUAGONG IMAGE TECHNOLOGY & DEVELOPMENT****Inventors:**

LU QIN, YANG ZHIFANG, ZHANG JING, YAN LONGQUAN, LIU CHANG

Application Nber / Date:

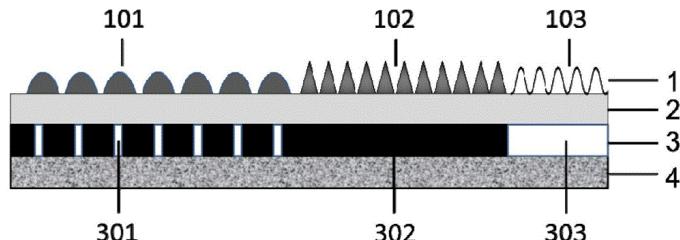
2020CN-1473555./ 2020-12-15

Priority Nber / Date / Country:

2020CN-1473555 / 2020-12-15

VARIABLE DYNAMIC HOLOGRAPHIC ANTI-COUNTERFEITING MARK AND PREPARATION METHOD THEREOF

The invention discloses a variable dynamic holographic anti-counterfeiting mark and a preparation method thereof. The variable dynamic holographic anti-counterfeiting mark comprises a microstructure layer, a substrate layer, a metal reflecting layer and a back glue layer which are sequentially arranged from top to bottom, wherein the microstructure layer comprises a holographic anti-counterfeiting area and a micro-lens array area; removing a local reflecting layer in a laser sintering mode in the area of the metal reflecting layer corresponding to the micro-lens array area to form a hollowed-out micro image-text array; the distance between the plane formed by the lens optical centers of the micro lens array and the metal reflecting layer is the focal length of the micro lens array, so that the micro lens array and the micro image-text array jointly show a dynamic image-text effect. The holographic optical anti-counterfeiting technology and the dynamic anti-counterfeiting technology based on the micro-lens array are organically fused together, so that the overall attractive effect is realized, and the multiple anti-counterfeiting technology is also realized.



CLAIM 1. A variable dynamic holographic anti-counterfeiting mark comprises a microstructure layer, a substrate layer, a metal reflecting layer and a back glue layer which are sequentially arranged from top to bottom, and is characterized in that the microstructure layer comprises a holographic anti-counterfeiting area and a micro-lens array area; removing a local reflecting layer in a laser sintering mode in the area of the metal reflecting layer corresponding to the micro-lens array area to form a hollowed-out micro image-text array; the distance between the plane formed by the lens optical centers of the micro lens array and the metal reflecting layer is the focal length of the micro lens array, so that the micro lens array and the micro image-text array jointly show a dynamic image-text effect.

No equivalent**Status:** Pending**Research Report:** Not available

Click on the title to return to table of contents

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

P33205

WO202173991

Priority Date: 15/10/2019

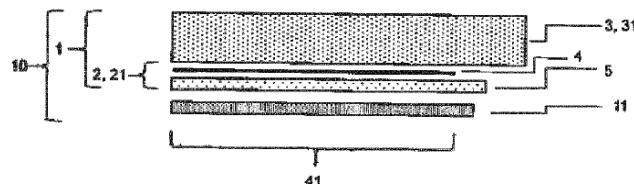
LEONHARD KURZ STIFTUNG

TRANSFER FILM, COMPONENT AND METHOD FOR THE PRODUCTION THEREOF

The invention relates to a transfer film (1), in particular for decorating trim components for motor vehicles or household appliances, comprising a carrier layer (3) with at least one carrier layer (31) and a transfer layer (2) arranged on the carrier layer (3), characterized in that the transfer layer (2) has a protective layer composite (21) comprising a first protective layer (5) and at least one acceptance layer (4) for coating the transfer layer (2) in a coatable region (41) with at least one coating (6), wherein the at least one acceptance layer (4) is arranged on the first protective layer (5) and wherein the at least one acceptance layer (4) is arranged on a first surface of the transfer layer (2) facing the carrier layer (3). The invention also relates to a method for producing a transfer film, to a component and to a method for the production thereof using a transfer film.

FILM DE TRANSFERT, COMPOSANT ET PROCÉDÉ POUR SA FABRICATION

L'invention concerne un film de transfert (1), en particulier pour la décoration de composants de revêtement pour véhicules automobiles ou appareils ménagers, comprenant une couche de support (3), qui présente au moins un revêtement de support (31), et une couche de transfert (2) disposée sur la couche de support (3), caractérisé en ce que la couche de transfert (2) présente un revêtement de protection composite (21) constitué d'un premier revêtement de protection (5) et d'au moins un revêtement de réception (4) pour le revêtement de la couche de transfert (2) dans une région pouvant être revêtue (41) au moyen d'au moins un revêtement (6), ledit au moins un revêtement de réception (4) étant disposé sur le premier revêtement de protection (5) et ledit au moins un revêtement de réception (4) étant disposé sur une première surface de la couche de transfert (2) faisant face à la couche de support (3). L'invention concerne en outre un procédé de fabrication d'un film de transfert et un composant, ainsi qu'un procédé de fabrication de celui-ci à l'aide d'un film de transfert.



CLAIM 1. Transfer film (1), in particular for decorating trim components for motor vehicles or household appliances, comprising a carrier layer (3) with at least one carrier layer (31) and a transfer layer (2) arranged on the carrier layer (3), characterized in that In that the transfer layer (2) has a protective layer composite (21) comprising a first protective layer (5) and at least one acceptance layer (4) for coating the transfer layer (2) in a coatable region (41) with at least one coating (6), wherein the at least one acceptance layer (4) is arranged on the first protective layer (5) and wherein the at least one acceptance layer (4) is arranged on a first surface of the transfer layer (2) facing the carrier layer (3).

P33250

PRINTING

JP2021053855

Priority Date: 27/09/2019

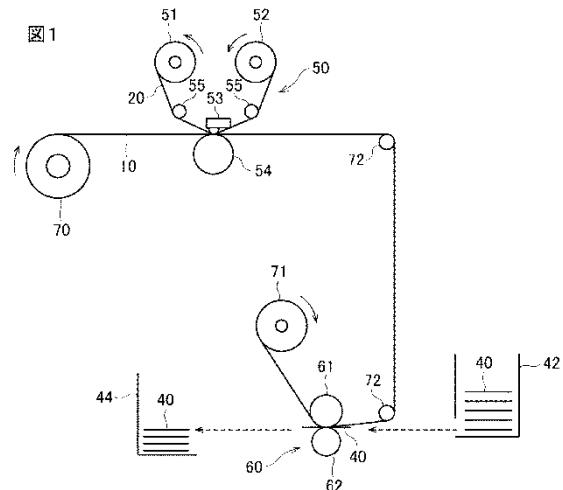
DAI NIPPON PRINTING

INTERMEDIATE TRANSFER MEDIUM, METHOD FOR PRODUCING PRINTED MATTER, AND COMBINATION OF HEAT TRANSFER SHEET AND INTERMEDIATE TRANSFER MEDIUM

TOPIC: To provide an intermediate transfer medium for obtaining a print having high anti-counterfeiting properties, a method for manufacturing a print using this intermediate transfer medium, and a combination of a heat transfer sheet and an intermediate transfer medium.

INVENTION: An intermediate transfer medium is provided with a transfer layer on one surface of a support so as to be releasable from the support. The transfer layer includes a release layer provided on the support body, a receiving layer provided above the release layer, and at least one layer provided between the release layer and the receiving layer, and a hologram layer containing hologram flakes is provided in a partial region between the release layer and the receiving layer.

CLAIM 1. An intermediate transfer medium in which a transfer layer is provided on one surface of a supporting body so as to be releasable from the supporting body, the transfer layer having a release layer provided on the supporting body and a receiving layer provided above the release layer, A hologram layer containing hologram flakes is provided in a partial region between the release layer and the receiving layer.



P33256

CARD

JP2021047412

Priority Date: 21/10/2020

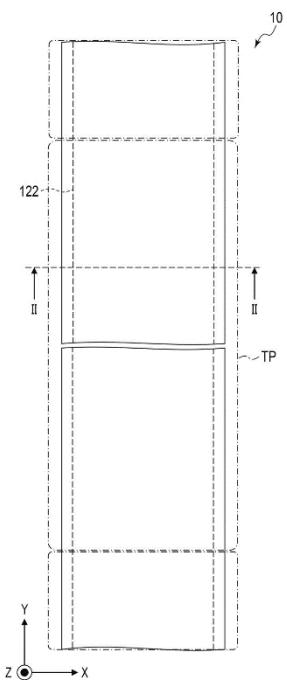
TOPPAN PRINTING

TRANSFER FOIL AND METHOD OF MAKING SAME

TOPIC: To make it possible to manufacture a transfer foil provided with a relief structure for reproducing an image with a sufficiently large dimension at a high yield without causing burrs in a metal layer or problems with chemical resistance.

INVENTION: a method of producing a transfer foil includes: forming a relief structure formation layer having a relief structure configured to display a diffracted image provided on one main surface thereof; forming a metal layer on the main surface on which the relief structure is provided; and exposing, on the metal layer, a pair of edge portions, each of the edge portions extending in a length direction of the relief structure formation layer, of a surface of the metal layer, Forming a mask layer covering a central portion interposed between the edge portions; and forming a reflective layer by removing portions of the metal layer corresponding to the pair of edge portions by etching using the mask layer as an etching mask, wherein the reflective layer is formed to have one or more through-holes.

CLAIM 1. A method for producing a strip-shaped transfer foil comprising an transfer material layer and a supporting member that releasably supports the transfer material layer, the transfer material layer including a relief structure forming layer and a reflective layer, the method comprising the steps of: Forming a relief structure formation layer including a relief structure configured to display a diffracted image, the relief structure being provided on one main surface of the relief structure; forming a metal layer on the main surface on which the relief structure is provided; and forming, on the metal layer, one or more of a surface of the metal layer, Forming a mask layer that exposes a pair of edge portions each extending in a lengthwise direction of the relief structure forming layer and covers a central portion sandwiched between the edge portions; and etching using the mask layer as an etching mask to form a mask layer, Forming a reflective layer by removing a portion of the metal layer corresponding to the pair of edge portions, wherein the reflective layer is formed to have one or more through-holes.



P33257

CARD

JP2021047411

Priority Date: 21/10/2020

TOPPAN PRINTING

TRANSFER FOIL AND METHOD OF MAKING SAME

TOPIC: To make it possible to manufacture a transfer foil provided with a relief structure for reproducing an image with a sufficiently large dimension at a high yield without causing burrs in a metal layer or problems with chemical resistance.

INVENTION: a method of producing a transfer foil includes: forming a relief structure formation layer having a relief structure configured to display a diffracted image provided on one main surface thereof; forming a metal layer on the main surface on which the relief structure is provided; and exposing, on the metal layer, a pair of edge portions, each of the edge portions extending in a length direction of the relief structure formation layer, of a surface of the metal layer, Forming a mask layer covering a center portion sandwiched between the edge portions; and removing portions of the metal layer corresponding to the pair of edge portions by etching using the mask layer as an etching mask to form a mask layer, Forming a reflective layer; and forming the adhesive layer, wherein a thickness of the adhesive layer is within a range of 2 to 40 times a thickness of the mask layer.

CLAIM 1. A method for producing a strip-shaped transfer foil comprising an transfer material layer, a support releasably supporting the transfer material layer, and an adhesive layer facing the support with the transfer material layer interposed therebetween, the transfer material layer comprising a relief structure forming layer and a reflective layer, the method comprising: Forming a relief structure formation layer including a relief structure configured to display a diffracted image, the relief structure being provided on one main surface of the relief structure; forming a metal layer on the main surface on which the relief structure is provided; and forming, on the metal layer, one or more of a surface of the metal layer, Forming a mask layer that exposes a pair of edge portions each extending in a lengthwise direction of the relief structure forming layer and covers a central portion sandwiched between the edge portions; and etching using the mask layer as an etching mask to form a mask layer, Forming a reflective layer by removing portions of the metal layer corresponding to the pair of edge portions; and forming the adhesive layer, wherein a thickness of the adhesive layer is within a range of 2 to 40 times a thickness of the mask layer.

P33258

CARD

JP2021047410

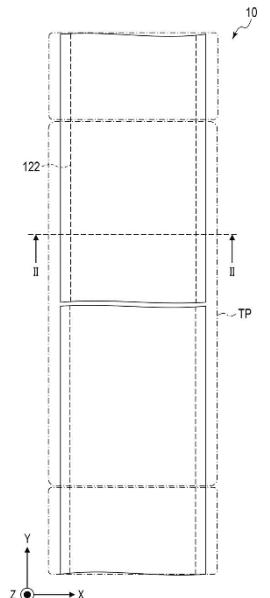
Priority Date: 21/10/2020

TOPPAN PRINTING

TRANSFER FOIL AND METHOD OF MAKING SAME

TOPIC: To make it possible to manufacture a transfer foil provided with a relief structure for reproducing an image with a sufficiently large dimension at a high yield without causing burrs in a metal layer or problems with chemical resistance. INVENTION: a method for producing a solar cell, the method comprising the steps of: forming a relief structure formation layer having a band shape such that a relief structure for displaying a diffracted image is provided on one main surface; forming a metal layer on the main surface; and forming, on the metal layer, a relief structure formation layer having a band shape, wherein A mask layer is formed covering a center portion by exposing a pair of edge portions of the surface, and a reflective layer is formed by removing portions of the metal layer corresponding to the edge portions by etching using the mask layer as an etching mask. An adhesive layer including a fluorescing material is formed on the imprint material layer including the relief structure formation layer and the metal layer.

CLAIM 1. A method for producing a strip-shaped transfer foil comprising an transfer material layer, a support releasably supporting the transfer material layer, and an adhesive layer facing the support with the transfer material layer interposed therebetween, the transfer material layer comprising a relief structure forming layer and a reflective layer, the method comprising: Forming a relief structure formation layer including a relief structure configured to display a diffracted image, the relief structure being provided on one main surface of the relief structure; forming a metal layer on the main surface on which the relief structure is provided; and forming, on the metal layer, one or more of a surface of the metal layer, Forming a mask layer that exposes a pair of edge portions each extending in a lengthwise direction of the relief structure forming layer and covers a central portion sandwiched between the edge portions; and etching using the mask layer as an etching mask to form a mask layer, Forming a reflective layer by removing portions of the metal layer corresponding to the pair of edge portions; and forming an adhesive layer on an imprint material layer that includes the relief structure formation layer and the reflective layer, wherein the adhesive layer includes a fluorescing material.



P33270

EP3321092

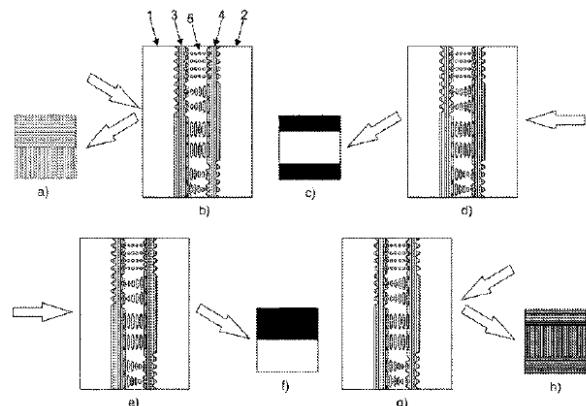
Priority Date: 03/12/2021

ALISE DEVICES - UNIVERSIDAD POLITECNICA DE MADRID

METHOD AND DEVICE FOR ACHIEVING DOCUMENT SECURITY BY GENERATING MULTIPLE REFLEXIVE AND TRANSMISSIVE LATENT IMAGES

The present invention relates to a production method and to a device for document security applications including various latent images on each side. The invention comprises: depositing, according to an established pattern, at least one layer of metallized material, forming a holographic element on at least one part of one of the surfaces of a confinement substrate; defining different regions on the surface of the substrate; inducing different alignment directions for orienting a liquid crystal according to the previously defined 10 regions; doping the liquid crystal with at least one dichroic dye; placing the liquid crystal over at least one confinement substrate, covering the holographic element; adding a second confinement substrate, forming a sandwich-type structure; and polymerizing the liquid crystal, forming a sheet.

CLAIM 1. A manufacturing method for producing transparent devices for document security including various reflective and transmissive images, characterized in that it comprises the following steps: a) depositing, according to a selective-pattern, at least one layer of partially metallized material, forming a holographic element on at least one part of one of the sides of at least one confinement substrate, such that a fraction of the incident light is reflected, allowing the remaining fraction of the light to be transmitted; b) defining different regions on the surface of the at least one substrate; c) inducing different alignment directions for orienting a liquid crystal according to the previously defined regions; d) doping the liquid crystal with at least one dichroic dye; e) placing the doped liquid crystal on at least one confinement substrate, covering the holographic element; f) adding a second confinement substrate, forming a sandwich-type structure; g) polymerizing the liquid crystal, forming a sheet.



P33281

PRINTING – LABEL

CN212966803U

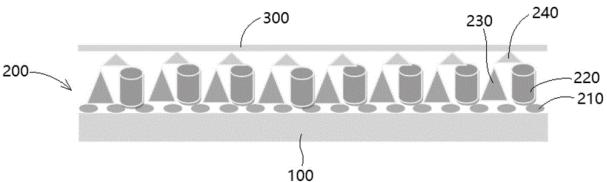
Priority Date: 09/01/2020

SHANGHAI ZHENGWEI PRINTING

NOVEL PERSPECTIVE HOLOGRAPHIC ANTI-COUNTERFEIT LABEL

The utility model discloses a novel perspective holographic anti-counterfeit label, which comprises a label substrate layer and an anti-counterfeiting printing layer printed on the surface of the label substrate layer; the anti-counterfeiting printing layer comprises: a first dot printing layer printed on the upper surface of the label base material layer in a full-page dot mode; a three-dimensional image-text layer printed on the upper surface of the first dot printing layer in a digital parallel line mode; a second dot printing layer which is printed on the upper surface of the first dot printing layer in a dot printing mode and surrounds the three-dimensional image-text layer; and the hidden image-text layer is printed on the upper surfaces of the three-dimensional image-text layer and the second dot printing layer in a digital parallel line mode. The utility model discloses an anti-fake printing layer adopts three-dimensional picture and text layer and hides the picture and text range upon range of mode of adding and forms holographic effect, need not cover grating or microlens diaphragm, has greatly reduced the preparation cost, has simplified process flow, and the structure is more simple reasonable.

CLAIM 1. A novel perspective holographic anti-counterfeiting label comprises a label base material layer and an anti-counterfeiting printing layer printed on the surface of the label base material layer; the anti-counterfeiting printing layer is characterized by comprising: a first dot printing layer printed on the upper surface of the label base material layer in a full-page dot mode; a three-dimensional image-text layer printed on the upper surface of the first dot printing layer in a digital parallel line mode; a second dot printing layer which is printed on the upper surface of the first dot printing layer in a dot printing mode and surrounds the three-dimensional image-text layer; and the hidden image-text layer is printed on the upper surfaces of the three-dimensional image-text layer and the second dot printing layer in a digital parallel line mode.



P33293

LABEL

CN212873852U

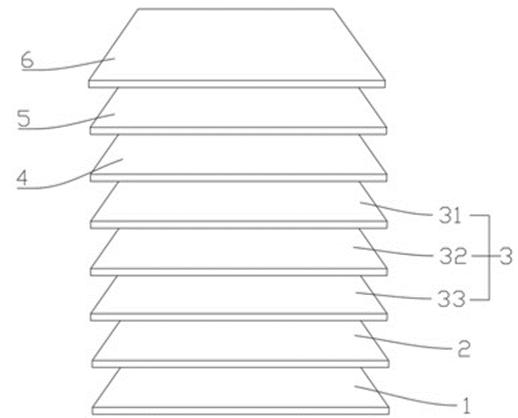
Priority Date: 08/11/2020

HENAN WEIQUN TECHNOLOGY DEVELOPMENT

HOLOGRAPHIC 3D LASER EMBOSSTMENT ANTI-COUNTERFEITING WATER LABEL

The utility model discloses a holographic 3D laser relief (sculpture) anti-fake water pastes mark, including the die base stock, the printing takes off the end on the die base stock and scalds the gilt layer of pressing and take off the end and scald the holographic 3D laser relief (sculpture) image structure on the gilt layer of pressing, holographic 3D laser relief (sculpture) structure is including the 3D relief (sculpture) moulded layer that stacks gradually, metal level and alternately combine the layer, alternately combine the layer and take off the end gilt layer and contact the gilt layer and scald pressure, the coating has colored picture and text layer and high strength wearing layer and drawing of patterns peel ply on 3D relief (sculpture) moulded layer in proper. Put holographic 3D laser relief sculpture anti-fake water subsides mark into aquatic, make the separation of end boiling hot gold layer and die supporting base paper of taking off, the stripping peel layer of taking off the membrane can play the effect of fixed pattern this moment, paste the anti-fake water subsides mark that will separate and paste on corresponding bottle, carry out 180 °C of toasting, make anti-fake water paste mark hug closely on the bottle, will take off the membrane peel layer and tear, let this anti-fake water paste mark can show different colour and gloss under different light, realize multiple anti-fake.

CLAIM 1. The holographic 3D laser embossment anti-counterfeiting water mark is characterized by comprising a mold supporting base paper (1), a bottom-removing gold stamping layer (2) printed on the mold supporting base paper (1) and a holographic 3D laser embossment image structure (3) stamped on the bottom-removing gold stamping layer (2); the holographic 3D laser relief image structure (3) comprises a 3D relief mould pressing layer (31), a metal layer (32) and a cross combination layer (33) which are sequentially stacked from top to bottom, wherein the cross combination layer (33) is in contact with the bottom-removing gold stamping layer (2) for stamping; and the 3D embossment mould pressing layer (31) is sequentially coated with a color picture and text layer (4), a high-strength wear-resistant layer (5) and a demoulding stripping layer (6).



P33298

PRINTING

CN212830230U

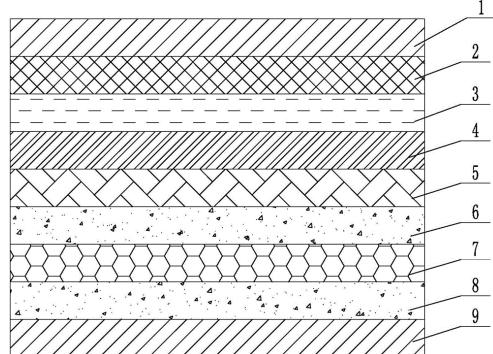
Priority Date: 06/12/2020

SHANDONG TAIBAO INFORMATION TECHNOLOGY GROUP

POINT LIGHT SOURCE READING LASER ENCRYPTED HOLOGRAPHIC ANTI-COUNTERFEITING GASKET

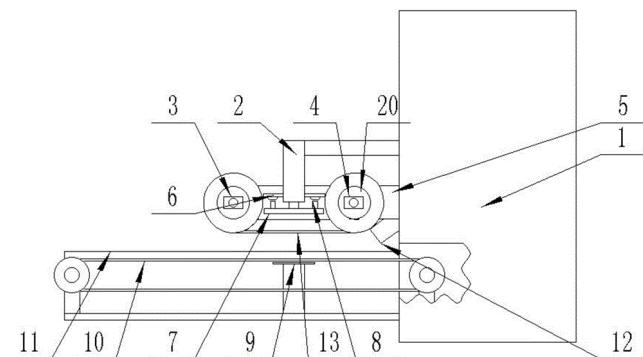
The utility model belongs to the technical field of it is anti-fake, concretely relates to holographic anti-fake gasket is encrypted to pointlite recognition laser. The laser encrypted holographic anti-counterfeiting gasket comprises a PET (polyethylene terephthalate) layer, an imaging layer, a laser encrypted information layer, an aluminum coating layer, a printing layer, a gluing agent layer, a foaming layer, a lower gluing agent layer and a lower PET layer which are sequentially connected from top to bottom, wherein digital coding information is hidden in the laser encrypted information layer. The utility model discloses a grating space frequency and two parameters of grating angle in the grating lattice, preparation laser encryption information layer mould pressing version, with the duplication of laser encryption information on PET formation of image layer, form laser encryption information layer, when the consumer uses hand-held point light source equipment to shine holographic anti-fake gasket's front, will present hidden information, judge the product true and false, be one kind and be difficult to imitate but easy discernment's novel holographic anti-fake gasket.

CLAIM 1. A pointlite recognition laser encryption holographic anti-fake gasket which characterized in that: the multifunctional laser encryption device comprises an upper PET layer (1), an imaging layer (2), a laser encryption information layer (3), an aluminum coating layer (4), a printing layer (5), an upper adhesive layer (6), a foaming layer (7), a lower adhesive layer (8) and a lower PET layer (9) which are sequentially connected from top to bottom, wherein digital coding information is hidden in the laser encryption information layer (3).



AUTOMATIC IN-FILM LABELING STRUCTURE BASED ON DIGITAL HOLOGRAPHIC ANTI-COUNTERFEITING

The utility model discloses an automatic mark structure that pastes in membrane based on holographic anti-fake of digit, including anti-fake code printing machine, anti-fake code printing machine's left downside horizontally connected has the conveyer belt device, the upside level that the conveyer belt device is close to the right-hand member position is provided with the connection diaphragm, it is provided with first commentaries on classics post to connect the diaphragm, the right-hand member level of connecting the diaphragm is rotated and is connected with the second commentaries on classics post, first commentaries on classics post with the reel has been cup jointed in the equal cooperation on the second commentaries on classics post, on the second commentaries on classics post the reel is gone up to coil and is had the label paper tape, the equidistant. The utility model discloses conveyer belt device is used for transmitting the packing material that the printing is good in the anti-fake code printing machine to the outside, then the two-dimensional code recognizer just discerns the production signal of telecommunication, then makes electric telescopic handle start-up extension through starting electrical component, and electric telescopic handle just takes the kicking block just like this outside label membrane that quick travel down collided on the label paper tape.



CLAIM 1. The utility model provides an automatic mark structure that pastes in membrane based on digital holographic anti-fake, includes anti-fake code printing machine (1), its characterized in that: the anti-counterfeiting code printing machine is characterized in that a conveyor belt device (10) is horizontally connected to the lower left side of the anti-counterfeiting code printing machine (1), a connecting transverse plate (5) is horizontally arranged on the upper side of the conveyor belt device (10) close to the right end of the conveyor belt device, a stepping motor (19) is fixedly connected to the rear side of the left end of the connecting transverse plate (5), a first rotary column (3) is fixedly connected to the spindle end of the stepping motor (19), a second rotary column (4) is horizontally and rotatably connected to the right end of the connecting transverse plate (5), the cross sections of the first rotary column (3) and the second rotary column (4) are square surfaces, a winding drum (20) is sleeved on the first rotary column (3) and the second rotary column (4) in a matched mode, a label paper tape (13) is wound on the winding drum (20) on the second rotary column (4), and the tail end of the label paper tape (13) is fixedly connected to the winding drum (20), outer label films (18) are equidistantly distributed on the label paper tape (13), concave trace grooves (14) are formed in the edge positions of the outer label films (18), electric telescopic rods (2) are vertically arranged on the upper sides of the positions between the winding drums (20) on the left side and the right side, the lower end of the electric telescopic rod (2) is horizontally and fixedly connected with a top block (7), a two-dimension code recognizer (12) is obliquely arranged at the upper side of the right end position of the conveyor belt device (10), the two-dimension code recognizer (12) is electrically connected with the electric telescopic rod (2), a pressure induction switch (9) is horizontally arranged at the lower side of the conveyor belt device (10), the pressure induction switch (9) is electrically connected with the electric telescopic rod (2), electric telescopic handle (2) stiff end downside fixed mounting have motor switch (6) and motor switch (6) with step motor (19) electricity is connected.

P33300

PRINTING

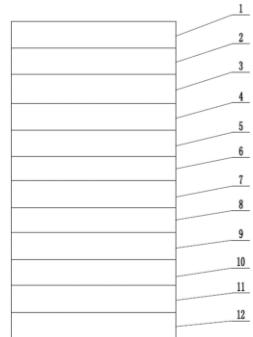
CN212809579U

Priority Date: 09/09/2020

SHANDONG TAIBAO INFORMATION TECHNOLOGY GROUP

HOLOGRAPHIC PLASTIC FILM POSITIVE AND NEGATIVE CODE CORRESPONDING ANTI-COUNTERFEITING MARK

The utility model belongs to the technical field of the false proof mark, concretely relates to positive and negative sign of sign indicating number corresponds false proof mark is moulded to holographic. The holographic plastic film positive and negative code corresponding anti-counterfeiting mark comprises a liquid silicone oil layer, a first plastic film layer, a first glue layer, a first printing layer, a second plastic film layer, a mould pressing information layer, an aluminum plating layer, an isolation layer, a second printing layer and a second glue layer which are sequentially arranged from top to bottom; the anti-counterfeiting mark can be uncovered and is divided into a stripping part and a bottom-remaining part, wherein the stripping part is a part above the isolation layer, and the bottom-remaining part is a part below the isolation layer. The utility model discloses the sign is for revealing the design, reveals first printing layer information before revealing, reveals second printing layer information after revealing, has corresponding relation between first printing layer information and the second printing layer information to possess holographic effect, anti-fake dynamics is high, and can solve the excessive gluey problem, automatic labeling in-process does not have the anti-phenomenon of gluing.



CLAIM 1. The utility model provides a positive sign and negative sign of correspondence false proof mark of holographic plastic film which characterized in that: the printing ink comprises a liquid silicone oil layer (1), a first plastic film layer (2), a first glue layer (3), a first printing layer (4), a second plastic film layer (5), a mould pressing information layer (6), a positioning mould pressing layer (7), an aluminum plating layer (8), an isolation layer (9), a second printing layer (10) and a second glue layer (11) which are arranged from top to bottom in sequence; the anti-counterfeiting mark can be uncovered and is divided into a stripping part and a reserved part, wherein the stripping part is a part above the isolation layer (9), and the reserved part is the isolation layer (9) and a part below the isolation layer (9).

P33309

PRINTING

CN112644152

Priority Date: 18/12/2020

WUHAN HUAGONG IMAGE TECHNOLOGY & DEVELOPMENT

METHOD FOR MANUFACTURING HOLOGRAPHIC FRAME PAPER

The invention discloses a method for manufacturing holographic frame paper, and belongs to the field of printing. The manufacturing method comprises the following steps: preparing a holographic working plate according to the size of the holographic frame paper; preparing a holographic positioning film based on the holographic working plate; setting a fixed length detection device and a stretching device, wherein the fixed length detection device is used for detecting the plate width size of the holographic positioning film, and the stretching device is used for receiving a signal of the plate width size of the fixed length detection device; controlling the traction force of the traction device through the fixed length detection device and the stretching device; the holographic positioning film is attached to the paper through glue, and holographic composite paper is obtained; and (4) peeling the base film from the holographic composite paper, and printing to obtain the holographic frame paper. The manufacturing method provided by the invention not only can introduce the holographic technology into the frame paper so as to increase the anti-counterfeiting performance of the frame paper, but also can ensure that the plate width of the holographic positioning film meets the specification in the compounding process, greatly improves the accurate positioning of the holographic pattern and ensures the accurate registration of the subsequent printing.

CLAIM 1. A method for manufacturing holographic frame paper is characterized by comprising the following steps: preparing a holographic working plate according to the size of the holographic frame paper; preparing a holographic positioning film based on the holographic working plate; setting a fixed length detection device and a stretching device, wherein the fixed length detection device is used for detecting the plate width size of the holographic positioning film, and the stretching device is used for receiving a plate width size signal of the fixed length detection device so as to control the traction force of the traction device on the holographic positioning film, thereby controlling the plate width of the holographic positioning film; in the process that the holographic positioning film is drawn by the drawing device, the drawing force of the drawing device is controlled through the fixed length detection device and the drawing device; compounding the holographic positioning film with paper through glue to obtain holographic composite paper; and peeling the base film from the holographic composite paper, and printing to obtain the holographic frame paper.

P33311

PRINTING – LABEL

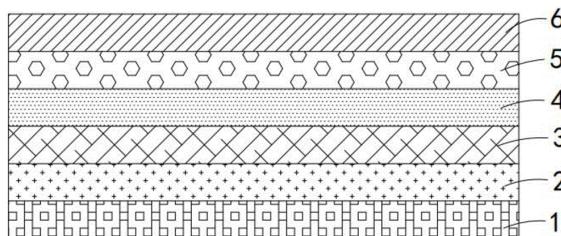
CN112634742

Priority Date: 30/12/2020

GUANGZHOU TIMES PRINTING FACTORY

NOVEL ANTI-COUNTERFEIT LABEL AND MANUFACTURING METHOD THEREOF

The invention discloses a novel anti-counterfeit label and a manufacturing method thereof, wherein the label comprises a transparent carrier layer, a printing layer, a plastic layer, a reflecting layer, a non-setting adhesive layer and base paper which are sequentially arranged according to a hierarchical structure; and one surface of the plastic layer, which faces the reflecting layer, is provided with an optical holographic image. The manufacturing method comprises the following steps: (a) printing designed patterns and/or characters on one surface of the transparent carrier coiled material to form a printing layer; (b) coating UV gloss oil on one surface of the transparent carrier coiled material with the printing layer, and curing the UV gloss oil by using ultraviolet light; (c) pressing micron-level embossing on the UV gloss oil by using the template to form an optical holographic image; (d) arranging a reflecting layer on one side of the UV gloss oil pressed with the embossings; (e) compounding base paper on the reflecting layer through adhesive sticker; (f) cutting the web material of step (e) to form individual labels.



CLAIM 1. A novel anti-counterfeit label is characterized by comprising a transparent carrier layer, a printing layer, a plastic layer, a reflecting layer, a non-setting adhesive layer and base paper which are sequentially arranged according to a hierarchical structure; and one surface of the plastic layer, which faces the reflecting layer, is provided with an optical holographic image.

P33321

LUMINESCENCE

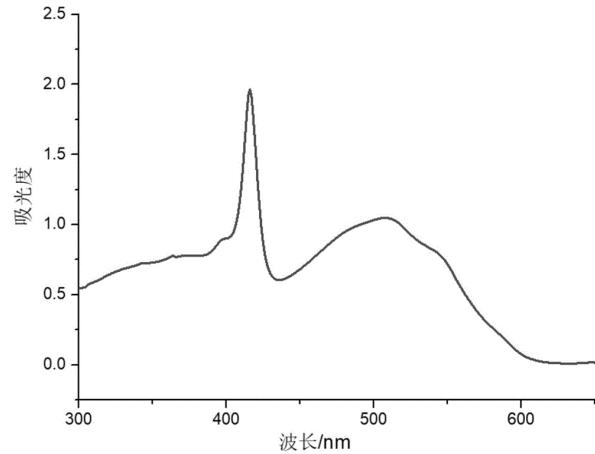
CN112606613

Priority Date: 14/12/2020

HUBEI YI EMMETT HOLOGRAPHIC TECHNOLOGY

FLUORESCENCE AND HOLOGRAPHIC DOUBLE ANTI-COUNTERFEITING BRONZING FILM AND PREPARATION METHOD THEREOF

The invention relates to a fluorescence and holographic double anti-counterfeiting gold stamping film and a preparation method thereof, wherein the fluorescence and holographic double anti-counterfeiting gold stamping film and the preparation method thereof comprise the following steps: (1) preparation of fluorescent dye porphyrin: modifying one of hydrogen, methyl, methoxy and dimethylamino groups on the porphyrin fluorescent dye; (2) preparing a fluorescent and holographic double anti-counterfeiting bronzing film: porphyrin and pigment are mixed according to a certain proportion, a proper amount of ethyl acetate is added to serve as a dispersion phase, then a certain amount of polymethacrylate coating is added, stirring is carried out for 10min, the mixture is uniformly mixed, then the mixture is coated on a base film, and then the fluorescent and holographic double anti-counterfeiting bronzing film is obtained after holographic die pressing and aluminum plating processes. The invention adopts the fluorescence and holographic double anti-counterfeiting function, has the characteristics of advanced technology, strong anti-counterfeiting capability, great counterfeiting difficulty and the like, and improves the anti-counterfeiting level of the film.



CLAIM 1. The fluorescence and holographic double anti-counterfeiting hot stamping film is characterized by comprising the following raw material components in parts by weight: 1 part of fluorescent dye porphyrin, 5-100 parts of pigment and 10-100 parts of ethyl acetate; the fluorescent dye porphyrin has a structure as shown in formula (I): r₁ is one or more of hydrogen, methyl, methoxyl and dimethylamino group.

P33322

PRINTING

CN112606588

Priority Date: 17/01/2021

PENG LIANG

OPTICAL COLOR-CHANGING GOLD STAMPING MATERIAL

The invention relates to an optical color-changing gold stamping material, which comprises a substrate film layer, a separation layer, a protective layer, a nano microstructure layer, a special color metal ink printing layer, an absorption layer, a dielectric layer, a mirror reflection layer and a hot melt adhesive coating, wherein the absorption layer, the dielectric layer and the reflection layer form a multi-coating interference type reflection coating forming a Fabry-Perot interferometer structure, the nano-micro-structure layer is a holographic grating mould pressing micro-structure, the microstructure is a combination of one or more grating structures with different intervals in the whole or local area, the color matching of the spot color metal ink printing layer is close to the first color of the interference type reflection coating, the spot color printing information is hidden in the background color of the interference type reflection coating when the spot color metal ink printing layer is seen from the front side, and when the metal printing ink is seen at an inclined angle, the color of the interference type reflection coating is changed, so that the printed spot color metal printing ink is not changed, and spot color printing information is displayed. The hot stamping material has the characteristics of wide adaptability, simple printing process on commodities or valuable articles and higher anti-counterfeiting performance.



1	基材层
2	离型层
3	保护层
~~~~~	~~~~~
4	纳米微结构层
5	专色金属油墨层
6	吸收层
7	介质层
8	反射层
9	热熔胶涂层

**CLAIM 1.** An optical color-changing gold stamping material is characterized by comprising a substrate film layer, a separation layer, a protective layer, a nano-micro structural layer, a special color metal ink printing layer, an absorption layer, a dielectric layer, a mirror reflection layer and a hot melt adhesive coating, wherein the absorption layer, the dielectric layer and the reflection layer form a multi-coating interference type reflection coating forming a Fabry-Perot interferometer structure, the nano-micro-structure layer is a holographic grating mould pressing micro-structure, the microstructure is a combination of one or more grating structures with different intervals in the whole or local area, the color matching of the spot color metal ink printing layer is close to the first color of the interference type reflection coating, the spot color printing information is hidden in the background color of the interference type reflection coating when the spot color metal ink printing layer is seen from the front side, and when the metal printing ink is seen at an inclined angle, the color of the interference type reflection coating is changed, so that the printed spot color metal printing ink is not changed, and spot color printing information is displayed.

P33323

PRINTING

CN112606582

Priority Date: 17/11/2020

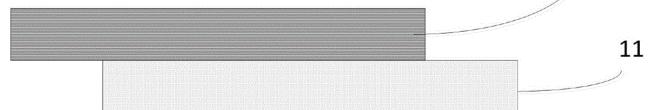
SHENZHEN JINJIA

**LASER FILM, LOCAL POSITIONING LASER PAPER AND PREPARATION METHOD THEREOF**

The invention discloses a laser film, local positioning laser paper and a preparation method thereof, wherein the laser film comprises the following components: the nano ink layer can generate a mirror surface effect by orderly arranging polar nano aluminum powder; the gloss oil layer with laser information is arranged on the water-based nano ink layer and at least partially overlapped with the nano ink layer; and laser holographic patterns in the laser information are matched with the mirror effect of the nano ink at the overlapping part of the laser oil layer with the laser information and the nano ink layer to present the laser effect. The laser film in the application does not need to carry out a film compounding transfer process, is simple in process, can effectively solve the problems of complex production process, environmental pollution and the like of local positioning laser paper when being applied to carriers such as paper and the like, and is beneficial to continuously widening the application field of the laser film.

1

12



11

**CLAIM 1.** The laser film is characterized by comprising: the nano ink layer can generate a mirror surface effect by orderly arranging polar nano aluminum powder; the gloss oil layer with laser information is arranged on the water-based nano ink layer and at least partially overlapped with the nano ink layer; and laser holographic patterns in the laser information are matched with the mirror effect of the nano ink at the overlapping part of the laser oil layer with the laser information and the nano ink layer to present the laser effect.

P33327

CN112597989

Priority Date: 18/12/2020

SHANGHAI INSTITUTE OF MICROSYSTEM & INFORMATION  
TECHNOLOGY CHINESE ACADEMY OF SCIENCES

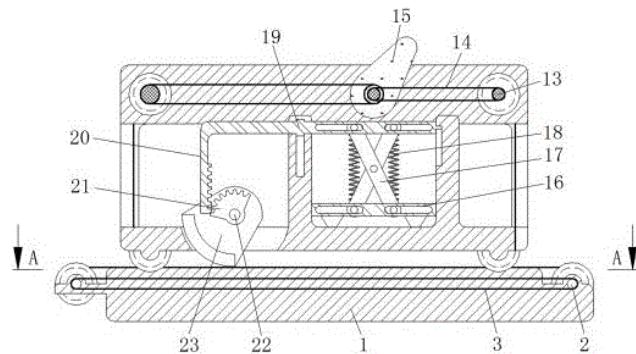
**MILLIMETER WAVE THREE-DIMENSIONAL HOLOGRAPHIC IMAGE CONCEALED ARTICLE DETECTION METHOD AND SYSTEM**

The invention provides a millimeter wave three-dimensional holographic image concealed article detection method and system with accurate positioning, which comprises the following steps: carrying out high-pass filtering and voxelization on the original three-dimensional holographic image; the method comprises the steps of performing down-sampling on a three-dimensional image after voxelization through sparse 3D convolution and sub-manifold sparse 3D convolution, extracting low-level three-dimensional space geometric features, acquiring long-range context information by using sub-manifold sparse 3D hole convolution, extracting high-level semantic features, and outputting a four-dimensional tensor; and transforming the four-dimensional tensor into a three-dimensional tensor by combining the depth dimension and the channel dimension, and then performing a classification task and a bounding box regression task to obtain a bounding box and a confidence coefficient. The invention uses three-dimensional data as input, improves the data volume of small objects, reduces the surrounding noise, introduces depth dimension, completely retains the three-dimensional space geometric information of the objects without distortion, and improves the identification of the small objects, thereby effectively improving the detection rate and the positioning precision of hidden objects in the millimeter wave three-dimensional holographic image.

**CLAIM 1.** A millimeter wave three-dimensional holographic image concealed article detection method is characterized by at least comprising the following steps: s1) millimeter wave scanning is carried out on the target, and an original three-dimensional holographic image is obtained; s2) carrying out high-pass filtering on the original three-dimensional holographic image to obtain a foreground image; s3) carrying out voxelization on the foreground image, and using the mean value of the characteristics of each point in each voxel grid as the characteristics of the corresponding voxel grid; s4) feeding the voxelized three-dimensional image into a three-dimensional feature extractor, performing down-sampling on the three-dimensional image through sparse 3D convolution and sub-manifold sparse 3D convolution, extracting low-level three-dimensional space geometric features, acquiring long-range context information by using sub-manifold sparse 3D hole convolution, extracting high-level semantic features, and outputting a four-dimensional tensor; s5) converting the four-dimensional tensor into a three-dimensional tensor, feeding the three-dimensional tensor into a region candidate network to perform a classification task and a boundary frame regression task, and obtaining a boundary frame and a confidence coefficient of the hidden article on a front view obtained by projecting the original three-dimensional holographic image along the depth direction.

**PRINTING DEVICE FOR HIGH-BRIGHTNESS HOLOGRAPHIC GOLD STAMPING ANTI-COUNTERFEIT LABEL**

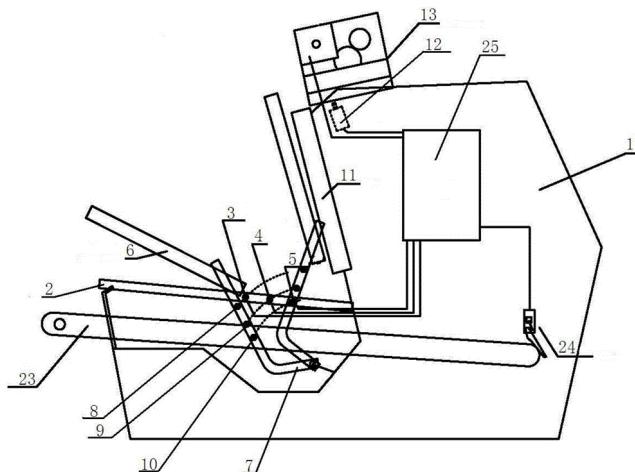
The invention relates to the technical field of label printing, and discloses a printing device for a high-brightness holographic gold-stamping anti-counterfeit label, which comprises a frame body, wherein the bottom of the frame body is rotatably connected with a first rotating shaft, the outer part of the first rotating shaft is in transmission connection with a first transmission belt, the inner wall of the first rotating shaft is fixedly connected with an adjusting resistor, the inner part of the first rotating shaft is rotatably connected with a movable rod, one end of the movable rod, which is close to the frame body, is fixedly connected with a contact, and the other end of the movable rod is rotatably connected with a hot-stamping roll. This holographic gilt antifalsification label's of hi-lite printing device, through the cam rotation to microcephaly end butt on the adjustable shelf, the adjustable shelf pushes down and makes the rotatory thermoprint of thermoprint mould head, reaches the effect of the orderly thermoprint of discontinuous, prevents that the rolling brush from taking off partially label paper when speed is too fast, through outwards pressing the movable rod according to holding the width of scalding a roll, control electro-magnet magnetic field, the magnetic path is attracted and is changed spacing width, reduces the step of manual regulation, improve equipment's practicality.



**CLAIM 1.** The utility model provides a printing device of gilt antifalsification label of hi-lite holographic, includes support body (1), its characterized in that: the bottom of the frame body (1) is rotatably connected with a first rotating shaft (2), the external transmission of the first rotating shaft (2) is connected with a first transmission belt (3), the inner wall of the first rotating shaft (2) is fixedly connected with an adjusting resistor (4), the internal rotation of the first rotating shaft (2) is connected with a movable rod (5), the movable rod (5) is close to one end fixedly connected with contact (6) of the frame body (1), the other end of the movable rod (5) is rotatably connected with a bearing hot coil (7), the middle part of the frame body (1) is fixedly connected with an electromagnet (8), one end of the frame body (1) close to the electromagnet (8) is rotatably connected with a limiting block (9), the external rotation of the limiting block (9) is connected with a connecting rod group (10), the internal movable connection of the limiting block (9) is provided with a limiting rod (11), the limiting rod (11) is close to one end fixedly connected with a magnetic block (12), the top of support body (1) is rotated and is connected with second pivot (13), the outside transmission of second pivot (13) is connected with cam (15) through second drive belt (14) transmission, spout (16) have been set up to the inside at support body (1) middle part, the inside limit connection of spout (16) has X type pole (17), the inside elastic connection of X type pole (17) has reset spring (18), the top swing joint of X type pole (17) has adjustable shelf (19), the left end fixedly connected with rack (20) of adjustable shelf (19), the tooth end meshing of rack (20) is connected with incomplete gear (21), the inside fixedly connected with third pivot (22) of incomplete gear (21), the outside fixedly connected with thermoprint die head (23) of third pivot (22).

## HOLOGRAPHIC ANTI-COUNTERFEITING MARK HIGH-PRECISION POSITIONING HOT STAMPING DEVICE AND WORKING METHOD THEREOF

The invention relates to the technical field of positioning hot stamping, in particular to a holographic anti-counterfeiting mark high-precision positioning hot stamping device and a working method thereof. Including gilding press organism, dragging material equipment, its characterized in that: the hot stamping machine is characterized in that a fixing plate is arranged on one side of the hot stamping machine body, a Hall high-position sensor, a Hall material dragging sensor and a Hall low-position sensor are arranged on the fixing plate respectively, one end of the fixing plate is provided with a first combined pressing plate, the other end of the first combined pressing plate is connected with one end of a rotating shaft, the other end of the rotating shaft is provided with a first cursor detection point, a second cursor detection point and a third cursor detection point from top to bottom respectively, a second combined pressing plate is arranged on the other end of the fixing plate, material dragging equipment is arranged on one side of the second combined. Compared with the prior art, the hot stamping machine can accurately hot stamp by adding the Hall low-position sensor, the material dragging sensor, the high-position sensor and the corresponding cursor detection point, and the material dragging equipment determines whether to drag the material according to the signal of the Hall material dragging sensor.



**CLAIM 1.** The utility model provides a holographic false proof mark high accuracy location thermoprint device, includes gilding press organism, drags material equipment, its characterized in that: gilding press organism (1) one side be equipped with fixed plate (2), be equipped with hall high level sensor (3) on fixed plate (2) respectively, hall drags material sensor (4), hall low level sensor (5), it is equipped with first clamp plate (6) one end to be located fixed plate (2) one end, axis of rotation (7) one end is connected to first clamp plate (6) other end, axis of rotation (7) other end is from last to being equipped with first cursor check point (8) down respectively, second cursor check point (9), third cursor check point (10), it is equipped with second and closes clamp plate (11) to be located fixed plate (2) other end, second closes clamp plate (11) one side and is equipped with drags material equipment (13), it is equipped with cursor detector (12) to drag material equipment (13) below.

P33338

**PATENT OF THE MONTH**  
**OVD – RELIEF – MICROLENS**

CN112562489

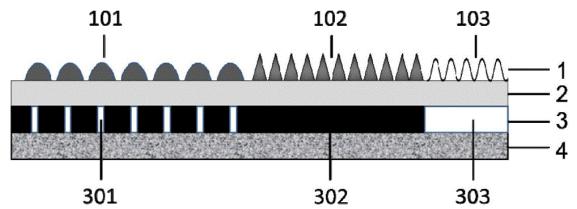
Priority Date: 15/12/2020

WUHAN HUAGONG IMAGE TECHNOLOGY & DEVELOPMENT

**VARIABLE DYNAMIC HOLOGRAPHIC ANTI-COUNTERFEITING MARK AND PREPARATION METHOD THEREOF**

The invention discloses a variable dynamic holographic anti-counterfeiting mark and a preparation method thereof. The variable dynamic holographic anti-counterfeiting mark comprises a microstructure layer, a substrate layer, a metal reflecting layer and a back glue layer which are sequentially arranged from top to bottom, wherein the microstructure layer comprises a holographic anti-counterfeiting area and a micro-lens array area; removing a local reflecting layer in a laser sintering mode in the area of the metal reflecting layer corresponding to the micro-lens array area to form a hollowed-out micro image-text array; the distance between the plane formed by the lens optical centers of the micro lens array and the metal reflecting layer is the focal length of the micro lens array, so that the micro lens array and the micro image-text array jointly show a dynamic image-text effect. The holographic optical anti-counterfeiting technology and the dynamic anti-counterfeiting technology based on the micro-lens array are organically fused together, so that the overall attractive effect is realized, and the multiple anti-counterfeiting technology is also realized.

**CLAIM 1.** A variable dynamic holographic anti-counterfeiting mark comprises a microstructure layer, a substrate layer, a metal reflecting layer and a back glue layer which are sequentially arranged from top to bottom, and is characterized in that the microstructure layer comprises a holographic anti-counterfeiting area and a micro-lens array area; removing a local reflecting layer in a laser sintering mode in the area of the metal reflecting layer corresponding to the micro-lens array area to form a hollowed-out micro image-text array; the distance between the plane formed by the lens optical centers of the micro lens array and the metal reflecting layer is the focal length of the micro lens array, so that the micro lens array and the micro image-text array jointly show a dynamic image-text effect.



P33339

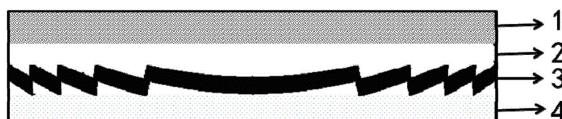
CN112562488

Priority Date: 12/12/2020

WUHAN HUAGONG IMAGE TECHNOLOGY & DEVELOPMENT

**DYNAMIC OPTICALLY VARIABLE ANTI-COUNTERFEITING ELEMENT AND PREPARATION METHOD THEREOF**

The invention provides a dynamic optically variable anti-counterfeiting element which is of a laminated structure and comprises a first resin layer, a second resin layer and a third resin layer, wherein the first resin layer is formed by synthetic resin capable of transmitting light and comprises a first surface and a second surface which are opposite, and the first surface is provided with a micro-groove structure; a light changing layer formed on the first surface of the first resin layer; a base film layer covering the second surface of the first resin layer; the light changing layer is provided with a film interference structure formed by at least two reflecting layers with different transparencies, so that the micro-groove structure can present dynamic optical or light color changing effects under natural light. The method is realized through a coating process, and the process is simple and is easy for batch production.



**CLAIM 1.** A dynamic optically variable security element, characterized in that the security element is a layered structure comprising: a first resin layer (2) formed of a synthetic resin capable of transmitting light, and including a first surface and a second surface opposite to each other, the first surface having a micro-groove structure (304) formed thereon; a light-changing layer (3) formed on the first surface of the first resin layer (2); a base film layer (1) covering the second surface of the first resin layer (2) for protecting the first resin layer (2); wherein, a thin film interference structure formed by at least two reflecting layers with different transparencies is arranged in the light change layer (3), so that the micro-groove structure (304) presents dynamic optical or light color changing effect under natural light; the micro-groove structure (304) is a holographic anti-counterfeiting embossment or a micro-groove array with sequentially increasing or decreasing inclination angles.

P33340

## PRINTING

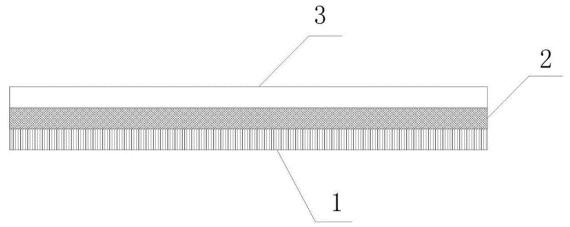
CN112562487

Priority Date: 30/11/2020

SHAANXI YICHENG ANTI COUNTERFEITING PRINTING

### POSITIONING PAPER HOLOGRAPHIC PRINTING COMBINED MARK AND PREPARATION METHOD THEREOF

The invention relates to a positioning paper holographic printing combined mark and a preparation method thereof, wherein the mark comprises the following components: the laser mark comprises a mark body, an ink printing layer and a laser film, wherein the ink printing layer is positioned above the mark body, the laser film is positioned above the ink printing layer, and the ink of the ink printing layer is a mixture of transparent white ink, isopropanol and isolation oil; the preparation method of the mark comprises the following steps: the laser film is manufactured, the ink printing layer is printed on the surface of the mark body, the ink of the ink printing layer is made of a mixture of transparent white ink, isopropanol and isolation oil, the laser film and the ink printing layer are completely pressed, and the laser film and a printed matter are peeled off through ultraviolet drying. The method can display the holographic pattern by using common paper, not damage the pattern printed by the ink, but also can display the laser holographic technology; and the mark is printed by adopting common paper as a raw material, can be naturally degraded after being used, and has no pollution.



P33345

## MANUFACTURING PROCESS

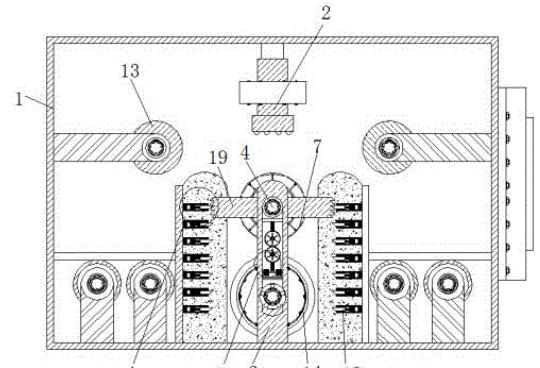
CN112549734

Priority Date: 26/12/2020

CHANGYUAN TEFA TECHNOLOGY

### HOLOGRAPHIC THERMOPRINT CHARACTERISTIC IDENTIFICATION ANTI-COUNTERFEITING MARK AND PREPARATION METHOD THEREOF

The invention relates to the technical field of holographic hot stamping anti-counterfeiting marks and discloses a holographic hot stamping characteristic recognition anti-counterfeiting mark which comprises a shell, wherein a laser device is movably arranged in the shell, a first support is movably arranged in the shell, a first connecting shaft is rotatably connected in the first support, a first fixing piece is rotatably connected to the outer side of the first connecting shaft, an electrode plate is slidably connected in the first fixing piece, and one end of the electrode plate is fixedly connected with a first connecting plate. This holographic thermoprint feature recognition false proof mark and preparation method thereof through the connection of shell, first connecting plate, has solved the simple problem of prior art's holographic thermoprint equipment device, utilizes the electromagnetic induction principle, can adjust the speed of the live-rollers of the ejection of compact and rolling in real time, effectively prevents the skew simultaneously, and material saving, great improvement practicality and reliability improve the impression precision, have avoided the condition of forging easily to take place.



**CLAIM 1.** Holographic thermoprint feature recognition false proof mark, including shell (1), its characterized in that: the laser device (2) is movably mounted inside the shell (1), the first support (3) is movably mounted inside the shell (1), the first connecting shaft (4) is rotatably connected inside the first support (3), the first fixing piece (5) is rotatably connected outside the first connecting shaft (4), the electrode plate (6) is slidably connected inside the first fixing piece (5), the first connecting plate (7) is fixedly connected to one end of the electrode plate (6), the first capacitor (8) is fixedly connected inside the first fixing piece (5), the first rack (9) is arranged outside the first capacitor (8), the first gear (10) is meshed outside the first rack (9), the first shell (11) is rotatably connected outside the first gear (10), the metal rod (12) is rotatably connected outside the first gear (10), the first rotating roller (13) is movably mounted inside the shell (1), the inside of first support (3) rotates and is connected with second live-rollers (14), the inside of second live-rollers (14) rotates and is connected with first magnetic pole (15), the outside of first magnetic pole (15) rotates and is connected with first coil (16), the outside of first support (3) is provided with second coil (17), the outside sliding connection of second coil (17) has second magnetic pole (18), the outside joint of second magnetic pole (18) has first connecting block (19), the inside of first support (3) is provided with third coil (20), the outside of third coil (20) is provided with gasbag (21).

*Click on the title to return to table of contents*

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

**P33207**

**BRAND PROTECTION**

**WO202172006**

Priority Date: 10/09/2019

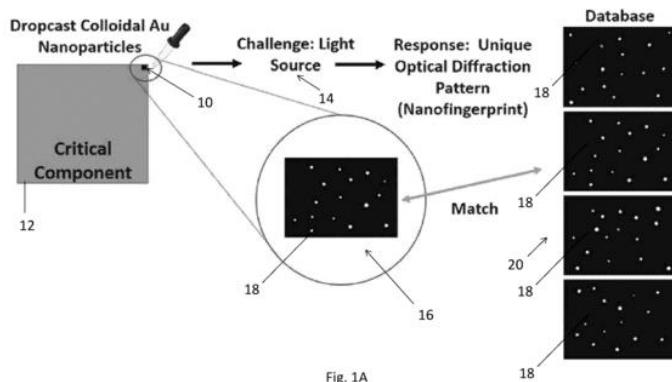
**INDIANA UNIVERSITY**

**SYSTEM AND METHOD OF USING PLASMONIC NANOPARTICLES FOR ANTI-COUNTERFEIT APPLICATIONS**

A method of using at least one nanoparticle for an anti-counterfeit application including selecting the at least one nanoparticle having a non-spherical configuration; providing the at least one nanoparticle on a substrate; providing a light to the at least one nanoparticle; determining a position of the at least one nanoparticle based on providing the light to the at least one nanoparticle; determining a color of the at least one nanoparticle based on providing the light to the at least one nanoparticle; defining a nanofingerprint based on the position and the color of the at least one nanoparticle; and recognizing the nanofingerprint.

**SYSTÈME ET PROCÉDÉ D'UTILISATION DE NANOParticules PLASMONIQUES POUR DES APPLICATIONS ANTI-CONTREFAÇON**

Procédé d'utilisation d'au moins une nanoparticule pour une application anti-contrefaçon consistant à sélectionner ladite nanoparticule ayant une configuration non sphérique ; à placer ladite nanoparticule sur un substrat ; à apporter une lumière à ladite nanoparticule ; à déterminer une position de ladite nanoparticule sur la base de l'apport de la lumière à ladite nanoparticule ; à déterminer une couleur de ladite nanoparticule sur la base de l'apport de la lumière à ladite nanoparticule ; à définir une nano-empreinte sur la base de la position et de la couleur de ladite nanoparticule ; et à reconnaître la nano-empreinte.



**CLAIM 1.** A method of using at least one nanoparticle for an anti-counterfeit application, comprising: selecting the at least one nanoparticle having a non-spherical configuration; providing the at least one nanoparticle on a substrate; providing a light to the at least one nanoparticle; determining a position of the at least one nanoparticle based on providing the light to the at least one nanoparticle; determining a color of the at least one nanoparticle based on providing the light to the at least one nanoparticle; defining a nanofingerprint based on the position and the color of the at least one nanoparticle; and recognizing the nanofingerprint.

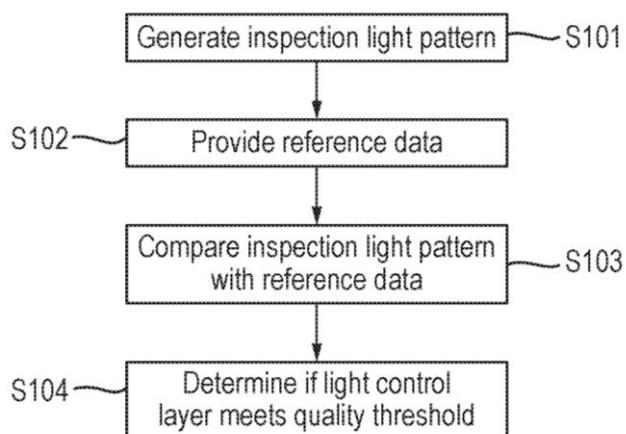
## DE LA RUE INTERNATIONAL

**A METHOD AND APPARATUS FOR INSPECTING A LIGHT CONTROL LAYER FOR A SECURITY DEVICE**

Disclosed herein is a method of inspecting a substantially transparent light control layer for an optically variable security device, said substantially transparent light control layer comprising a surface relief defined by an array of substantially transparent refractive microstructures. The method comprises: directing a beam of substantially collimated light towards a first region that is expected to contain the surface relief of the light control layer so as to generate an inspection light pattern; providing reference data that is indicative of a light control layer that meets a predetermined quality threshold; comparing the inspection light pattern with the reference data; and determining whether the light control layer meets the predetermined quality threshold based on the comparison. A corresponding inspection apparatus is also disclosed.

**PROCÉDÉ ET APPAREIL D'INSPECTION DE COUCHE DE RÉGLAGE DE LUMIÈRE D'UN DISPOSITIF DE SÉCURITÉ**

La présente invention concerne un procédé d'inspection de couche de réglage de lumière sensiblement transparente d'un dispositif de sécurité optiquement variable, ladite couche de réglage de lumière sensiblement transparente présentant un relief de surface défini par un réseau de microstructures de réfraction sensiblement transparentes. Le procédé consiste : à diriger un faisceau de lumière sensiblement collimatée vers une première région qui est censée comporter le relief de surface de la couche de réglage de lumière de façon à générer un motif de lumière d'inspection ; à fournir des données de référence qui sont indicatives d'une couche de réglage de lumière qui satisfait à un seuil de qualité prédéterminé ; à comparer le motif de lumière d'inspection aux données de référence ; et à déterminer si la couche de réglage de lumière satisfait au seuil de qualité prédéterminé ou non en fonction de la comparaison. Un appareil d'inspection correspondant est également divulgué.



**CLAIM 1.** A method of inspecting a substantially transparent light control layer for an optically variable security device, said substantially transparent light control layer comprising a surface relief defined by an array of substantially transparent refractive microstructures, the method comprising: directing a beam of substantially collimated light towards a first region that is expected to contain the surface relief of the light control layer so as to generate an inspection light pattern; providing reference data that is indicative of a light control layer that meets a predetermined quality threshold; comparing the inspection light pattern with the reference data; and determining whether the light control layer meets the predetermined quality threshold based on the comparison.

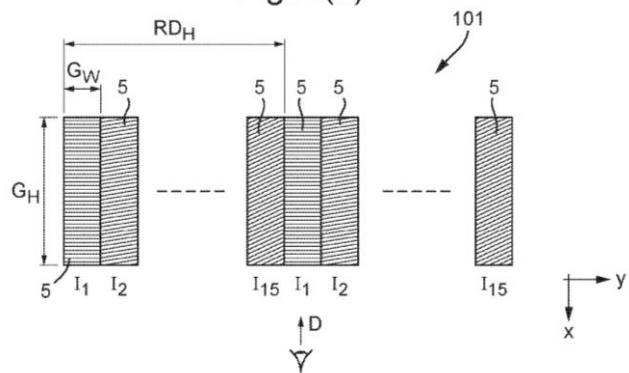
**OPTICAL DEVICE AND METHOD OF MANUFACTURE THEREOF**

An optical device is disclosed. Upon illumination, the optical device exhibits one or more diffractive images dependent upon viewing angle, said optical device having a diffractive structure comprising a plurality of grating regions, each grating region corresponding to a component of a respective diffractive image, wherein: each grating region of the diffractive structure comprises a plurality of grating elements arranged along a respective first direction, each grating element having a principal component of orientation within the plane of the device that is substantially orthogonal to said respective first direction; wherein, the grating elements within each grating region have a constant pitch and substantially the same orientation such that each grating region, upon illumination, exhibits a diffractive colour such that the corresponding diffractive image is exhibited; wherein, the diffractive structure comprises first and second grating regions that are both elongate along a common first direction, said first and second grating regions being adjacent along said common first direction, and wherein the pitch and/or orientation of the grating elements of the first and second grating regions are different. A method of forming the optical device is also disclosed.

**DISPOSITIF OPTIQUE ET SON PROCÉDÉ DE FABRICATION**

L'invention concerne un dispositif optique. Lors de l'éclairage, le dispositif optique présente une ou plusieurs images de diffraction qui dépendent d'un angle de vision, ledit dispositif optique ayant une structure de diffraction comportant une pluralité de régions de réseau, chaque région de réseau correspondant à une composante d'une image de diffraction respective : chaque région de réseau de la structure de diffraction comportant une pluralité d'éléments de réseau agencés dans une première direction respective, chaque élément de réseau ayant une composante principale d'orientation dans le plan du dispositif qui est sensiblement orthogonale à ladite première direction respective ; les éléments de réseau dans chaque région de réseau ayant un pas constant et sensiblement la même orientation de telle sorte que chaque région de réseau, lors de l'éclairage, présente une couleur de diffraction de sorte que l'image de diffraction correspondante est présentée ; la structure de diffraction comportant des première et seconde régions de réseau qui sont toutes deux allongées dans une première direction commune, lesdites première et seconde régions de réseau étant adjacentes dans ladite première direction commune, et le pas et/ou l'orientation des éléments de réseau des première et seconde régions de réseau étant différents. L'invention concerne également un procédé de formation du dispositif optique.

Fig. 2(b)



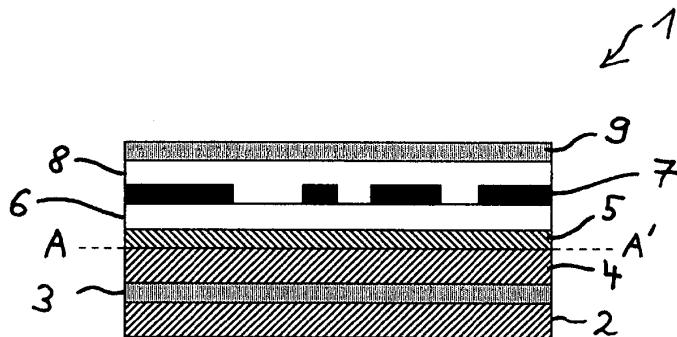
**CLAIM 1.** An optical device that, upon illumination, exhibits one or more diffractive images dependent upon viewing angle, said optical device having a diffractive structure comprising a plurality of grating regions, each grating region corresponding to a component of a respective diffractive image, wherein: each grating region of the diffractive structure comprises a plurality of grating elements arranged along a respective first direction, each grating element having a principal component of orientation within the plane of the device that is substantially orthogonal to said respective first direction; wherein, the grating elements within each grating region have a constant pitch and substantially the same orientation such that each grating region, upon illumination, exhibits a diffractive colour such that the corresponding diffractive image is exhibited; wherein, the diffractive structure comprises first and second grating regions that are both elongate along a common first direction, said first and second grating regions being adjacent along said common first direction, and wherein the pitch and/or orientation of the grating elements of the first and second grating regions are different.

**SECURITY ELEMENT TRANSFER MATERIAL, METHOD FOR THE PRODUCTION THEREOF AND USE THEREOF**

The invention relates to a security element transfer material comprising a security element layer composite having a plurality of layers, to which at least one feature layer belongs, and a temporary carrier, which is separably connected to the viewing layer of the security element layer composite, wherein the temporary carrier has a carrier substrate, namely a plastic film, and the carrier substrate is provided with a plastic layer produced by coextrusion.

**MATÉRIAUX DE TRANSFERT D'ÉLÉMENT DE SÉCURITÉ, SON PROCÉDÉ DE FABRICATION ET UTILISATION**

L'invention concerne un matériau de transfert d'élément de sécurité comprenant un stratifié d'éléments de sécurité comportant une pluralité de couches et, parmi ces couches, au moins une couche caractéristique, et un support temporaire qui est relié amovible à la couche visible du stratifié d'éléments de sécurité, le support temporaire comprenant un substrat, à savoir un film plastique, et le substrat étant doté d'une couche de plastique générée par coextrusion.



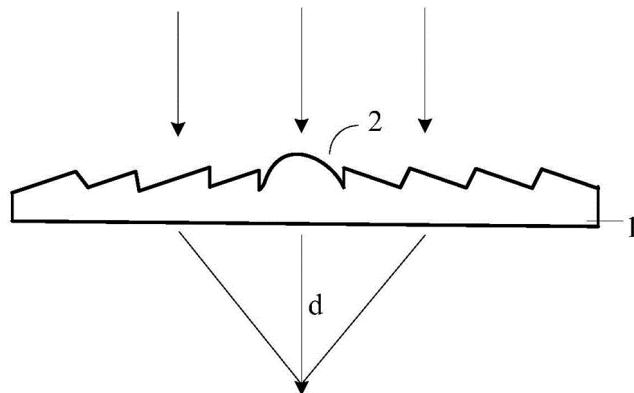
**CLAIM 1.** A security element transfer material (1) comprising - a security element layer composite comprising a plurality of layers including at least an adhesive layer (9), a feature layer (6; 7) and a viewing layer (5), wherein the viewing layer is the layer, after the transfer of a security element (34) to an object of value (33), faces a viewer, and - a temporary carrier which is separably connected to the viewing layer (5) of the security element layer composite, characterized in that Characterized in that - the temporary carrier has at least one first temporary carrier substrate (4), namely a plastic film; and - the viewing layer (5) of the security element layer composite is present on the first temporary carrier substrate (4) in the form of a plastic layer produced on the first temporary carrier substrate (4) by coextrusion and having a slight adhesion capability.

**OPTICAL ANTI-COUNTERFEITING ELEMENT AND ANTI-COUNTERFEITING PRODUCT**

The invention relates to the field of optical anti-counterfeiting and discloses an optical anti-counterfeiting element and an anti-counterfeiting product. The optical security element comprises: a substrate; and a plurality of Fresnel structures with preset transverse dimensions formed on the substrate, wherein the Fresnel structures are used for forming preset image-text information in a transmission direction under the irradiation of a preset light source and presenting the preset image-text information with a relief effect in a reflection direction. The preset pattern can be reappeared from the transmission direction under the irradiation of portable light sources such as a mobile phone flash lamp and the like, and the embossment effect is shown from the reflection direction, so that the anti-counterfeiting capacity and the identification degree are improved, and the identification process is simple.

**ÉLÉMENT ANTI-CONTREFAÇON OPTIQUE ET PRODUIT ANTI-CONTREFAÇON**

L'invention concerne un élément anti-contrefaçon optique et un produit anti-contrefaçon, l'élément anti-contrefaçon optique comprenant : un substrat (1) ; et une pluralité de structures de Fresnel (2) possédant des dimensions latérales prédéfinies formées sur le substrat (1), la pluralité de structures de Fresnel (2), lorsqu'elle sont illuminées par une source de lumière prédefinie, étant utilisées pour former des informations graphiques prédefinies dans la direction de transmission, et pour présenter les informations graphiques prédefinies avec un effet de relief dans la direction de réflexion. L'élément anti-contrefaçon optique, lorsqu'il est illuminé, reproduit un motif prédefini à partir de la direction de transmission, et présente un effet de relief à partir de la direction de réflexion. L'élément améliore la reconnaissance et la capacité anti-contrefaçon, et possède un processus d'identification simple.



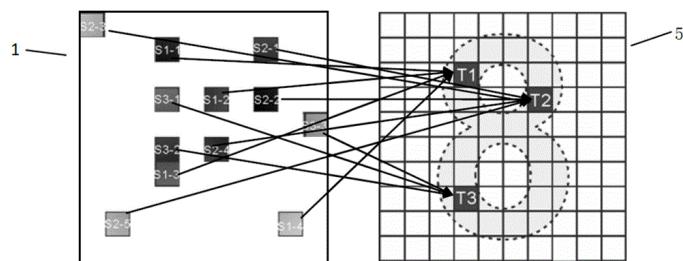
**CLAIM 1.** An optical security element, comprising: a substrate; and the Fresnel structures are formed on the substrate and have preset transverse dimensions, and the Fresnel structures are used for forming preset image-text information in a transmission direction under the irradiation of a preset light source and presenting the preset image-text information with a relief effect in a reflection direction.

**OPTICAL ANTI-COUNTERFEITING ELEMENT AND ANTI-COUNTERFEITING PRODUCT**

The invention relates to the field of optical anti-counterfeiting and discloses an optical anti-counterfeiting element and an anti-counterfeiting product. The optical security element comprises: a substrate; a plurality of reflective facets formed on the substrate for reflecting and/or transmitting incident light to a predetermined position to present predetermined graphic information at the predetermined position; and the color modulation structure is formed on the reflecting facet and used for modulating the color of the light rays reflected and/or transmitted by the reflecting facet so as to enable the preset image-text information to present a preset color. The invention can reproduce colorful preset patterns under the irradiation of white light, and improves the anti-counterfeiting capability and the identification degree, thereby realizing an optical anti-counterfeiting element which is easy to identify and difficult to forge.

**ÉLÉMENT ANTI-CONTREFAÇON OPTIQUE ET PRODUIT ANTI-CONTREFAÇON**

Un élément anti-contrefaçon optique et un produit anti-contrefaçon sont divulgués. L'élément anti-contrefaçon optique comprend : un substrat (2) ; une pluralité de facettes réfléchissantes (3) formée sur le substrat et utilisée pour réfléchir et/ou transmettre une lumière incidente vers une position pré définie de manière à présenter des informations graphiques et de texture pré définies à la position pré définie ; et une structure de modulation de couleur (4) formée sur les facettes réfléchissantes et utilisées pour moduler la couleur de la lumière réfléchie et/ou transmise par les facettes réfléchissantes, de telle sorte que les informations graphiques et de texture pré définies présentent une couleur pré définie. La présente invention peut reproduire un motif pré défini de couleur sous l'effet de l'irradiation de lumière blanche, améliorant la capacité anti-contrefaçon et le degré de reconnaissance.



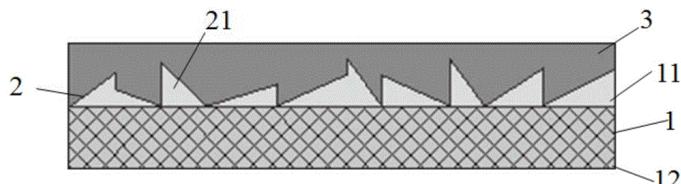
**CLAIM 1.** An optical security element, comprising: a substrate; a plurality of reflective facets formed on the substrate for reflecting and/or transmitting incident light to a predetermined position to present predetermined graphic information at the predetermined position; and the color modulation structure is formed on the reflecting facet and used for modulating the color of the light rays reflected and/or transmitted by the reflecting facet so as to enable the preset image-text information to present a preset color.

**OPTICAL ANTI-COUNTERFEITING ELEMENT AND ANTI-COUNTERFEITING PRODUCT**

The embodiment of the invention provides an optical anti-counterfeiting element and an anti-counterfeiting product, and belongs to the technical field of anti-counterfeiting. The optical security element comprises: a substrate comprising a first surface and a second surface opposite to each other; the surface micro-structure layer is formed on at least one part of the first surface of the substrate, at least part of the surface micro-structure layer comprises at least a first set of micro prisms, and the micro prisms have refraction and reflection functions at the same time, wherein each pixel of a first pattern corresponds to one or more micro prism refraction illumination light spots in the first set of micro prisms, so that when the optical anti-counterfeiting element is illuminated on one side of the optical anti-counterfeiting element, the reproduced first pattern can be observed through the receiving carrier at a specific distance on the other side, and in addition, the floating or sinking virtual images of the first pattern can be directly observed on two sides of the optical anti-counterfeiting element respectively. The optical anti-counterfeiting element can provide various anti-counterfeiting effects and improve the anti-counterfeiting performance of the anti-counterfeiting element.

**ÉLÉMENT ANTI-CONTREFAÇON OPTIQUE ET PRODUIT ANTI-CONTREFAÇON**

Un élément anti-contrefaçon optique et un produit anti-contrefaçon sont divulgués. L'élément anti-contrefaçon optique comprend : un substrat (1), qui comprend une première surface (11) et une seconde surface (12) qui sont opposées l'une à l'autre ; et une couche de microstructure de surface (2) qui est formée sur au moins une partie de la première surface (11) du substrat (1). Au moins une partie de la couche de microstructure de surface (2) comprend un premier ensemble d'au moins un micro-prisme (21), et le micro-prisme (21) est simultanément pourvu d'un indice de réfraction et d'une fonction réfléchissante. Chaque pixel d'un premier motif correspond à un ou plusieurs points d'éclairage de réfraction de micro-prisme dans le premier ensemble de micro-prismes (21) de sorte que, lorsqu'un côté d'un élément anti-contrefaçon optique éclaire l'élément anti-contrefaçon optique, un premier motif reproduit peut être observé au moyen d'un support de réception à une distance spécifique de l'autre côté, et une image virtuelle flottante ou enfoncée du premier motif peut être directement observée depuis les deux côtés de l'élément anti-contrefaçon optique, respectivement. L'élément anti-contrefaçon optique décrit peut fournir divers effets anti-contrefaçon et améliorer les performances anti-contrefaçon de l'élément anti-contrefaçon.



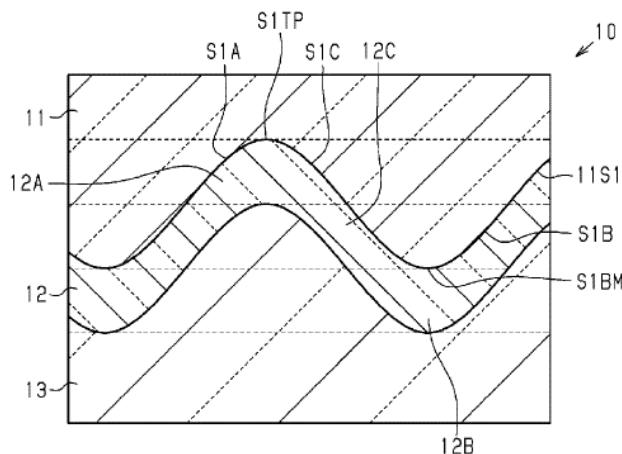
**CLAIM 1.** An optical security element comprising: a substrate comprising a first surface and a second surface opposite to each other; a surface microstructure layer formed on at least a portion of the first surface of the substrate, at least a portion of the surface microstructure layer including at least a first set of microprisms having both refractive and reflective functionality, wherein each pixel of the first pattern corresponds to a refracted illumination spot of one or more microprisms of the first set of microprisms such that: the refracted illumination spots of the first set of microprisms form the first pattern on a receiver carrier in a plane at a first distance from the second surface when the optical security element is illuminated at a first side of the optical security element; the refracted illumination spots of the first set of microprisms form the first pattern on a receiver carrier in a plane at a second distance from the first surface when illuminating the optical security element at a second side of the optical security element; and a virtual image of the first pattern is observable at the first side and the second side of the optical security element respectively, the first side is the side where the first surface is located, and the second side is the side where the second surface is located.

## COLOR DISPLAY BODY, AUTHENTICATION MEDIUM AND AUTHENTICITY DETERMINATION METHOD OF COLOR DISPLAY BODY

A forming mold includes a first wavy surface on part or all of a surface contacting a deposited film. The period of waves on a wavy surface is within the range 250-500 nm. The deposited film follows the surface of the forming mold. The first wavy surface includes multiple rib surfaces, multiple groove surfaces, and multiple taper surfaces that connect the rib surfaces and the groove surfaces. The deposited film includes a peak zone, a valley zone and a transition zone. The thickness and/or volume density of one of the peak zone, the valley zone and the transition zone is different from the thickness and/or the volume density of another of the peak zone, the valley zone and the transition zone, or, one of the peak zone, the valley zone and the transition zone contains portions having mutually different thicknesses and/or volume densities.

## CORPS D'AFFICHAGE COULEUR, SUPPORT D'AUTHENTIFICATION ET PROCÉDÉ DE DÉTERMINATION D'AUTHENTICITÉ DE CORPS D'AFFICHAGE COULEUR

Selon l'invention, un moule de formage comprend une première surface ondulée sur une partie ou la totalité d'une surface en contact avec un film déposé. La période d'ondes sur une surface ondulée est dans la plage de 250 à 500 nm. Le film déposé suit la surface du moule de formage. La première surface ondulée comprend de multiples surfaces de nervure, de multiples surfaces de rainure, et de multiples surfaces effilées qui relient les surfaces de nervure et les surfaces de rainure. Le film déposé comprend une zone de crête, une zone de vallée et une zone de transition. L'épaisseur et/ou la densité volumique de l'une de la zone de crête, de la zone de vallée et de la zone de transition étant différente de l'épaisseur et/ou de la densité volumique d'une autre de la zone de crête, de la zone de vallée et de la zone de transition, ou l'une de la zone de crête, de la zone de vallée et de la zone de transition contient des parties ayant des épaisseurs et/ou des densités volumiques mutuellement différentes.



**CLAIM 1.** A color display comprising: a forming mold having optical transparency; a deposition film having optical transparency and located on the forming mold; and a plastic protection having optical transparency and located on the deposition film, wherein the forming mold has a first refractive index, the plastic protection has a third refractive index, the deposition film has a second refractive index, and the second refractive index is such that: The first refractive index and the third refractive index, the formation mold includes a first corrugated surface on a portion or an entirety of a surface in contact with the deposited film, a wave period of the first corrugated surface is in a range from 250 nm to 500 nm, the deposited film follows the surface of the formation mold, and the first corrugated surface includes a plurality of rib surfaces, A plurality of groove surfaces; and a plurality of tapered surfaces that connect the rib surfaces and the groove surfaces, wherein the deposited film includes a peak zone contacting the rib surfaces, and a valley zone contacting the groove surfaces; And a transition zone tangent to the tapered surface, wherein at least one of a thickness and a volumetric density of one of the peak zone, the valley zone, and the transition zone is such that: Portions different from the at least one of a thickness and a volumetric density of another one of the peak zone, the valley zone, and the transition zone, or one of the peak zone, the valley zone, and the transition zone differs from each other in at least one of a thickness and a volumetric density.

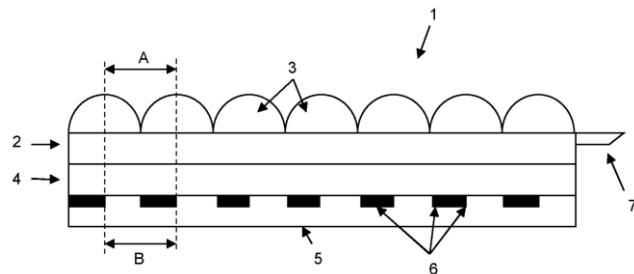
## OPTRICAL

## IMPROVEMENTS IN AND RELATING TO SECURITY DEVICES

A security device (1) comprising an optically transparent layer (3) including a repeating first array of separate optical focussing elements (3) (e.g. having translational symmetry) wherein a pitch distance between repeated elements in the first array is a first pitch value (A). The device also includes a repeating second array of separate image elements (6) (e.g. having translational symmetry) collectively defining an image viewable through the first part. The device is structured such that a pitch distance between repeated or successive elements in the second array is a second pitch value (B) wherein the ratio (A/B) of the first pitch value and the second pitch value has a value,  $A/B = n \pm \Delta$ , that differs from a positive integer value, n, according to an absolute difference,  $\Delta$ , not exceeding 0.01 and not less than 0.001.

## AMÉLIORATIONS APPORTÉES À DES DISPOSITIFS DE SÉCURITÉ ET ASSOCIÉES À CEUX-CI

La présente invention concerne un dispositif de sécurité (1) comprenant une couche optiquement transparente (3) comprenant un premier réseau répété d'éléments de focalisation optique distincts (3) (présentant par exemple une symétrie de translation), une distance de pas entre des éléments répétés dans le premier réseau étant une première valeur de pas (A). Le dispositif comprend également un second réseau répété d'éléments d'image distincts (6) (présentant par exemple une symétrie de translation) définissant collectivement une image visible à travers la première partie. Le dispositif est structuré de sorte qu'une distance de pas entre des éléments répétés ou successifs dans le second réseau est une seconde valeur de pas (B), le rapport (A/B) entre la première valeur de pas et la seconde valeur de pas présentant une valeur,  $A/B = n \pm \Delta$ , qui diffère d'une valeur de nombre entier positif, n, selon une différence absolue,  $\Delta$ , non supérieure à 0,01 et non inférieure à 0,001.



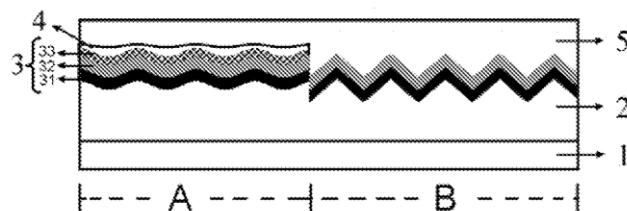
**CLAIM 1.** A security device comprising: an optically transparent layer including a repeating first array of separate optical focussing elements comprising lenticular lenses having translational symmetry wherein a pitch distance between repeated elements in the first array is a first pitch value (A); a repeating second array of separate image elements having translational symmetry and collectively defining an image viewable through the first part wherein a pitch distance between repeated elements in the second array is a second pitch value (B) wherein the ratio (A/B) of the first pitch value and the second pitch value has a value  $A/B = n \pm \Delta$ , that differs from a positive integer value, n, according to an absolute difference,  $\Delta$ , not exceeding 0.01 and not less than 0.001 .

## MULTILAYER BODY OPTICAL ANTI-COUNTERFEITING ELEMENT AND FABRICATION METHOD THEREFOR

Provided are an optical anti-counterfeiting element and a fabrication method therefor. The optical anti-counterfeiting element comprising: an undulating structure layer (2), which comprises: a first region (A) having a first microstructure and a second region (B) having a second microstructure, the specific volume of the second microstructure being greater than the specific volume of the first microstructure; and a first plating layer (31), a dielectric layer (32), a second plating layer (33) and a protective layer (4) which are sequentially stacked on one side of the undulating structure layer (2), the first plating layer (31) and the dielectric layer (32) being located in the first region (A) and the second region (B), while the second plating layer (33) and the protective layer (4) are located in the first region (A) but not in the second region (B). The first plating layer (31), the dielectric layer (32) and the second plating layer (33) constitute a functional plating layer group (3), and the functional plating layer group (3) and the first microstructure have combined optical features in the first region (A), and the first plating layer (31) and the second microstructure have combined optical features in the second region (B).

## ÉLÉMENT ANTI-CONTREFAÇON OPTIQUE À CORPS MULTICOUCHE ET SON PROCÉDÉ DE FABRICATION

La présente invention concerne un élément anti-contrefaçon optique et son procédé de fabrication. L'élément anti-contrefaçon optique comprend : une couche de structure ondulée (2), qui comprend : une première région (A) ayant une première microstructure et une seconde région (B) ayant une seconde microstructure, le volume spécifique de la seconde microstructure étant supérieur au volume spécifique de la première microstructure ; et une première couche de placage (31), une couche diélectrique (32), une seconde couche de placage (33) et une couche de protection (4) qui sont empilées de manière séquentielle sur un côté de la couche de structure ondulée (2), la première couche de placage (31) et la couche diélectrique (32) étant situées dans la première région (A) et la seconde région (B), tandis que la seconde couche de placage (33) et la couche de protection (4) sont situées dans la première région (A) mais pas dans la seconde région (B). La première couche de placage (31), la couche diélectrique (32) et la seconde couche de placage (33) constituent un groupe de couches de placage fonctionnel (3), et le groupe de couches de placage fonctionnel (3) et la première microstructure ont des caractéristiques optiques combinées dans la première région (A), et la première couche de placage (31) et la seconde microstructure ont des caractéristiques optiques combinées dans la seconde région (B).



**CLAIM 1.** An optical security element, characterized in that, the optical security element comprises: An undulating structural layer (2); The undulating structural layer (2) comprises a first region (A) having a first microstructure and a second region (B), having a second microstructure having a specific volume greater than the specific volume of the first microstructure. The undulating structure layer (2) has on one side a first plating layer (31), a dielectric layer (32), a second plating layer (33) and a protective layer (4); laminated in this order. The first coating (31) and the dielectric layer (32) are located in the first region (A) and in the second region (B), The second coating (33) and the protective layer (4) are located in the first region (A) and not in the second region (B); Wherein, said first coating (31), said dielectric layer (32) and said second coating (33) constitute a functional coating group (3), said functional coating group (3) and said first microstructure have bonded optical characteristics in said first region (A), said first coating (31) and said second microstructure have bonded optical characteristics in said second region (B).

P33234

## BANKNOTE – CARD – MAGNETIC PIGMENT – WINDOW

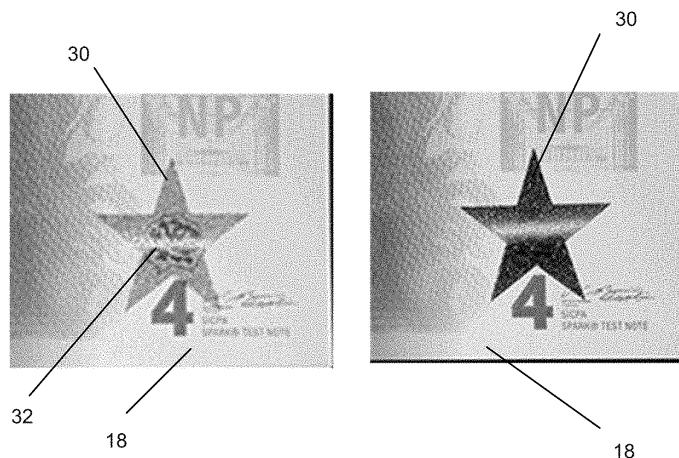
US20210101402

Priority Date: 10/08/2019

VIAVI SOLUTIONS

### SECURITY PIGMENT AND OPTICAL SECURITY ELEMENT

An article including a substrate; and a composition on the substrate, the composition including a liquid medium, and a semi-transparent magnetic pigment including a semi-transparent, metallic, magnetic material and a dielectric material used as a light interference cavity is disclosed, A method of making the article is also disclosed.



**CLAIM 1.** An article comprising: a substrate; and a composition on the substrate, the composition including a liquid medium, and a semi-transparent magnetic pigment including a semi-transparent, metallic magnetic material and a dielectric material used as a light interference cavity.

P33239

## PRINTING – MAGNETIC INK

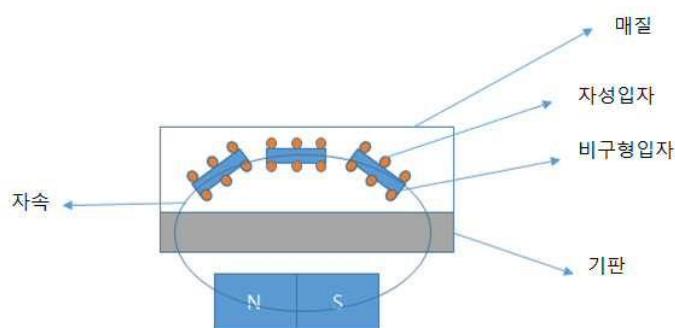
KR20210037976

Priority Date: 30/09/2019

NANO BRICK

### A METHOD OF MANUFACTURING A FORGERY AND TAMPER-RESISTANT DEVICE.

The present invention relates to a method for manufacturing a forgery and tampering prevention device, and more particularly, to a method for manufacturing a forgery and tampering prevention device, the method including preparing non-magnetic particles and magnetic or magnetizable particles, Preparing a dispersion solution by dispersing the composite in a medium cured by light energy or thermal energy, and printing or applying the dispersion solution to a specific region of a substrate.



**CLAIM 1.** A method of manufacturing a magnetic particle, the method comprising: preparing a non-magnetic particle and a magnetic or magnetizable particle whose optical characteristics change according to a viewing angle; Preparing a dispersion solution by dispersing the composite in a medium cured by light energy or thermal energy; and printing or applying the dispersion solution to a specific area of a substrate.

P33244

## PRINTING – LABEL – RELIEF – MICROLENS

JP2021059025

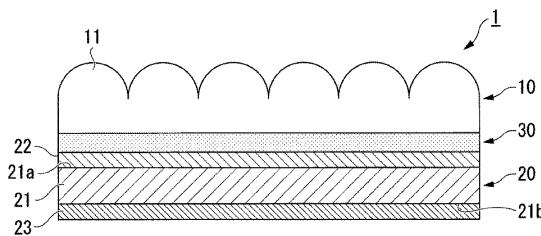
Priority Date: 10/03/2019

TOPPAN INFOMEDIA

### SECURITY LABEL

TOPIC: To provide a security label that can be manufactured at a much lower cost while exhibiting a visual effect equivalent to that of a hologram.

INVENTION: a security label (1) includes a lenticular lens sheet (10) having a plurality of cylindrical lenses (11), and a reflective printing layer (22) having metallic luster, the reflective printing layer (22) being provided below the lenticular lens sheet (10) so as to correspond to the cylindrical lenses (11).



**CLAIM 1.** A security label comprising: a lenticular lens sheet including a plurality of cylindrical lenses; and a reflective printing layer provided below the lenticular lens sheet to correspond to the cylindrical lenses and having metallic luster.

P33245

## PRINTING – IRISATION – PHOTOCROMIC PEARL PIGMENT

JP2021059024

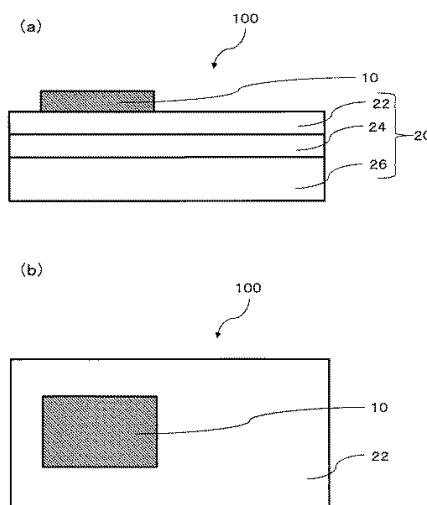
Priority Date: 10/03/2019

KYODO PRINTING

### PRINTING MEDIUM

TOPIC: To provide a novel printing medium that does not impede reading of printing on a thermosensitive recording sheet and has good anti-counterfeiting properties.

INVENTION: a printing medium 100 of the present invention includes a thermosensitive recording sheet 20 and a photoluminescent printing layer 10 on the thermosensitive recording sheet 20, where the photoluminescent printing layer 10 contains a photochromic pearl pigment, a synthetic mica non-colored pearl pigment, and a binder resin.



**CLAIM 1.** A printing medium comprising: a thermosensitive recording sheet; and a photoluminescent printing layer on the thermosensitive recording sheet, the photoluminescent printing layer containing a photochromic pearl pigment, a synthetic mica non-colored pearl pigment, and a binder resin.

P33260

## PRINTING – CARD – RELIEF – MICROLENS

JP2021045910

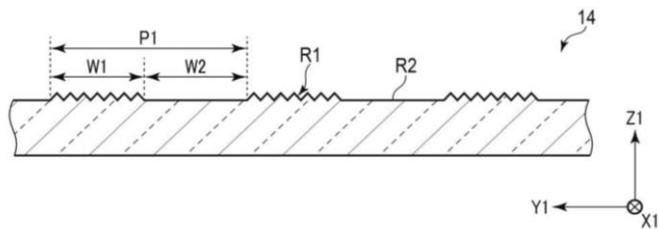
Priority Date: 19/09/2019

TOPPAN PRINTING

### VISUALIZER WITH GUIDE, DISPLAY KIT, LIGHT TRANSMISSION LAYER, AND MOLD

TOPIC: To provide a visualized body that does not significantly reduce the visibility of a visible image even when a concealing pattern overlaps with a print pattern of the visible image.

INVENTION: a visualization member with a guide according to the present invention includes a plurality of strip-shaped regions regularly arranged in a width direction, and is superimposed on a display member in which a latent image to be visualized when partially concealed is recorded in the plurality of strip-shaped regions. The visualizer with a guide includes first and second regions R1, R2 each having a shape elongated in a first direction and alternately and regularly arranged in a second direction intersecting the first direction; A light deflecting structure having light deflectability is provided in each of the first regions R1, and each of the second regions R2 includes a light-transmissive layer 14, which is a transparent region having a flat front surface and a flat back surface.



**CLAIM 1.** A display device comprising a plurality of strip-shaped regions regularly arranged in a width direction, wherein a latent image that is revealed when partially concealed is superimposed on a display member recorded in the plurality of strip-shaped regions, and A visualized member with a guide for visualizing the latent image of the display member, wherein the visualized member includes first and second regions each having a shape elongated in a first direction and alternately and regularly arranged in a second direction intersecting the first direction, and each of the first regions includes: A light deflecting structure having light deflectability is provided, and each of the second regions is a transparent region having a flat front surface and a flat back surface; A guide part for aligning the display member with respect to the light transmissive layer such that the plurality of strip-shaped regions face portions of the light transmissive layer corresponding to the first and second regions and such that a length direction of the strip-shaped regions coincides with the first direction.

P33266

## BANKNOTE – CARD

EP3800063

Priority Date: 10/03/2019

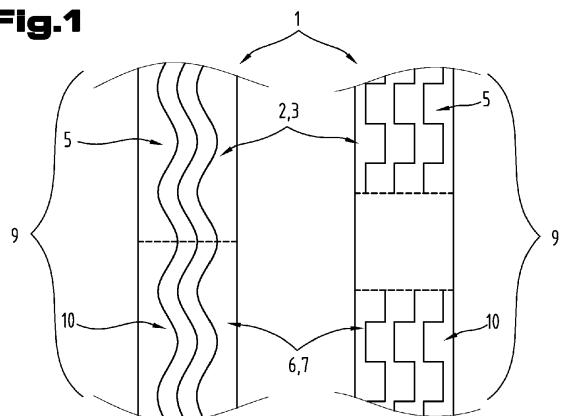
HUECK FOLIEN

### SECURITY ELEMENT FOR SECURITIES OR SECURITY PAPERS

The invention relates to a security element (1) for securities or security papers, wherein the security element (1) has a first structure region (2) with first structures (3) which generate a first movement image (5) when the security element (1) is tilted about a first axis (4), characterized in that the security element (1) has at least one second structure region (6) with second structures (7) which generate a second movement image (10) when the security element is tilted about a second axis (8).

**CLAIM 1.** A security element (1) for papers of value or security papers, wherein the security element (1) has a first structure region (2) with first structures (3) that generate a first movement image (5) when the security element (1) is tilted about a first axis (4), characterized in that the security element (1) has at least one second structure region (6) with second structures (7) which generate a second movement image (10) when the security element is tilted about a second axis (8).

**Fig.1**

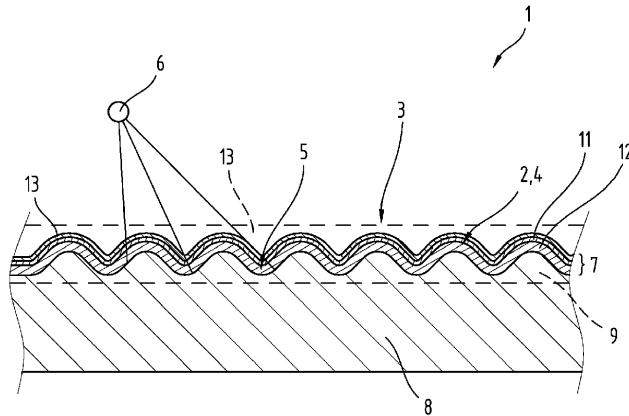


**SECURITY ELEMENT COMPRISING AN OPTICAL EFFECT LAYER FORMED AS A THIN FILM ELEMENT**

The invention relates to a security element (1) with increased security against forgery, which has at least one first region (2) with structures (4). The structures (4) reflect an image motif (5) into different spatial regions, so that a movement image is produced for the observer with a corresponding movement of a light source (6) and/or with a change in an observation angle. The movement of the light source (6) and/or a change in the observation angle simultaneously results in a movement of the image motif (5). Furthermore, an optical effect layer (7) is provided which defines a second region (3). The optical effect layer (7) is embodied as a thin-film element, the structures (4) being completely or partially covered by the optical effect layer (7).

**ÉLÉMENT DE SÉCURITÉ DOTÉ D'UNE COUCHE À EFFET OPTIQUE CONÇUE SOUS LA FORME D'ÉLÉMENT À COUCHE MINCE**

L'invention concerne un élément de sécurité (1) présentant une protection accrue contre la contrefaçon, qui a au moins une première zone (2) avec des structures (4). Les structures (4) réfléchissent un motif d'image (5) dans différentes zones spatiales de telle sorte qu'une image de mouvement est créée pour l'observateur lorsqu'une source de lumière (6) est déplacée en conséquence et/ ou lorsqu'un angle d'observation est modifié. Lorsque la source de lumière (6) se déplace et/ ou l'angle d'observation change, le motif d'image (5) se déplace en même temps. L'invention concerne en outre une couche à effet optique (7) qui définit une seconde zone (3). La couche à effet optique (7) est réalisée sous la forme d'un élément à couche mince, moyennant quoi les structures (4) sont entièrement ou partiellement recouvertes par la couche à effet optique (7).



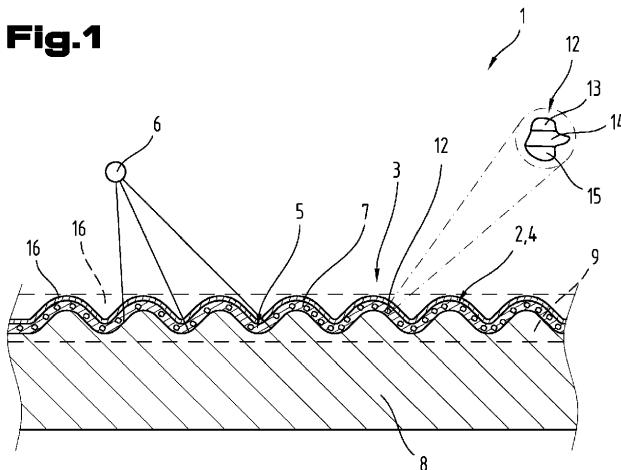
**CLAIM 1.** A security element (1), in particular for papers of value, security paper or security objects, such as banknotes, identity cards, credit cards, banknote cards, Tickets, wherein the security element (1) has at least one first region (2) with structures (4), and the structures (4) reflect an image motif (5) into different spatial regions, such that a movement image is produced for the viewer with a corresponding movement of a light source (6) and/or with a change in an observation angle, wherein a movement of the image motif (5) is produced simultaneously with a movement of the light source (6) and/or a change in the observation angle, characterized in that, - characterized in that an optical effect layer (7) is provided, which optical effect layer (7) defines at least one second region (3), - characterized in that the optical effect layer (7) is formed as a thin film element, and - characterized in that the structures (4) are covered over the entire surface or partially by the optical effect layer (7).

**SECURITY ELEMENT WITH AN OPTICAL EFFECT LAYER**

The invention relates to a security element (1) with increased security against forgery, which has at least one first region (2) with structures (4). The structures (4) reflect an image motif (5) into different spatial regions, so that a movement image is produced for the observer with a corresponding movement of a light source (6) and/or with a change in an observation angle. The movement of the light source (6) and/or a change in the observation angle simultaneously results in a movement of the image motif (5). Furthermore, an optical effect layer (7) is provided which defines a second region (3). The structures (4) are completely or partially covered by the optical effect layer (7).

**ÉLÉMENT DE SÉCURITÉ DOTÉ D'UNE COUCHE À EFFET OPTIQUE**

L'invention concerne un élément de sécurité (1) ayant une sécurité contre la falsification améliorée, présentant au moins une première zone (2) dotée de structures (4). Les structures (4) réfléchissent un motif d'image (5) dans différentes zones spatiales de telle sorte qu'une image cinématique se forme à l'attention de l'observateur lors d'un mouvement correspondant d'une source de lumière (6) et/ou lors de la modification de l'angle d'observation. Un mouvement de la source de lumière (6) et/ou une modification de l'angle d'observation s'accompagne d'un mouvement du motif d'image (5). Par ailleurs une couche à effet optique (7) est présente et définit une seconde zone (3). Les structures (4) sont entièrement ou partiellement recouvertes par la couche à effet optique (7).

**Fig.1**

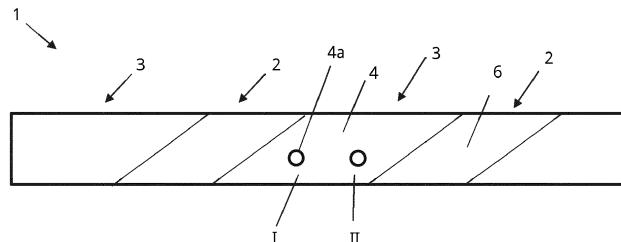
**CLAIM 1.** A security element (1), in particular for papers of value, security paper or security objects, such as banknotes, identity cards, credit cards, banknote cards, Tickets, wherein the security element has at least one first region (2) with structures (4), and the structures (4) reflect an image motif (5) into different spatial regions, such that a movement image is produced for the viewer with a corresponding movement of a light source (6) and/or with a change in an observation angle, wherein a movement of the image motif (5) is produced simultaneously with a movement of the light source (6) and/or a change in the observation angle, characterized in that, - characterized in that an optical effect layer (7) is provided, which optical effect layer (7) defines a second region (3) and - characterized in that the structures (4) are covered over the entire surface or partially by the optical effect layer (7).

**SECURITY ELEMENT WITH AT LEAST ONE COLOUR CHANGE AREA**

The invention relates to a security element (1) for securities or security papers, wherein the security element (1) has at least one first color-shifting region (2), wherein the security element (1) additionally has at least one second region (3) different from the first region (2) and having structures (4), which reflect an image motif into different spatial regions, so that a movement image is produced for the observer with a corresponding movement of a light source (5) and/or with a change in an observation angle, wherein a movement of the image motif and a colour shift effect are produced simultaneously with a movement of the light source and/or a change in the observation angle.

**ÉLÉMENT DE SÉCURITÉ POURVU D'AU MOINS UNE PREMIÈRE ZONE À INVERSEMENT DE COULEURS**

L'invention concerne un élément de sécurité (1) pour des documents de valeur ou des papiers de sécurité, l'élément de sécurité (1) présentant au moins une première région de changement de couleur (2), l'élément de sécurité (1) comprenant en outre au moins une seconde région (3) qui est différente de la première région (2) et qui a des structures (4) qui réfléchissent un motif d'image en différentes régions spatiales, de telle sorte qu'une image de mouvement est produite pour l'observateur en cas de mouvement correspondant d'une source de lumière (5) et/ou en cas de modification d'un angle d'observation, le mouvement de la source de lumière et/ou le changement de l'angle d'observation produisant simultanément un mouvement du motif d'image et un effet de changement de couleur.



**CLAIM 1.** A security element (1) for papers of value or security papers, wherein the security element (1) has at least one first color-shifting region (2), characterized in that the security element (1) additionally has at least one second region (3) which is different from the first region (2) and has structures (4) which reflect an image motif (4 a) into different spatial regions, with the result that a movement image is produced for the viewer with a corresponding movement of a light source (5) and/or with a change in an observation angle, wherein a movement of the image motif and a colour shift effect are produced simultaneously with a movement of the light source and/or a change in the observation angle.

P33271

## PRINTING

EP3249459

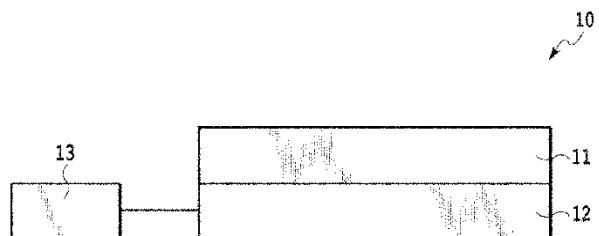
Priority Date: 20/01/2015

### TOPPAN PRINTING

#### DISPLAY MEDIUM PROVIDED WITH DIFFRACTION STRUCTURE AND LIGHT CONTROL ELEMENT

A display medium that is able to arbitrarily change the display of recorded optical image information even when viewed from the same field of view, and an image display method that uses that display medium. The display medium includes a diffraction structure section on which optical image information is recorded, a chromic device that controls the reflection and transmission using voltage, and a power supply that is connected to the chromic device.

**CLAIM 1.** A matrix-shaped display comprising (A) a top electrode comprising a plurality of first lines; (B) a bottom electrode, which a transparent conductive film comprising a plurality of second lines, which are arranged in a direction different from that of the plurality of first lines; (C) a thin film light controllable mirror between the top electrode and the bottom electrode; (D) a transparent diffraction structure on the top electrode opposite to the thin film light controllable mirror, the diffraction structure comprises a recorded optical image, the first lines and the second lines define a plurality of matrix elements in the thin film light controllable mirror and a plurality of corresponding matrix elements in the transparent diffraction structure; and wherein applying voltage to said top electrode and the bottom electrode switches each matrix element of said plurality in the thin film light controllable mirror between a transparent state and a mirror state, wherein when a matrix element of said plurality in the thin film light controllable mirror is in the transparent state a portion of the recorded optical image in a corresponding matrix element of said plurality of the transparent diffraction structure is not visible when observed from a side of the transparent diffraction structure, which is opposite to the top electrode; and when a matrix element of said plurality in the thin film light controllable mirror is in the mirror state a portion of the recorded optical image in a corresponding matrix element of said plurality of the transparent diffraction structure is visible when observed from the side of the transparent diffraction structure, which is opposite to the top electrode.



P33277

## PRINTING – LABEL – RELIEF – MICROLENS

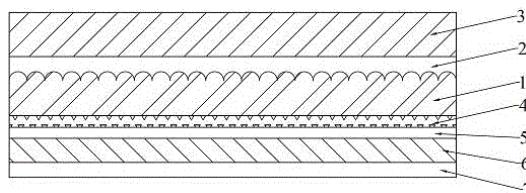
CN213012663U

Priority Date: 19/06/2020

### JIANGYIN TONGLI OPTOELECTRONIC TECHNOLOGY

#### ANTI-COUNTERFEITING INDICATING ADHESIVE TAPE

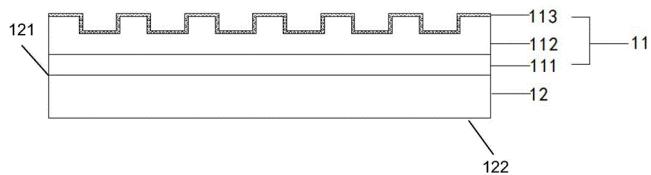
The utility model discloses an anti-counterfeiting indicating adhesive tape, which comprises a micro-lens layer, wherein one surface of the micro-lens layer is a concave-convex surface, and the other surface is a plane; the concave-convex surface is provided with a label layer, the plane is sequentially provided with a base material film layer and a surface adhesive layer, a picture and text layer is further arranged between the micro-lens layer and the base material film layer or between the base material film layer and the surface adhesive layer, and the label layer is provided with a light-transmitting part. The film of the anti-counterfeiting indicating adhesive tape comprises a micro-lens layer, a label layer and an image-text layer, wherein the label layer is used for displaying visual product information, the image-text layer generates changed image-text information through the micro-lens, and the changed image-text information is matched or associated with a light-transmitting part of the label layer, so that the anti-counterfeiting purpose is achieved.



**CLAIM 1.** An anti-counterfeiting indicating adhesive tape comprises a micro-lens layer, wherein one surface of the micro-lens layer is a concave-convex surface, and the other surface of the micro-lens layer is a plane; the micro-lens is characterized in that the concave-convex surface is provided with a labeling layer, the plane is sequentially provided with a substrate film layer and a surface adhesive layer, a picture and text layer is further arranged between the micro-lens layer and the substrate film layer or between the substrate film layer and the surface adhesive layer, and the labeling layer is provided with a light-transmitting part.

**ANTI-FAKE CERTIFICATE CARD**

The utility model provides an anti-counterfeiting certificate card, which comprises a card body and a composite surface layer arranged on the card body, wherein the composite surface layer comprises a base film layer, an information layer and a transparent dielectric layer which are sequentially stacked on the card body, and the base film layer is arranged on the card body; the card body comprises a card body, an information layer, a micro-nano structure, a plurality of structural units, a plurality of micro-nano patterns and a plurality of grooves, wherein the card body is arranged on the surface of the information layer, which is far away from the card body, the micro-nano structure comprises the structural units which are arranged in an array staggered manner, the structural units comprise the micro-nano patterns which are sequentially arranged in parallel and at intervals, in the same structural unit, the micro-nano patterns are arranged according to a rule that the micro-nano patterns are gradually shortened from the middle to two sides, in the micro-nano structure, the micro-nano patterns are not in contact with each other, the aspect ratio; the transparent medium layer is arranged on one side of the information layer with the micro-nano structure in a copying mode. Therefore, the anti-counterfeiting identification is simple, convenient and effective, and the antibacterial effect is achieved.



**CLAIM 1.** An anti-counterfeiting certificate card is characterized by comprising a card body and a composite surface layer arranged on the card body, the composite surface layer comprises a base film layer, an information layer and a transparent medium layer which are sequentially laminated on the card body, and the base film layer is arranged on the card body; the information layer is arranged on one side of the base film layer far away from the card body, the surface of the information layer far away from the base film layer is provided with a micro-nano structure, the micro-nano structure comprises a plurality of structure units, the structure units are arranged in an array staggered mode, the structure units comprise a plurality of micro-nano patterns which are sequentially arranged in parallel and at intervals, in the same structure unit, the micro-nano patterns are arranged according to a rule that the micro-nano patterns are gradually shortened from the middle to two sides, in the micro-nano structure, the micro-nano patterns are not in contact with each other, the aspect ratio of the micro-nano patterns is larger than 1, and the micro-nano patterns comprise protruding structures and/or groove structures; the transparent medium layer is arranged on one side of the information layer with the micro-nano structure in a copying mode.

P33285

CN212920874U

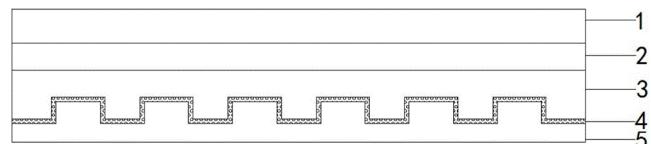
Priority Date: 13/03/2020

JIANGSU WEIGE NEW MATERIAL SCIENCE & TECHNOLOGY – SVG  
TECHNOLOGY

### ANTI-COUNTERFEITING HOT STAMPING FILM

The utility model discloses an anti-fake thermoprint membrane, it is including the base film layer that stacks gradually the setting, from type layer, information layer, cladding material and glue film. The information layer is provided with a micro-nano structure on one side far away from the release layer, and the plating layer is arranged on one side of the information layer with the micro-nano structure in a copying manner. The micro-nano structure comprises a plurality of structure units, the structure units are arranged in an array staggered mode, the structure units comprise a plurality of micro-nano patterns which are sequentially arranged in parallel and at intervals, in the same structure unit, the micro-nano patterns are arranged according to a rule that the micro-nano patterns are gradually shortened from the middle to two sides, in the micro-nano structure, the micro-nano patterns are not in contact with each other, the aspect ratio of the micro-nano patterns is larger than 1, and the micro-nano patterns comprise protruding structures and/or groove structures. The utility model discloses an anti-fake thermoprint membrane does not present special light efficiency when no light source shines, presents special light efficiency under the light source irradiation condition, can effectively carry out anti-fake differentiation.

**CLAIM 1.** An anti-counterfeiting hot stamping film is characterized by comprising a base film layer, a release layer, an information layer, a plating layer and a glue layer which are sequentially stacked, the information layer is provided with a micro-nano structure at one side far away from the release layer, the plating layer is arranged on one side of the information layer with the micro-nano structure in a copying manner, the micro-nano structure comprises a plurality of structure units, the structure units are arranged in an array staggered mode, the structure units comprise a plurality of micro-nano patterns which are sequentially arranged in parallel and at intervals, in the same structure unit, the micro-nano patterns are arranged according to a rule that the micro-nano patterns are gradually shortened from the middle to two sides, in the micro-nano structure, the micro-nano patterns are not in contact with each other, the aspect ratio of the micro-nano patterns is larger than 1, and the micro-nano patterns comprise protruding structures and/or groove structures.



P33307

PRINTING – LUMINESCENCE – MAGNETISM

CN112644200

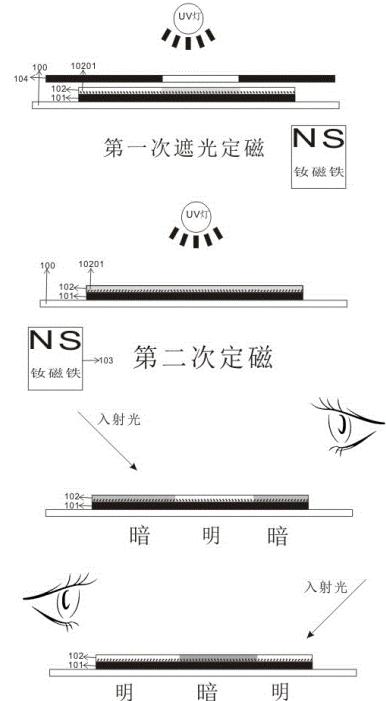
Priority Date: 01/05/2021

PENG LIANG

### PHASE-CHANGE OPTICAL ANTI-COUNTERFEITING ELEMENT

The invention provides a kind of phase light change false proof component, it has magnetic light change pigment layer and dark background layer at least; the magnetic optically variable pigment layer ink has ultraviolet cured resin as the coupling material, and may be arranged in several phase angles under the interaction of several magnetic positioning devices and one or several shading plates to form alternate bright and dark effect. The dark background layer can also combine with infrared, magnetism, fluorescence, hidden information and other two-line machine-readable anti-counterfeiting characteristics to form a coherent light-variable anti-counterfeiting element which can meet the requirement of the public for easy identification and can be compounded with multi-level anti-counterfeiting elements difficult to forge.

**CLAIM 1.** The phase-change optically variable anti-counterfeiting element is characterized in that a coupling material of the magnetic optically variable pigment layer ink is ultraviolet light curing resin.



## P33310

CN112634743

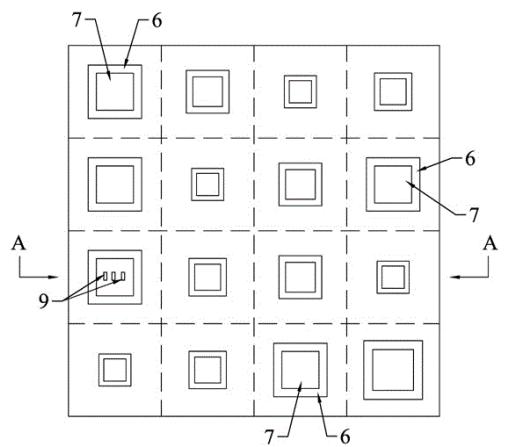
Priority Date: 31/12/2020

JI HUA LABORATORY

### OPTICAL ANTI-COUNTERFEITING STRUCTURE AND MANUFACTURING METHOD THEREOF

An optical anti-counterfeiting structure and a manufacturing method thereof relate to the technical field of optical anti-counterfeiting structures, and the optical anti-counterfeiting structure comprises a first metal layer, an intermediate medium layer, a second metal layer and a pasting layer which are sequentially stacked from bottom to top, and is also provided with a plurality of separation grooves, wherein the separation grooves penetrate through the intermediate medium layer and the second metal layer from top to bottom and are closed-loop annular grooves, the first metal layer and the intermediate medium layer and the second metal layer in an area surrounded by each separation groove jointly form a color development unit, the color development unit is an FP (Fabry-Perot) cavity color development unit, the pasting layer is provided with a structure of the separation grooves, so that when the pasting layer is stripped, the parts except the color development units of the second metal layer are stripped along with the pasting layer, and each color development unit can be stripped together when being irradiated by light, so that each color. The manufacturing method comprises the steps of sequentially manufacturing a first metal layer, an intermediate medium layer, a second metal layer and an adhesive layer, manufacturing the intermediate medium layer, forming the isolation grooves and the polarization holes, and manufacturing the second metal layer.

**CLAIM 1.** The optical anti-counterfeiting structure is characterized by comprising a first metal layer, an intermediate medium layer, a second metal layer and a pasting layer which are sequentially stacked from bottom to top, wherein a plurality of separation grooves are further arranged, the separation grooves vertically penetrate through the intermediate medium layer and the second metal layer and are closed-loop annular grooves, the first metal layer, the intermediate medium layer and the second metal layer in an area surrounded by each separation groove jointly form a color development unit, the color development units are FP (Fabry-Perot) cavity color development units based on a film interference effect, the pasting layer can be peeled off, and the separation grooves are arranged so that when the pasting layer is peeled off, the parts except the color development units of the second metal layer are peeled off together along with the pasting layer, and the color development units jointly present a first anti-counterfeiting image when being illuminated.



## P33316

PRINTING

CN112622467

Priority Date: 18/12/2020

PEOPLE S PRINTING PLANT OF GUANGZHOU

### PREPARATION METHOD OF ANGLE-DEPENDENT COLOR-CHANGING POLARIZATION HIDDEN IMAGE-TEXT

The invention discloses a preparation method of an angularly variable polarization hidden image-text, which comprises the following steps: (a) embedding required hidden information on a hidden image-text carrier with a polarizing property; (b) compounding the processed hidden image and text carrier on the reflecting layer; (c) and compounding a plurality of layers of polarizing materials onto a hidden image-text carrier, wherein the hidden image-text carrier is positioned between the polarizing materials and the reflecting layer. The prepared polarization hidden graph-text has different color combinations through the polarization materials with different layers; when the polarizing material is a layer, the polarization hidden image-text is black under the observation of the polarizing optical sheet at an initial angle, and the polarization hidden image-text is silver after the polarizing optical sheet is rotated for a certain angle (such as 90 °C); when the polarizing material is two layers, the color combination presented by the polarization hiding graphics is purple and green; when the polarizing material has three layers, the color combination is yellow and blue; the product has richer hierarchical structure and also improves the anti-counterfeiting effect.

**CLAIM 1.** A preparation method of an angle-dependent color-changing polarization hidden picture and text is characterized by comprising the following steps: (a) embedding required hidden information on a hidden image-text carrier with a polarizing property; (b) compounding the processed hidden image and text carrier on the reflecting layer; (c) and compounding a plurality of layers of polarizing materials onto a hidden image-text carrier, wherein the hidden image-text carrier is positioned between the polarizing materials and the reflecting layer.

P33317

## PRINTING

CN112622462

Priority Date: 18/12/2020

PEOPLE S PRINTING PLANT OF GUANGZHOU

### IMAGE HIDING ANTI-COUNTERFEITING METHOD FOR MULTI-ANGLE OBSERVATION OF COLOR CHANGE

The invention discloses an image hiding anti-counterfeiting method for multi-angle observation color change, which comprises the following steps: s1, document manufacturing, namely, carrying out offset printing on multi-color full-plate lines in parallel at an inclined angle and with consistent line width in an area where an image to be hidden is located by using an offset printing process; s2, preparing a mould pressing plate, namely preparing a mould pressing plate for hiding the image, wherein the mould pressing plate for the image mainly comprises lines with the inclination angle consistent with that of the lines of the multi-color full plate; s3, printing a product, namely printing an image to be hidden on paper; s4, hiding the pictures and texts, wherein the height difference of the hidden picture and text part can be realized by stamping or a UV gloss oil method; imprinting an image to be hidden through a mould pressing plate; the color bars stamped at different positions of the die pressing plate are different, and when the die pressing plate is used for die pressing, the part of one color bar or two color bars is lower than the reference plane, the color superposition result is changed, and the image hiding is realized; the invention realizes multi-angle observation color change by manufacturing the overprint color height difference method, and the realization technology can be realized by impressing or UV gloss oil.

**CLAIM 1.** A multi-angle observation color-changing image hiding anti-counterfeiting method is characterized by comprising the following steps: s1, document manufacturing, namely, carrying out offset printing on multi-color full-plate lines in parallel at an inclined angle and with consistent line width in an area where an image to be hidden is located by using an offset printing process; s2, preparing a mould pressing plate, namely preparing a mould pressing plate for hiding the image, wherein the mould pressing plate for the image mainly comprises lines with the inclination angle consistent with that of the lines of the multi-color full plate; s3, printing a product, namely printing an image to be hidden on paper; s4, hiding the pictures and texts, wherein the height difference of the hidden picture and text part can be realized by stamping or a UV gloss oil method; imprinting an image to be hidden through a mould pressing plate; the color bars stamped at different positions of the die pressing plate are different, when the die pressing plate is used for die pressing, the part of one color bar or two color bars is lower than the reference plane, the color superposition result is changed, the stamping pressure enables the ink layer to fluctuate so that the ink layer is different in height, and image hiding is realized; or the UV gloss oil can enable the part of one color bar or two color bars to be higher than the reference plane, the color superposition result is changed, the ink layer height is different, and the image hiding is realized.

P33318

## LABEL

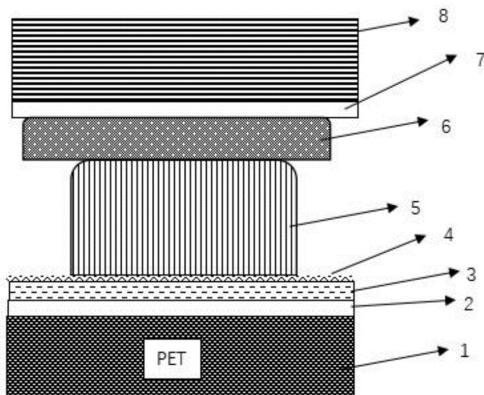
CN112613591

Priority Date: 29/12/2020

SUZHOU IMAGE LASER TECHNOLOGY

### ANTI-COUNTERFEIT LABEL AND PREPARATION METHOD THEREOF

The invention relates to the technical field of anti-counterfeiting, and discloses an anti-counterfeiting label and a preparation method thereof. This antifalsification label includes: the optical micro-nano structure comprises a base material layer, a photosensitive high polymer layer, a resin layer, an information layer, a metal layer and a glue layer which are sequentially stacked, wherein the photosensitive high polymer layer is provided with a laser photoetching image, and the information layer is provided with an optical micro-nano structure. In the invention, multiple anti-counterfeiting functions are formed by combining the optical micro-nano structure with positioning laser photoetching, so that the anti-counterfeiting label has better anti-counterfeiting capability.



**CLAIM 1.** The anti-counterfeiting label is characterized by comprising a base material layer, a photosensitive high polymer layer, a resin layer, an information layer, a metal layer and a glue layer which are sequentially stacked, wherein the photosensitive high polymer layer is provided with a laser photoetching image, and the information layer is provided with an optical micro-nano structure.

P33329

## LUMINESCENCE

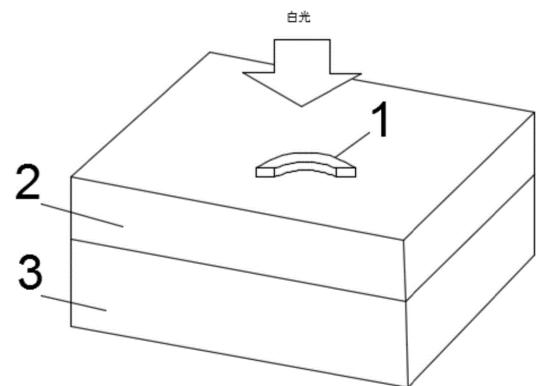
CN112590419

Priority Date: 24/11/2020

HUNAN UNIVERSITY

### OPTICAL ANTI-COUNTERFEITING MARK WITH NANO COMPOSITE STRUCTURE

The invention discloses an optical anti-counterfeiting mark with a nano composite structure, which is prepared by the following method: preparing a nano composite structure, wherein the nano composite structure comprises a substrate and a gold nano structure layer above the substrate, the substrate comprises a monocrystalline silicon wafer or a metal oxide, and the second step comprises the following steps: combining the nano composite structure array into any pattern; step three: the pattern is irradiated by white light, and bright field and dark field of the light are distinguished, so that different bright and dark field patterns are displayed, and optical anti-counterfeiting is realized. The method has the advantages of simple operation, small difficulty, high realization possibility and higher actual production value.



**CLAIM 1.** An optical anti-counterfeiting mark with a nano composite structure is characterized by being prepared by the following method, comprising the following steps: preparing a nano composite structure, wherein the nano composite structure comprises a substrate and a gold nano structure layer above the substrate, the substrate comprises a monocrystalline silicon wafer or a metal oxide, and the second step comprises the following steps: combining the nano composite structure array into any pattern; step three: the pattern is irradiated by white light, and bright field and dark field of the light are distinguished, so that different bright and dark field patterns are displayed, and optical anti-counterfeiting is realized.

P33333

## BANKNOTE

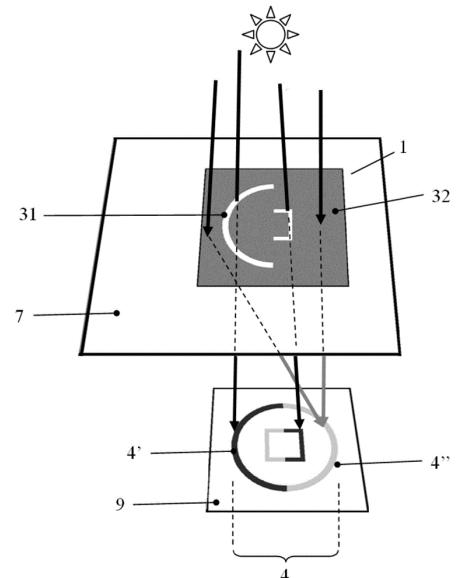
CN112572019

Priority Date: 30/09/2019

CHINA BANKNOTE PRINTING & MINT

### OPTICAL ANTI-COUNTERFEITING ELEMENT AND ANTI-COUNTERFEITING PRODUCT

The embodiment of the invention provides an optical anti-counterfeiting element and an anti-counterfeiting product, and belongs to the technical field of anti-counterfeiting. The optical security element comprises: a substrate; the microstructure forming layer formed on the first surface of the substrate comprises at least a first area and a second area, wherein the first area has the shape of a first part of a first pattern, and the second area is composed of a first plurality of groups of microstructures, wherein the second part is a part of the first pattern except the first part, and the optical anti-counterfeiting element can reproduce the first pattern when the optical anti-counterfeiting element is illuminated by parallel light, wherein the first area is used for reproducing the first part, and the second area is used for reproducing the second part. The optical anti-counterfeiting element can provide anti-counterfeiting effect of 'seal-on' and improve anti-counterfeiting performance of the anti-counterfeiting element.



**CLAIM 1.** An optical security element, comprising: a substrate having a first surface and a second surface opposite to each other; a microstructure forming layer formed on the first surface, the microstructure forming layer including at least a first region and a second region, wherein the first region has a shape of a first portion of a first pattern, the second region is composed of a first plurality of groups of microstructures, each group of microstructures in the first plurality of groups of microstructures has a single focus, and the focus of each group of microstructures is in one-to-one correspondence with each pixel point of a second portion of the first pattern, wherein the second portion is a portion of the first pattern other than the first portion, the optical security element is capable of reproducing the first pattern when the optical security element is illuminated with parallel light, wherein the first area is used to reproduce the first portion and the second area is used to reproduce the second portion.

P33334

## BANKNOTE

CN112572017

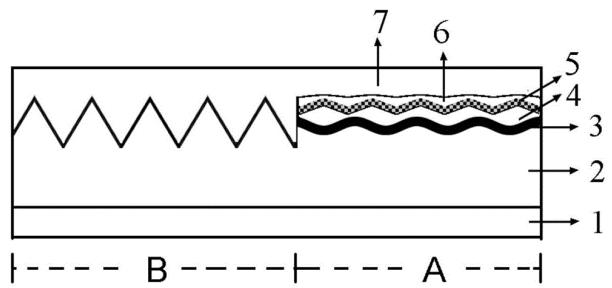
Priority Date: 29/09/2019

CHINA BANKNOTE PRINTING & MINT

### OPTICAL ANTI-COUNTERFEITING ELEMENT CAPABLE OF BEING OBSERVED FROM TWO SIDES

The invention discloses an optical anti-counterfeiting element and a manufacturing method thereof, belonging to the technical field of optical anti-counterfeiting. The optical security element comprises: a first photovoltaic structure layer; the first photovoltaic structure layer comprises a first region with a first microstructure and a second region with a second microstructure, and the specific volume of the first microstructure is smaller than that of the second microstructure; a first coating, a second undulating structure layer and a second coating which are sequentially stacked are arranged on one side of the first undulating structure layer; the first and second plating layers are both located in the first region and not in the second region, and the first and second plating layers have different surface relief shapes at least in part.

**CLAIM 1.** A thin-film optical security element, comprising: a first photovoltaic structure layer (2); the first photovoltaic structure layer (2) comprises a first region (A) with a first microstructure and a second region (B) with a second microstructure, the specific volume of the first microstructure is smaller than that of the second microstructure; a first plating layer (3), a second undulating structure layer (4) and a second plating layer (5) which are sequentially stacked are arranged on one side of the first undulating structure layer (2); the first and second coating layers (3, 5) are located in the first region (A) but not in the second region (B), and the first and second coating layers (3, 5) have different surface relief shapes at least in part.



P33335

## BANKNOTE

CN112572016

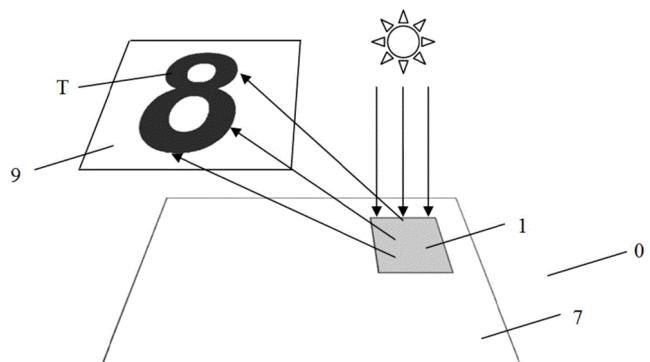
Priority Date: 30/09/2019

CHINA BANKNOTE PRINTING & MINT

### OPTICAL ANTI-COUNTERFEITING ELEMENT AND ANTI-COUNTERFEITING PRODUCT

The embodiment of the invention provides an optical anti-counterfeiting element and an anti-counterfeiting product, and belongs to the technical field of anti-counterfeiting. The optical anti-counterfeiting element comprises: a substrate having a first surface and a second surface opposite to each other; the microstructure forming layer is formed on the first surface, at least part of the microstructure forming layer comprises a first plurality of groups of microstructures, each group of microstructures in the first plurality of groups of microstructures respectively has a single focus, and the focuses of each group of microstructures in the first plurality of groups of microstructures are in one-to-one correspondence with each pixel point of a first graph text, so that: when the optical anti-counterfeiting element is illuminated by parallel light, the reproduced image of the first image-text can be received by the receiving carrier in the direction of the reflected light of the first plurality of groups of microstructures. The optical anti-counterfeiting element can be illuminated by using a common light source, and a clear reproduced image can be observed in the direction of reflected light through the receiving carrier.

**CLAIM 1.** An optical security element, comprising: a substrate having a first surface and a second surface opposite to each other; the microstructure forming layer is formed on the first surface, at least part of the microstructure forming layer comprises a first plurality of groups of microstructures, each group of microstructures in the first plurality of groups of microstructures respectively has a single focus, and the focuses of each group of microstructures in the first plurality of groups of microstructures are in one-to-one correspondence with each pixel point of a first graph text, so that: when the optical anti-counterfeiting element is illuminated by parallel light, the reproduced image of the first image-text can be received by the receiving carrier in the direction of the reflected light of the first plurality of groups of microstructures.



P33338

**PATENT OF THE MONTH**  
**HOLOGRAM – RELIEF – MICROLENS**

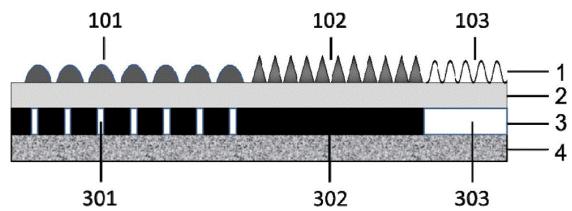
CN112562489

Priority Date: 15/12/2020

WUHAN HUAGONG IMAGE TECHNOLOGY & DEVELOPMENT

**VARIABLE DYNAMIC HOLOGRAPHIC ANTI-COUNTERFEITING MARK AND PREPARATION METHOD THEREOF**

The invention discloses a variable dynamic holographic anti-counterfeiting mark and a preparation method thereof. The variable dynamic holographic anti-counterfeiting mark comprises a microstructure layer, a substrate layer, a metal reflecting layer and a back glue layer which are sequentially arranged from top to bottom, wherein the microstructure layer comprises a holographic anti-counterfeiting area and a micro-lens array area; removing a local reflecting layer in a laser sintering mode in the area of the metal reflecting layer corresponding to the micro-lens array area to form a hollowed-out micro image-text array; the distance between the plane formed by the lens optical centers of the micro lens array and the metal reflecting layer is the focal length of the micro lens array, so that the micro lens array and the micro image-text array jointly show a dynamic image-text effect. The holographic optical anti-counterfeiting technology and the dynamic anti-counterfeiting technology based on the micro-lens array are organically fused together, so that the overall attractive effect is realized, and the multiple anti-counterfeiting technology is also realized.



P33343

**PRINTING – MAGNETISM – PHOTONIC FILM**

CN112552557

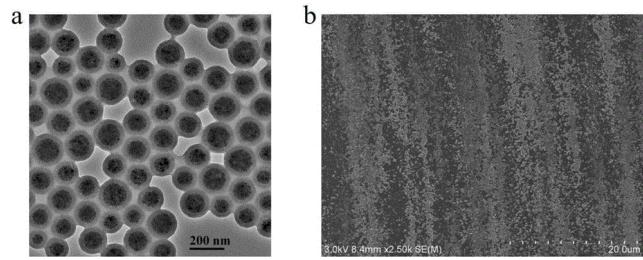
Priority Date: 19/12/2020

JIANGNAN UNIVERSITY

**MAGNETIC FIELD RESPONSE PHOTONIC CRYSTAL ANTI-COUNTERFEITING FILM AND PREPARATION METHOD AND APPLICATION THEREOF**

The invention relates to a magnetic field response photonic crystal anti-counterfeiting film and a preparation method and application thereof. The invention adopts sodium dodecyl sulfate as emulsifying agent for fine emulsification, and synthesizes superparamagnetic nano crystal cluster with adjustable particle size by volatilizing organic solvent in the fine emulsion, which is used for preparing magnetic colloidal nano particles for constructing photonic crystals. And the stable and uniform magnetic colloid nano particles are synthesized by modifying the nonionic polymer and coating the silicon dioxide, and are used for preparing the magnetic assembly photonic crystals. And then, agarose hydrogel is adopted as a film material, and the magnetic response photonic crystal anti-counterfeiting film is formed by curing under a magnetic field. The magnetic response photonic crystal anti-counterfeiting film prepared by the invention can display anti-counterfeiting patterns instantly after a magnetic field is applied, and the patterns disappear immediately after the magnetic field is cancelled, so that the anti-counterfeiting patterns are displayed and hidden quickly. The preparation is simple and rapid, the cost is low, the anti-counterfeiting response is rapid, the anti-counterfeiting pattern can be regulated and controlled, and the anti-counterfeiting material can be used as an anti-counterfeiting material.

**CLAIM 1.** A preparation method of a magnetic field response photonic crystal anti-counterfeiting film is characterized by comprising the following steps: (1) dispersing hydrophobic magnetic nanoparticles in an organic solvent to serve as an oil phase, dissolving an emulsifier in water to serve as a water phase, mixing the oil phase and the water phase, and then performing fine emulsification to obtain an oil-in-water type miniemulsion; (2) evaporating the oil-in-water type miniemulsion under negative pressure to remove the organic solvent to obtain a magnetic nano crystal cluster, and then modifying the magnetic nano crystal cluster by using a water-soluble macromolecular compound; (3) coating the modified magnetic nano crystal cluster with silicon dioxide by a sol-gel method, and then washing and magnetically separating for multiple times to obtain magnetic colloidal nano particles; (4) the magnetic colloid nano particles are dispersed in a hydrogel solution and are solidified under a magnet forming a pattern to form the photonic crystal anti-counterfeiting film with the pattern capable of being displayed and hidden.



*Click on the title to return to table of contents*

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

**N7694**

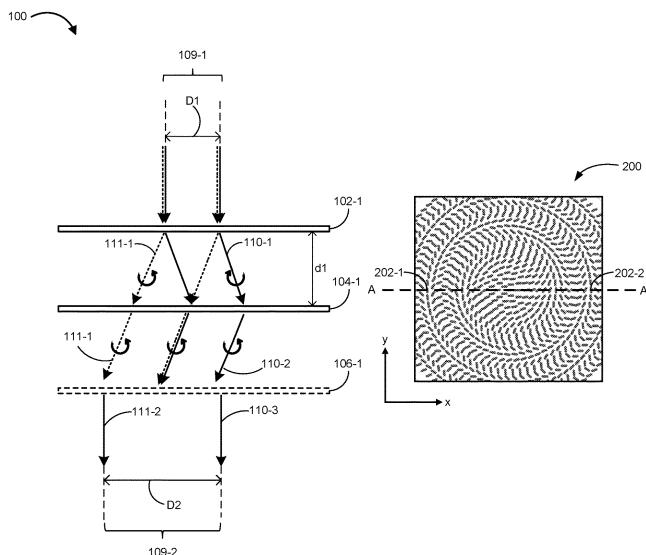
**US10969599**

Priority Date: 18/12/2018

**FACEBOOK TECHNOLOGIES**

**POLARIZATION CONVERSION USING GEOMETRIC PHASE AND POLARIZATION VOLUME HOLOGRAM OPTICAL ELEMENTS**

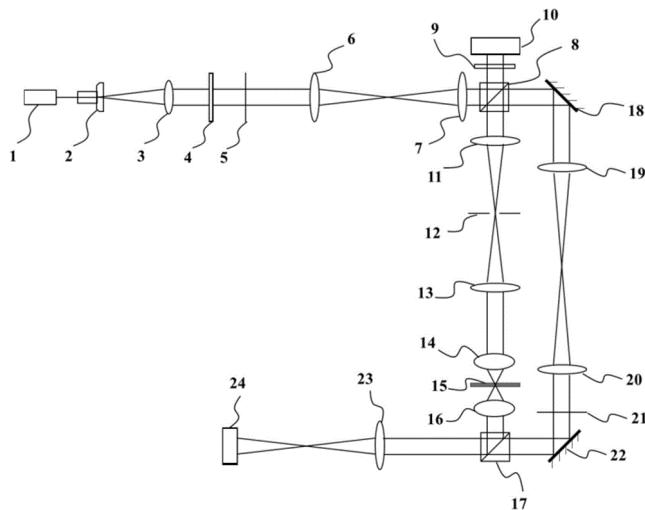
A device includes a first optical element configured to receive first light in a first direction. The first light includes a first component having a first circular polarization and a second component having a second circular polarization. The first optical element is also configured to convert the first component of the first light into second light having the second circular polarization and output the second light in a second direction. The first optical element is further configured to convert the second component of the first light into third light having the first circular polarization and output the third light in a third direction. The device also includes a second optical element configured to receive and transmit the second light and to receive the third light and convert to the third light into fourth light having the second circular polarization.



**CLAIM 1.** A device, comprising: a first optical element configured to (i) receive first light in a first direction, the first light including a first component having a first circular polarization and a second component having a second circular polarization distinct from the first circular polarization, (ii) convert the first component of the first light into second light having the second circular polarization and output the second light in a second direction distinct from the first direction, and (iii) convert the second component of the first light into third light having the first circular polarization and output the third light in a third direction distinct from the first direction and the second direction; and a second optical element optically coupled with the first optical element, the second optical element configured to (i) receive the second light having the second circular polarization in the second direction and transmit the second light, and (ii) receive the third light having the first circular polarization in the third direction and convert the third light into fourth light having the second circular polarization.

**PHASE ENCODING AND DECODING DEVICE FOR SINGLE INTERFERENCE READING PHASE**

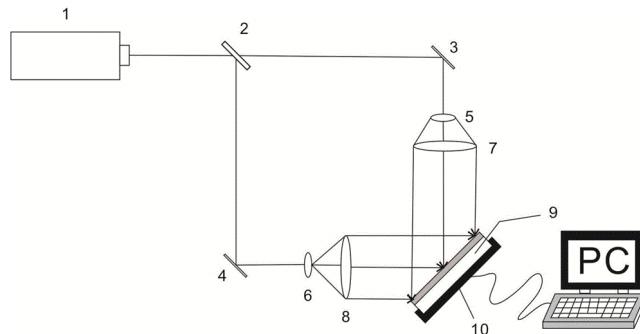
The utility model belongs to the technical field of the phase place image reads, a phase coding and phase decoding device of single interference reading phase place is disclosed, including laser instrument, pinhole filter, collimating lens, shutter, first diaphragm, first relay lens, second relay lens, first unpolarized three-dimensional beam splitter, half wave plate, phase modulation spatial light modulator, third relay lens, second diaphragm, fourth relay lens, first objective, holographic material layer, second objective, second unpolarized three-dimensional beam splitter, first plane mirror, fifth relay lens, sixth relay lens, attenuator, second plane mirror, imaging lens and luminous intensity detector, it can improve phase place reading system's stability and data conversion rate; the phase position is read by single interference, and the stability and the data conversion rate of a phase position reading system can be greatly improved.



**CLAIM 1.** The phase coding and phase decoding device for reading phases by single interference comprises a laser (1), a pinhole filter (2), a collimating lens (3), a shutter (4), a first diaphragm (5), a first relay lens (6), a second relay lens (7), a first non-polarized solid beam splitter (8), a half-wave plate (9), a phase modulation spatial light modulator (10), a third relay lens (11), a second diaphragm (12), a fourth relay lens (13), a first objective lens (14), a holographic material layer (15), a second objective lens (16), a second non-polarized solid beam splitter (17), a first plane mirror (18), a fifth relay lens (19), a sixth relay lens (20), an attenuator (21), a second plane mirror (22), an imaging lens (23) and a light intensity detector (24); it is characterized in that the preparation method is characterized in that, the pinhole filter (2), the collimating lens (3), the shutter (4), the first diaphragm (5), the first relay lens (6), the second relay lens (7) and the first non-polarized three-dimensional beam splitter (8) are sequentially arranged on an optical axis of emergent light of the laser (1) from left to right; a phase modulation spatial light modulator (10) and a half wave plate (9) are sequentially arranged above a first non-polarization stereo beam splitter (8) from bottom to top in the direction of reflected light, a third relay lens (11), a second diaphragm (12), a fourth relay lens (13), a first objective lens (14), a holographic material layer (15), a second objective lens (16) and a second non-polarization stereo beam splitter (17) are sequentially arranged below the first non-polarization stereo beam splitter (8) from top to bottom, the optical axes of the phase modulation spatial light modulator (10) and the half wave plate (9) are overlapped, and the optical axes of the third relay lens (11), the second diaphragm (12), the fourth relay lens (13), the first objective lens (14), the holographic material layer (15), the second objective lens (16) and the second non-polarization stereo beam splitter (17) are overlapped; a first plane mirror (18) inclined at 45 degrees is arranged on the right side of the first non-polarizing stereo beam splitter (8) in the transmission light direction, and a fifth relay lens (19), a sixth relay lens (20), an attenuator (21) and a second plane mirror (22) inclined at 45 degrees are sequentially arranged on the reflected light optical axis of the first plane mirror (18) from top to bottom; an imaging lens (23) and a light intensity detector (24) are sequentially arranged on the left side of the second non-polarized stereo beam splitter (17) from right to left on the optical axis of reflected light, and the optical axis of the reflected light of the second plane mirror (22) is overlapped with the optical axes of the imaging lens (23) and the light intensity detector (24).

**EQUIPMENT FOR PREPARING HOLOGRAPHIC GRATING WITH SMALL ASPECT RATIO BY UTILIZING HOLOGRAPHIC INTERFERENCE RECORDING MEANS**

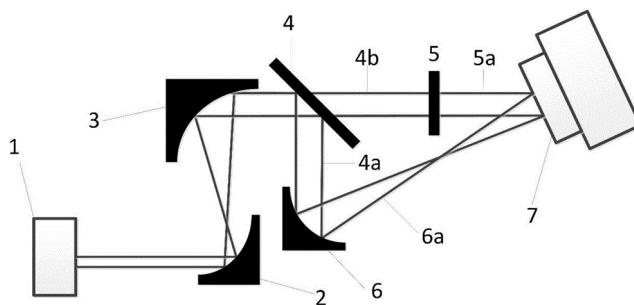
The application discloses utilize holographic interference recording means to prepare equipment of occupying a small amount of width ratio holographic grating, equipment includes light production unit, beam splitting unit, first light path changes the unit, second light path changes the unit, recording material and position mobile unit, can realize holographic interference recording means through above-mentioned equipment and prepare the holographic grating of occupying a small amount of width ratio, not only do not have special requirement to the preparation material, do not need extra equipment and special component moreover, utilize this well equipment preparation to occupy a small amount of width ratio holographic grating process simple, preparation speed is fast, and the cost of manufacture is low.



**CLAIM 1.** An apparatus for preparing a holographic grating with a small aspect ratio by using a holographic interference recording means, wherein the apparatus for preparing the holographic grating with the small aspect ratio by using the holographic interference recording means comprises: a light generating unit, a beam splitting unit, a first optical path changing unit, a second optical path changing unit, a recording material, and a position moving unit; the beam splitting unit is arranged on the light generating unit and used for splitting the light generated by the light generating unit into two beams of light, the first light path changing unit is arranged on a first emergent surface of the beam splitting unit, the second light path changing unit is arranged on a second emergent surface of the beam splitting unit, the recording material is arranged on a common emergent surface of the first light path changing unit and the second light path changing unit, so that the two emergent lights are interfered on the recording material at a certain angle, and the position moving unit is connected with the recording material and adjusts the position of the recording material.

**CONTINUOUS TERAHERTZ WAVE LENS-FREE FOURIER TRANSFORM DIGITAL HOLOGRAPHIC IMAGING METHOD**

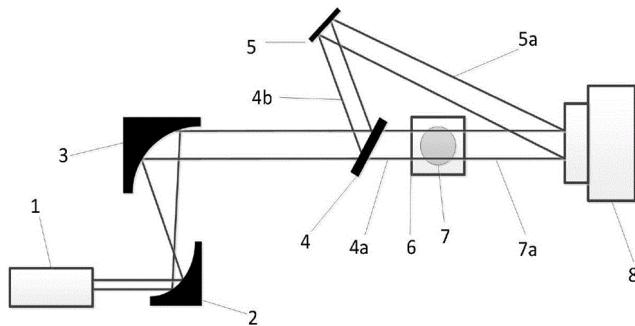
The invention discloses a lens-free Fourier transform digital holographic imaging method for continuous terahertz waves, which comprises the steps of shooting a digital hologram, wherein a space frequency spectrum of object light waves is recorded, so that a reproduced image of an object can be obtained only by utilizing one-time Fourier transform, shooting a plurality of holograms aiming at continuous videos of dynamic transformation samples so as to obtain a plurality of holograms, carrying out Fourier transform on the obtained plurality of holograms to obtain a reproduced image of the object, and finally carrying out video display on the reproduced image by utilizing Matlab software so as to obtain real-time reproduction of a dynamic transformation process of the reproduced object. The minimum recording distance allowed by the lensless Fourier transform holography is in direct proportion to the size of a recorded object and is irrelevant to the size of a target surface of the pyroelectric detector, and the holography can be recorded at a small distance for a tiny object, so that high-resolution imaging is realized. The experimental device is simple and compact, and is convenient to be practical.



**CLAIM 1.** The utility model provides a continuous terahertz wave does not have lens Fourier transform digital holographic imaging system which characterized in that: the optical path device of the imaging system comprises CO2The device comprises a pumping terahertz laser (1), a first gold-plated off-axis parabolic mirror (2), a second gold-plated off-axis parabolic mirror (3), a silicon wafer (4), a sample to be detected (5), a third gold-plated 60-degree off-axis parabolic mirror (6) and a pyroelectric detector (7); CO2The pump terahertz laser (1) is used for outputting continuous terahertz waves, CO2The pump terahertz laser (1) corresponds to the first gold-plated off-axis parabolic mirror (2), the first gold-plated off-axis parabolic mirror (2) and the second gold-plated off-axis parabolic mirror (3) are correspondingly arranged to form a beam expanding unit, and CO is used for expanding the beam expanding unit2The diameter of a terahertz wave spot output by the pumping terahertz laser (1) is enlarged by three times, and the propagation directions of the terahertz wave spot are parallel; the silicon chip (4) is arranged on a reflection light path of the second gold-plated off-axis parabolic mirror (3), the silicon chip (4) is used for dividing expanded terahertz waves into reflection waves (4a) and transmission waves (4b), the reflection waves (4a) are transmitted to a detected sample (5), object light waves (5a) carrying sample information are transmitted to the pyroelectric detector (7) through the detected sample (5), the reflection light waves (4a) are reflected by the third gold-plated 60-degree off-axis parabolic mirror (6) to form spherical reference light waves (6a), the spherical reference light waves (6a) are transmitted to the pyroelectric detector (7), the focal position of the spherical reference light waves (6a) and the detected sample (5) are located on the same plane, the spherical reference light waves (6a) are interfered with the object light waves (5a), and the digital hologram H is recorded through the pyroelectric detector (7) $i(x, y)$ , where i is the number of holograms recorded.

### **OFF-AXIS DIGITAL HOLOGRAPHIC DIFFRACTION TOMOGRAPHY METHOD BASED ON CONTINUOUS TERAHERTZ WAVES**

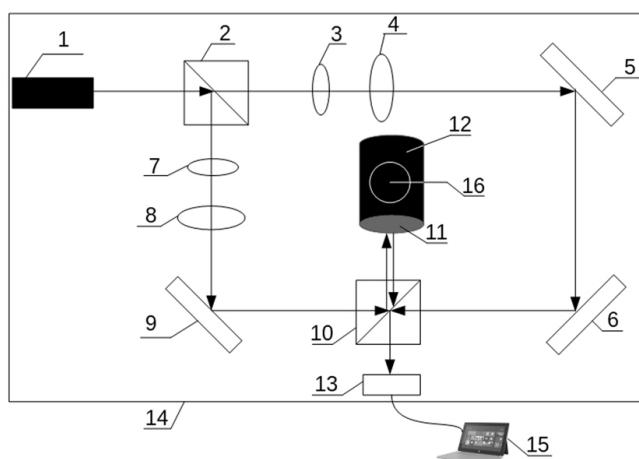
The invention discloses an off-axis digital holographic diffraction tomography method based on continuous terahertz waves, which comprises the steps of completing the superposition average preprocessing process of a hologram, the self-focusing preprocessing process of the hologram and the background removing preprocessing process of the hologram reconstruction result. The reconstruction of the three-dimensional complex refractive index distribution of the sample by using the off-axis digital holographic diffraction chromatography algorithm comprises the following three steps: reconstructing the off-axis digital hologram by using an angular spectrum diffraction propagation formula and a self-focusing algorithm; carrying out Rytov approximation processing on the reconstructed object complex amplitude distribution to obtain a Rytov approximation scattering field of the object; and then, obtaining the distribution of the object function by utilizing a filtering back propagation algorithm, and calculating the three-dimensional complex refractive index distribution of the object according to the relation between the object function and the refractive index.



**CLAIM 1.** An off-axis digital holographic diffraction tomography system based on continuous terahertz waves is characterized in that: comprising CO₂The device comprises a pumping terahertz laser, a first gold-plated off-axis parabolic mirror, a second gold-plated off-axis parabolic mirror, a beam splitting sheet, a gold-plated reflecting mirror, an electric rotating table, a sample to be detected and a pyroelectric detector; CO₂The pump terahertz laser is used for outputting continuous terahertz waves, the first gold-plated off-axis parabolic mirror and the second gold-plated off-axis parabolic mirror form a beam expanding unit, and CO is used for converting CO into CO₂The diameter of a terahertz wave spot output by the pumping terahertz laser is enlarged, and the propagation directions of the terahertz wave spot are parallel; the beam splitting piece is used for dividing expanded terahertz waves into transmission illumination waves and reflection waves, the transmission illumination waves are transmitted to a detected sample, the detected sample is placed on the electric rotating table, the object light waves of the detected sample with different rotation angles are transmitted to the pyroelectric detector by controlling the electric rotating table, the reflection waves are reflected by the gold-plated reflecting mirror and are transmitted to the pyroelectric detector as reference light waves and interfere with the object light waves, and the pyroelectric detector records an off-axis digital hologram  $H(x,y)$

# FINGERPRINT IDENTIFICATION DEVICE AND METHOD BASED ON HOLOGRAPHIC OPTICAL PATH PHASE IDENTIFICATION TECHNOLOGY

The invention discloses a fingerprint identification device and method based on a holographic optical path phase identification technology, and belongs to the technical field of holographic application. The device comprises a yellow laser, a beam splitter I, a beam expander I, a lens I, a beam splitter II, a beam expander II, a lens II, a focal plane array detector, a holophote I, a holophote II, a holophote III, a light-tight shell and a small computer; the method of the invention obtains the holographic interference pattern of the interference of the object light beam and the reference light beam in a non-contact way; and extracting the image signal, and then carrying out processing such as smoothing, sharpening, interpolation, filtering and the like on the holographic image after amplitude and phase information is extracted, so as to realize reconstruction imaging of the processed holographic image. The method of the invention can record the amplitude information and the phase information of the fingerprint, and can perform deep extraction on the detail information of the fingerprint, thereby ensuring the high imaging quality and meeting the high-precision requirement of fingerprint identification.



**CLAIM 1.** The utility model provides a fingerprint identification device based on holographic light path phase place identification technique which characterized in that: the device comprises a yellow laser (1), a beam splitter I (2), a beam expander I (3), a lens I (4), a holophote I (5), a holophote II (6), a beam expander II (7), a lens II (8), a holophote III (9), a beam splitter II (10), a polaroid (11), a detection cavity (12), a focal plane array detector (13), a light-tight shell (14), a small computer (15) and a detection hole (16); the yellow laser (1), the beam splitter I (2), the beam splitter II (10), the beam splitter I (3), the beam splitter II (7), the lens I (4), the lens II (8), the holophote I (5), the holophote II (6), the holophote III (9), the polaroid (11), the detection cavity (12), the detection hole (16) and the focal plane array detector (13) are all arranged in a light-tight shell (14); the polaroid (11) is tightly attached to the wall of the detection cavity (12); the yellow laser (1) emits laser, the laser is divided into two beams of laser by a beam splitter I (2), one beam of laser is expanded by a beam expander I (3), the laser is collimated into parallel laser by a lens I (4), the parallel laser beam reaches a holophote I (5), the parallel laser beam is reflected to a beam splitter II (10) by a holophote II (6), the beam enters a focal plane array detector (13) through the beam splitter II (10) in a reflection mode, and the beam is called as a reference light beam; another beam of light split by the beam splitter I (2) is expanded by a beam expander II (7), and is collimated by a lens II (8) to form a parallel beam, and then is reflected to a beam splitter II (10) by a holophote III (9), one beam of reflected light split by the beam splitter II (10) enters a detection cavity (12) through a polaroid (11), irradiates an object to be detected, namely a finger fingerprint, and then is reflected diffusely by the finger fingerprint and returns to the beam splitter II (10) along an original light path, and the beam enters a focal plane array detector (13) through the beam splitter II (10) in a transmission mode, and is called an object light beam; the object light beam and the reference light beam are fitted on the beam splitter II (10) to generate interference to form a holographic interference pattern, the holographic interference pattern is received and recorded by a focal plane array detector (13) and is displayed by a small computer (15), and therefore the finger fingerprint three-dimensional information is reproduced, imaged and displayed.

N7741

CN112596362

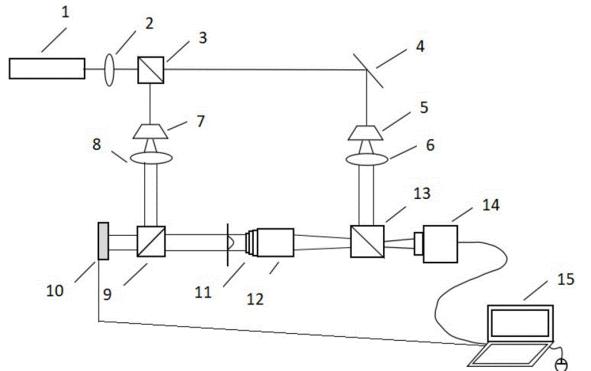
Priority Date: 18/12/2020

KUNMING UNIVERSITY OF SCIENCE & TECHNOLOGY

### FULL-FIELD SUPER-RESOLUTION DIGITAL HOLOGRAPHIC DEVICE AND IMAGING METHOD

The invention relates to a digital holographic device and an imaging method for full-field super resolution, wherein the device comprises: the device comprises a laser, a polaroid, a first light splitting component, a light path component of a reference beam, a light path component of an object light beam, a beam combining component and an acquisition system; light emitted by the laser passes through the polaroid and is then split into two beams by the first light splitting assembly, and the first beam of light passes through the light path assembly of the reference beam and reaches the beam combining assembly; the second beam of light is modulated when passing through a part of the optical path component of the object light beam, the modulated light irradiates the object to be measured, and the light penetrating through the object to be measured reaches the beam combining component; two beams of light reaching the beam combining assembly interfere, the acquisition system acquires holographic image information of the interfered light and processes the holographic image information to obtain intensity information and resolution information of an image surface of a measured object, and the structure can improve full-field super-resolution of digital holographic imaging.

**CLAIM 1.** A digital holographic imaging method of full-field super resolution is characterized by comprising the following steps: s1, dividing the emergent light of the same light source into an object light beam and a reference light beam; s2, loading N oblique spherical waves with different illumination angles by means of the light modulation component aiming at the object light beam; s3, making the modulated object light beam penetrate the object to be measured; s4, combining the object beam penetrating the object to be measured and the reference beam to form N pieces of holographic image information; n is greater than or equal to 2; and S5, acquiring the N pieces of holographic image information, and performing frequency spectrum transformation processing, Fourier transformation processing and conjugate image processing to obtain the intensity information of the image surface of the object to be measured and full-field super-resolution information.



N7743

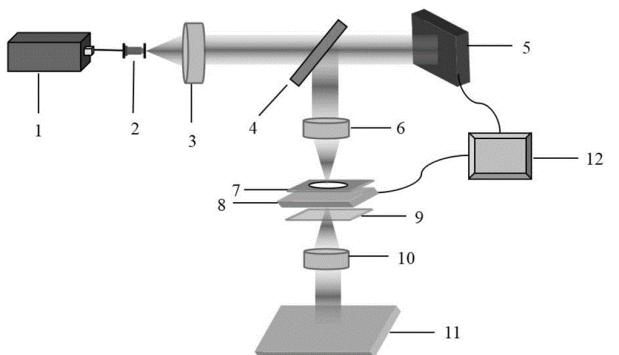
CN112596262

Priority Date: 14/12/2020

BEIHANG UNIVERSITY OF AERONAUTICS & ASTRONAUTICS

### HOLOGRAPHIC TRUE 3D DISPLAY SYSTEM AND METHOD BASED ON ADJUSTABLE LIQUID CRYSTAL GRATING

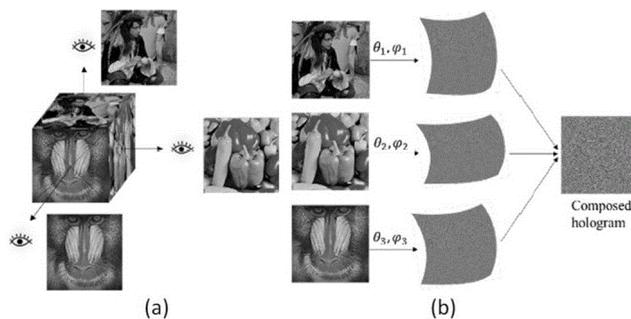
The invention provides a holographic real 3D display system and method based on an adjustable liquid crystal grating. The laser, the filter and the beam expander are used for generating collimated incident light, and the spatial light modulator is loaded with a hologram of a 3D object. The diffracted light passes through a lens I after being reflected by the spatial light modulator and the half-transmitting and half-reflecting mirror, the diaphragm is positioned behind the lens I and is used for eliminating the high-grade diffracted light in the holographic true 3D display, and the parameters of the lens I and the lens II are the same. The adjustable liquid crystal grating is positioned on the back focal plane of the lens I and on the front focal plane of the lens II, and the signal controller is used for synchronously controlling the voltage of the adjustable liquid crystal



grating and the generation and loading of the hologram. The system generates a plurality of secondary diffraction images by controlling the generation of the hologram and a method of adjusting the voltage on the liquid crystal grating, thereby realizing the holographic true 3D display with large visual angle. The system enables the reconstructed image to realize seamless splicing effect in space through a method of time sequence control hologram generation and voltage adjustment on the liquid crystal grating at corresponding time, thereby realizing large-size holographic true 3D display.

**TWO-DIMENSIONAL ANGLE MULTIPLEXING METHOD BASED ON SPHERICAL HOLOGRAPHY**

The invention provides a two-dimensional angle multiplexing method based on spherical holography. The method comprises a spherical diffraction calculation model based on phase compensation and a two-dimensional angle multiplexing and reconstruction method. The method firstly obtains the diffraction field distribution of the target spherical segment rapidly through a phase compensation method. When two-dimensional angle multiplexing is carried out, the two-dimensional angle multiplexing can be realized only by utilizing the change of the field angle parameters of two dimensions of the spherical holography, and a plurality of holograms are directly superposed to obtain a final hologram; during reconstruction, different view angle images of the object can be obtained only by reproducing reconstruction according to different field angle parameters. The method has the beneficial effects that: compared with the traditional angle multiplexing method, the two-dimensional angle multiplexing method based on the spherical holography effectively improves the angle multiplexing efficiency, has high reconstruction quality, and is an effective way for expanding the reconstruction visual angle.



**CLAIM 1.** The two-dimensional angle multiplexing method based on the spherical holography is characterized by comprising a spherical diffraction calculation model based on phase compensation and a two-dimensional angle multiplexing and reconstructing method; the specific description of the spherical diffraction calculation model based on the phase compensation is as follows: step A1, establishing a diffraction model from an object plane to a target spherical segment, wherein in the diffraction model, the object plane is vertical to the propagation direction, the center of the plane is positioned on the propagation optical axis, the center and the spherical center of the target spherical segment are positioned on the optical axis, the chordal plane and the object plane are parallel and have the same size, and the origin of coordinates is positioned on the spherical center; step A2, calculating the diffraction process from the object plane to the tangent plane of the target spherical segment according to the scalar diffraction theory, which is expressed as:  $u_1(x_1, y_1, z_1) = \text{FrT} \{ U_0(x_0, y_0, z_0), z_d \}$ , where  $U_0$  and  $U_1$  respectively represent diffraction field distributions of an object plane and a chord tangent plane,  $(x_0, y_0, z_0)$  and  $(x_1, y_1, z_1)$  are coordinates in a rectangular coordinate system thereof, and a diffraction distance is  $z_d = z_1 - z_0$ ; step A3, calculating a diffraction field  $u_2(x_2, y_2, z_2) = u_1(x_1, y_1, z_1) \exp(-j k z_c)$  of the target spherical segment by using a phase compensation method based on the diffraction field of the chord tangent plane, where  $x_2 = x_1$ ,  $y_2 = y_1$ ,  $z_2 = R \cos \theta \cos \varphi$ , and  $z_c = z_2 - z_1$ , and satisfies:  $\sin \theta = x_2/(R \cos \varphi)$ ,  $\sin \varphi = y_2/R$ , and being the angular orientation of the spherical segment in the warp and weft directions, respectively; the two-dimensional angle multiplexing and reconstructing method is specifically described as follows: b1, carrying out holographic encoding on a group of spherical segment diffraction fields with the maximum field angle of  $(\theta_1, \varphi_1)$  to obtain a hologram  $H_1$ ; step B2, multiplexing the two dimensions of the warp and weft field angles for  $n$  times, namely  $(\theta_2, \varphi_2)$ ,  $(\theta_3, \varphi_3)$  and . . .  $(\theta_n, \varphi_n)$ , obtaining  $n$  holograms multiplexed by two-dimensional angles, namely  $H_2$ ,  $H_3$  and . . .  $H_n$ , and then superposing the holograms to obtain the final hologram  $H = H_1 + H_2 + H_3 + \dots + H_n$ ; and step B3, performing holographic reconstruction on the final hologram according to the opening angle condition sets multiplexed for  $n$  times, namely  $(\theta_1, \varphi_1)$ ,  $(\theta_2, \varphi_2)$ ,  $(\theta_3, \varphi_3)$  and . . .  $(\theta_n, \varphi_n)$ , and obtaining different viewing angles of  $n$  objects.

*Click on the title to return to table of contents*

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

N7738

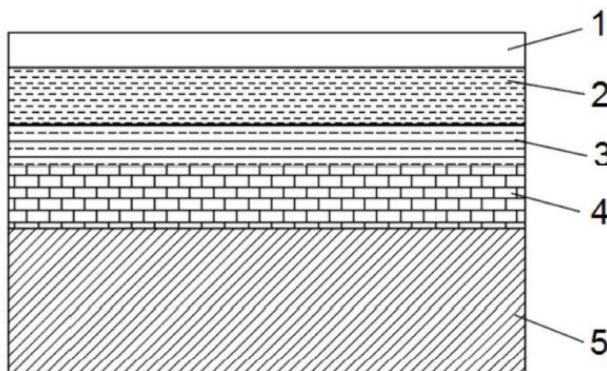
CN112622466

Priority Date: 12/04/2020

JIANGSU JINHENG NEW PACKAGING MATERIAL

### HOLOGRAPHIC DOUBLE-ZERO ALUMINUM FOIL PRODUCTION PROCESS

The invention discloses a holographic double-zero aluminum foil production process, which utilizes a holographic pressing method to stamp a holographic image on a coating film to obtain a holographic layer; heating aluminum metal to evaporate under a set vacuum state so that aluminum molecules are condensed on the surface of the holographic layer to obtain an aluminum-plated layer; coating the aluminum-plated layer to obtain a transfer coating; carrying out reactive compounding on a holographic transfer film containing a holographic layer, an aluminum-plated layer and a transfer coating and a double-zero aluminum foil; and stripping the double-zero aluminum foil in a mode of stripping and rolling at the same time to obtain the holographic double-zero aluminum foil. The compounding process adopts solvent-free, electron beam and other compounding processes, and no VOCs is discharged in the whole process, so that the application of a green production mode is realized, and the environment is protected.



**CLAIM 1.** A holographic double-zero aluminum foil production process is characterized by comprising the following steps: utilizing a holographic pressing method to print a holographic image on the coating film to obtain a holographic layer; heating aluminum metal to be evaporated in a set vacuum state, and condensing aluminum molecules on the surface of the holographic layer to obtain an aluminum-plated layer; coating the aluminum-plated layer to obtain a transfer coating; carrying out reactive compounding on the holographic transfer film containing the holographic layer, the aluminum-plated layer and the transfer coating and a double-zero aluminum foil; and stripping the double-zero aluminum foil in a mode of stripping and rolling at the same time to obtain the holographic double-zero aluminum foil.

*Click on the title to return to table of contents*

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

## N7691

WO202166391

Priority Date: 30/09/2019

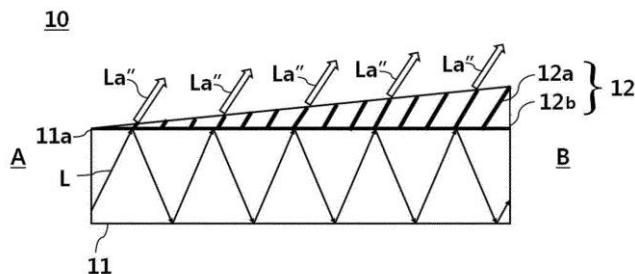
LG CHEM

### HOLOGRAPHIC OPTICAL DEVICE AND MANUFACTURING METHOD THEREFOR

Provided in one embodiment of the present invention is a method for manufacturing a holographic optical device having a holographic grid, the method comprising the steps of: (a) applying a photosensitive resin to one surface of a substrate so as to form a photosensitive substrate; and (b) emitting lasers at each of one surface and the other surface of the photosensitive substrate so as to record a holographic grid, wherein, in step (a), the photosensitive resin is applied so that the height of an application layer of the photosensitive resin varies according to a predetermined direction. [Representative drawing] figure 4

### DISPOSITIF OPTIQUE HOLOGRAPHIQUE ET SON PROCÉDÉ DE FABRICATION

Un mode de réalisation de la présente invention concerne un procédé de fabrication d'un dispositif optique holographique comprenant une grille holographique, le procédé comprenant les étapes consistant à : (a) appliquer une résine photosensible sur une surface d'un substrat de manière à former un substrat photosensible ; et (b) émettre des lasers au niveau de chacune d'une surface et de l'autre surface du substrat photosensible de manière à enregistrer une grille holographique, dans l'étape (a), la résine photosensible étant appliquée de telle sorte que la hauteur d'une couche d'application de la résine photosensible varie selon une direction pré-déterminée.



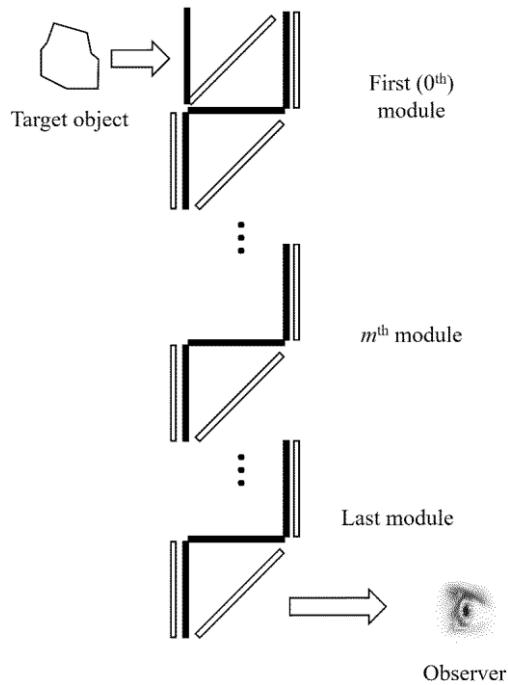
**CLAIM 1.** (a) Applying a photosensitive resin to one side of the substrate to form a photosensitive substrate; and (b) And irradiating a laser beam onto one surface and the other surface of the photosensitive substrate to record a holographic grating, Wherein step (a) comprises: And the photosensitive resin is applied so that the height of the coating layer of the photosensitive resin varies along a predetermined direction.

**DEVICE AND METHOD FOR TRANSMITTING HOLOGRAM USING UPDATABLE HOLOGRAPHIC MATERIAL**

A device and method capable of obtaining and transmitting a high resolution hologram in real time using an updatable holographic material is provided. A device for transmitting a hologram according to an embodiment of the present invention comprises: a first updatable holographic material (UHM) on which a hologram is updatable; a second UHM on which a hologram is updatable; and an optical system for transferring, to the second UHM, a hologram that is restored after being recorded on the first UHM, so as to record the hologram. Accordingly, by using the updatable holographic material, it is possible to obtain, transmit, and display high resolution holographic images in real time, without the burden of processing, transmitting, and displaying a large digital signal in real time.

**DISPOSITIF ET PROCÉDÉ DE TRANSMISSION D'HOLOGRAMME À L'AIDE D'UN MATERIAU HOLOGRAPHIQUE POUVANT ÊTRE MIS À JOUR**

L'invention concerne un dispositif et un procédé susceptibles d'obtenir et de transmettre un hologramme à haute résolution en temps réel à l'aide d'un matériau holographique pouvant être mis à jour. Un dispositif de transmission d'un hologramme selon un mode de réalisation de la présente invention comprend : un premier matériau holographique pouvant être mis à jour (UHM) sur laquelle un hologramme peut être mis à jour ; un second UHM sur lequel un hologramme peut être mis à jour ; et un système optique servant à transférer, au second UHM, un hologramme qui est restauré après avoir été enregistré sur le premier UHM, de façon à enregistrer l'hologramme. En conséquence, en utilisant le matériau holographique pouvant être mis à jour, il est possible d'obtenir, de transmettre et d'afficher des images holographiques à haute résolution en temps réel, sans la charge de traitement, de transmission et d'affichage d'un grand signal numérique en temps réel.



**CLAIM 1.** A first hologram rewritable holographic material (UHM); A second UHM in which the hologram is rewritable; and An optical system configured to transmit the hologram restored after being recorded in the first UHM to the second UHM and record the hologram.

10. Recording a hologram in a first Updatable Holographic Material (UHM) in which the hologram is rewritable; Restoring the hologram recorded in the first UHM; Communicating the reconstructed hologram to a second UHM in which the hologram is rewritable; Recording the transferred hologram in a second UHM; Restoring the hologram recorded in the second UHM.

## N7696

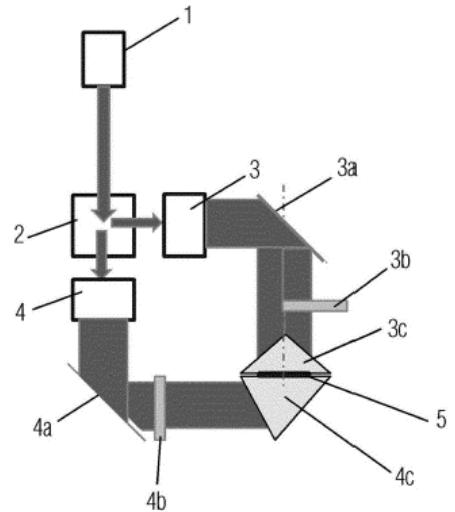
**RU2745540**

*Priority Date: 25/08/2020*

**SAMSUNG ELECTRONICS**

### AUGMENTED REALITY DEVICE BASED ON WAVEGUIDES WITH THE STRUCTURE OF HOLOGRAPHIC DIFFRACTION GRIDS, DEVICE FOR RECORDING THE STRUCTURE OF HOLOGRAPHIC DIFFRACTION GRIDS

**FIELD:** physics. **SUBSTANCE:** device for recording the structure of holographic diffraction gratings forms the first object beam and the reference beam, which falls on the edge of an isosceles triangular prism corresponding to one of the equal sides of an isosceles triangle, and the first object beam falls on the edge of an isosceles triangular prism corresponding to the other of the equal sides of an isosceles triangle. The device forms a second object beam that falls on the face of the triangular prism and refracts to the adjacent face of the triangular prism parallel to the face of the isosceles triangular prism corresponding to the base of the isosceles triangle. The recording material is located between the base of the isosceles triangular prism and the face of the triangular prism parallel to it. The augmented reality display device contains a projection system; a waveguide, on which the input diffraction element and the structure of the holographic diffraction gratings are located. **EFFECT:** providing an easy-to-manufacture, compact and lightweight device with a wide field of view and minimal radiation loss.



## N7697

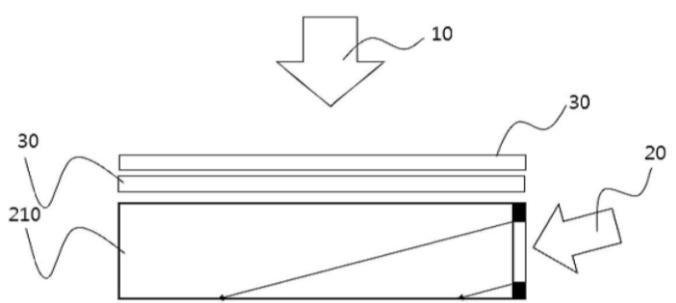
**KR20210032778**

*Priority Date: 17/09/2019*

**LG CHEM**

### HOLOGRAPHIC OPTICAL ELEMENT AND E-NORTH DISPLAY INCLUDING THE SAME

The present invention relates to a holographic optical device and an E-book display including the same. More particularly, the present invention relates to a holographic optical device including a volume hologram grating pattern in the holographic optical device, thereby preventing the readability of an E-book from being deteriorated in the dark area around the holographic optical device, and a display for an E-book including the same.



**CLAIM 1.** A holographic optical device comprising a photopolymer layer in which a volume hologram grating pattern is recorded, wherein the volume hologram grating pattern is recorded by interference between a first light incident on the photopolymer layer and a second light incident at an angle with the first light, and Wherein the first light passes through two optical sheets and is incident on the photopolymer layer, and each of the optical sheets has a rotation angle formed about an optical axis on which the first light is incident.

*Click on the title to return to table of contents*

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

N7687

WO202173086

Priority Date: 16/10/2019

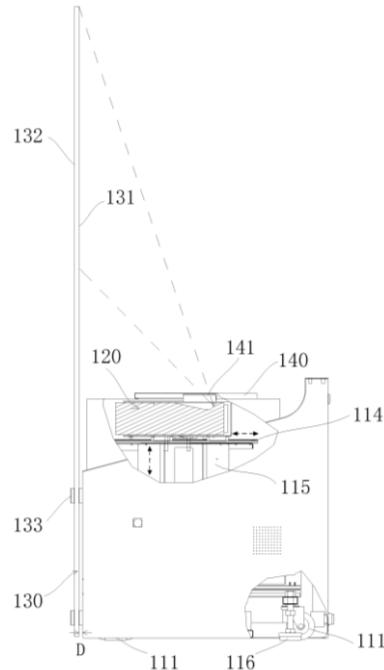
NUCTECH - TSINGHUA UNIVERSITY

#### MOVABLE HOLOGRAPHIC PROJECTION DEVICE AND HOLOGRAPHIC PROJECTION METHOD

Provided are a movable holographic projection device and a method for using said holographic projection device to perform holographic projection. The holographic projection device (100) comprises a movable base (110), a holographic projector (120), and a holographic projection board (130); the holographic projector is placed on a movable base, and is configured to project a light beam containing holographic image information to the holographic projection board; the holographic projection board is mounted on the movable base, and is configured to receive the light beam to form and display a virtual holographic image.

#### DISPOSITIF DE PROJECTION HOLOGRAPHIQUE MOBILE ET PROCÉDÉ DE PROJECTION HOLOGRAPHIQUE

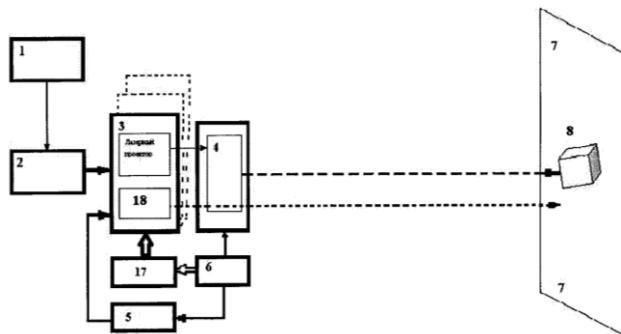
L'invention concerne un dispositif de projection holographique mobile et un procédé d'utilisation dudit dispositif de projection holographique pour réaliser une projection holographique. Le dispositif de projection holographique (100) comprend une base mobile (110), un projecteur holographique (120) et une plaque de projection holographique (130) ; le projecteur holographique est placé sur une base mobile, et il est conçu pour projeter un faisceau lumineux contenant des informations d'image holographique sur la carte de projection holographique ; la carte de projection holographique est montée sur la base mobile, et elle est conçue pour recevoir le faisceau lumineux de façon à former et à afficher une image holographique virtuelle.



**CLAIM 1.** A movable holographic projection device (100), comprising a movable base (110), a holographic projector (120) and a holographic projection plate (130). A holographic projector is disposed on the movable base, and is configured to project a beam of light containing holographic image information onto the holographic projection plate. A holographic projection plate is mounted to the movable base, and is configured to receive the light beam to form and display a virtual holographic image.

**DEVICE FOR CREATING DYNAMIC HOLOGRAPHIC IMAGES IN SPACE**

**FIELD:** advertising and information technologies. **SUBSTANCE:** invention relates to the field of advertising and information technologies. The device includes a light source, a laser projector, which includes a unit for forming the base of a virtual screen in air, a unit of holographic plates, a logic unit and a control computer. The light source is connected to the laser projector through an optical splitter and contains controlled drives. The block of holographic plates is a multilayer optically transparent liquid crystal matrix consisting of n separate optically transparent layers. A separate layer of an optically transparent liquid crystal matrix includes two outer optically transparent plates. Optically transparent conductive paths made of single-layer graphene are used as optically transparent conductive paths. They are connected to external current leads and point liquid crystal segments of a separate layer of an optically transparent liquid crystal matrix. There is a thin film of a metamaterial with a negative refractive index on the front surfaces of each separate layer of an optically transparent liquid crystal matrix, on the outside of two optical plates of each layer. An image hologram and a hologram of a contrast virtual screen are formed in the block of holographic plates at different times. The image hologram is focused upon the contrast virtual screen, and the switching of an image hologram to a hologram of a contrast virtual screen in the block of holographic plates is carried out by a logic unit according to the signals of the control computer taking into account the physiological parameters of the inertia of human vision. **EFFECT:** invention improves the clarity and contrast of the image.



**CLAIM 1.** Dynamic holographic imaging device in space, which includes a light source, one laser projector containing a virtual screen base in the air, and a logic block, a holographic plate stack installed downstream of the laser projector through its optical axis, which is a multilayer optical transparent LCD matrix consisting of separate optically transparent layers, A layer of optical transparent liquid-crystal matrix consists of two external optical transparent plates, which contain channels connected to external currents and point LCD segments of an optically transparent, liquid-crystal-crystal matrix, but on the frontal surfaces of each individual layer of an optical transparent liquid-crystal matrix on it two optical plates on external side with thin tape of metamaterial with negative refraction ratio equal to the refracting factor of the outer optical plate of the optical transparent liquid-crystal matrix; The hologram of the holographic plates shapes the image and hologram of the contrasting virtual screen on which the image hologram is focused at different moments of time, and the switch in the hologram of hologram plates to the hologram of the image of the contrasting virtual screen is carried out by the logic block of the signals of the managing computer, taking into account the physiological parameters of the inertia of the human vision providing the film principle, by using optical transparent conductive tracks from a single-layer graph as channels connected to external currents and point liquid LCD segments of an optical transparent liquid-crystal matrix.

N7699

KR102241148

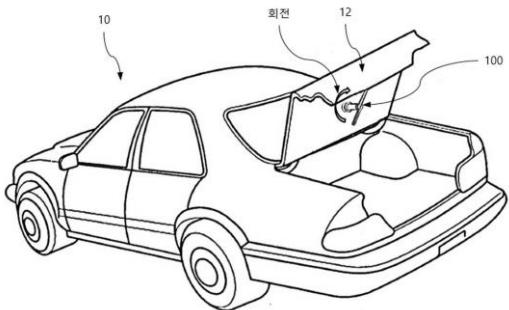
Priority Date: 31/12/2019

SHINSUNG UNIVERSITY

### HOLOGRAM TRIPOD FOR VEHICLE SAFETY DISPLAY AND METHOD FOR PROCESSING THE SAME

The present invention relates to a hologram tripod for a vehicle safety display and a processing method thereof. The hologram tripod for vehicle safety display includes a hologram display wing having a plurality of light emitting diodes, selectively lights the plurality of light emitting diodes corresponding to a hologram image for vehicle safety display, and outputs the corresponding hologram image by rotating the hologram display wing at a constant speed. The hologram tripod for displaying vehicle safety is fixedly installed inside a trunk door of a vehicle to open the trunk door and output a hologram image to warn or inform rear vehicle drivers of a dangerous situation when a failure or accident occurs in the vehicle. According to the present disclosure, secondary accidents can be prevented when a failure or an accident occurs in a vehicle by outputting a hologram image and informing rear vehicles.

**CLAIM 1.** A hologram tripod for a vehicle safety display, the hologram tripod comprising: a body in which an accommodation space is formed; a hologram display wing in which a plurality of light emitting diodes are uniformly arranged to irradiate light to an upper surface thereof, the hologram display wing being disposed on an upper portion of the body and rotatably axially coupled thereto; A fixing module having a front surface detachably coupled to a lower portion of the body and a rear surface fixedly installed on an inner surface of a trunk door of the vehicle; a driving module installed in the accommodation space of the body and pivotally coupled to a center of the hologram display wing to receive power from a power supply source of the vehicle and rotate the hologram display wing at a constant speed; A communication module installed in the accommodation space of the body and communicably connected to a driver terminal of the vehicle through a wireless communication network; and a controller installed in the accommodation space of the body, A memory configured to store at least setting information in which lighting positions of the light emitting diodes are set corresponding to a plurality of hologram images for vehicle safety display displayed by the lighted light emitting diodes, A plurality of relay elements corresponding to the light emitting diodes to supply the power supplied from the power supply to the light emitting diodes, A switching module configured to switch the light emitting diodes to be selectively turned on by the relay elements; and a driving module installed in the accommodation space of the body, When power is supplied from the power supply to the driving module and the switching module and a first remote control signal for remotely controlling to display the hologram image for displaying vehicle safety selected from the driver terminal is transmitted through the communication module, Control the switching module to read setting information corresponding to the first remote control signal from the memory and selectively turn on the light emitting diodes, and control the driving module to rotate the hologram display wing and output the selected hologram image for vehicle safety display, A control module configured to control the driving module and the switching module to terminate the output of the hologram image for vehicle safety display selected in response to a second remote control signal transmitted from the driver terminal.



N7700

KR102240477

Priority Date: 12/05/2019

KOREA UNIVERSITY INDUSTRIAL & ACADEMIC COLLABORATION FOUNDATION

### IMAGE PROJECTION APPARATUS AND METHOD USING HOLOGRAM FILM

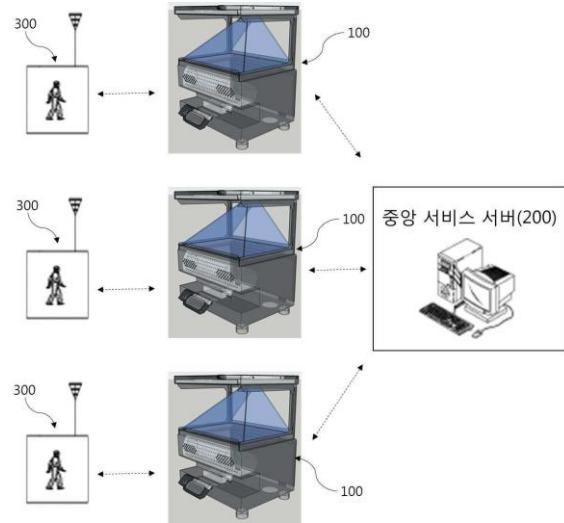
The present invention relates to an image projection apparatus and method using a hologram film, and more particularly, to an image projection apparatus and method using a hologram film, Controlling the plurality of mirrors to selectively reflect the plurality of changed beams, and generating an image based on the plurality of selectively reflected beams and controlling the image to be projected to the outside of the vehicle.

**CLAIM 1.** A hologram film unit configured to change a beam emitted from a light source unit into a plurality of beams, a mirror controller including a plurality of mirrors corresponding to the number of the plurality of beams changed, and configured to control the plurality of mirrors to selectively reflect the plurality of beams changed, And a projection controller configured to control the generated image to be projected to the outside of the vehicle, wherein the mirror controller rotates at least one of the plurality of mirrors except for a mirror corresponding to a shape related to the generated image.

**BIDIRECTIONAL COMMUNICATION SERVICE SYSTEM BASED ON 3 D HOLOGRAM DISPLAY DEVICE**

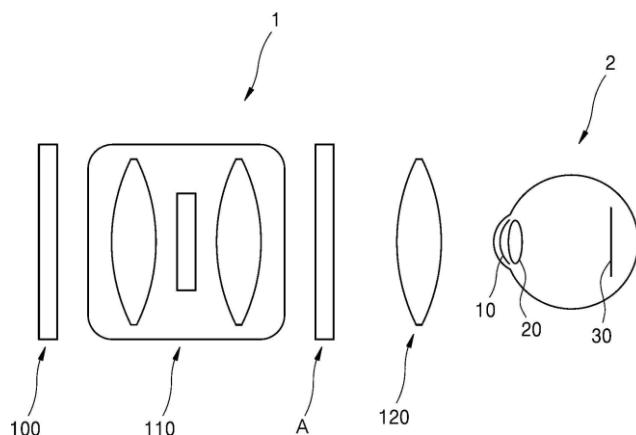
The present invention provides a 3 D hologram display apparatus capable of supporting optimal speech suitable for a character used by each user of the 3 D hologram display apparatus to implement a more realistic 3 D hologram. The present invention relates to a bidirectional communication service system based on a 3 D hologram display device, which can improve functionality and product competitiveness through various user-friendly updating of content play. According to the present invention, there is provided a three-dimensional (3 D) hologram display device including: a plurality of 3 D hologram display devices configured to display hologram content including a character or a figure as a 3 D hologram; A central service server configured to perform wired/wireless communication with a communication module configured in the 3 D hologram display apparatus to service hologram contents displayed in each of the 3 D hologram display apparatuses to perform a predetermined control operation; And a user terminal device installed with an interworking application and interworking with the 3 D hologram display device by short-range communication.

**CLAIM 1.** A 3 D hologram display system comprising: a plurality of 3 D hologram display devices configured to display hologram contents including characters or figures as 3 D holograms; a central service server configured to perform wired/wireless communication with a communication module configured in the 3 D hologram display devices to service the hologram contents displayed in each of the 3 D hologram display devices to perform a predetermined control operation; And a user terminal device installed with an interworking application and interworking with the 3 D hologram display device by short-range communication, wherein the 3 D hologram display device comprises a 3 D hologram display device main body, A hologram content output unit provided in the 3 D hologram display main body to output a hologram image, a hologram screen unit provided in the 3 D hologram display main body to project the hologram image output from the hologram content output unit, A microphone unit provided in the 3 D hologram display main body to receive sound, a motion sensor unit provided in the 3 D hologram display main body to recognize a motion of a user, a speaker unit provided in the 3 D hologram display main body to output sound, A communication module provided in the 3 D hologram display main body to communicate with the central service server and the user terminal device, and a controller provided in the 3 D hologram display main body to receive a control command transmitted from the central service server, A control module configured to control the hologram content in association with the hologram content output unit according to a self-setting condition, and a power supply unit configured to supply power to the 3 D hologram display device main body, wherein the central service server includes at least one of basic personal information of a user, A 3 D hologram display device, comprising: a user information database unit for storing user registration information including information of the 3 D hologram display device to be used; a voice data unit for receiving voice information of a user transmitted through the 3 D hologram display device; a voice information meaning analyzer unit for analyzing a meaning of the voice information provided by the voice data unit; and a controller for controlling the user information database unit, A voice information conversion unit configured to convert the voice information into text or convert the text to voice, a voice synthesis unit configured to synthesize a voice of a user's use character with the text converted by the voice information conversion unit, Wherein the control module includes an interlocking control unit configured to interlock with the hologram content output unit or the central service server to control hologram content, A motion detecting unit configured to perform an operation according to the motion pattern stored in the pattern recognition database based on the predetermined motion pattern recognized by the motion sensor unit, a voice recognition unit configured to recognize a voice input through the microphone unit and perform an operation according to the recognized voice, A character-voice converter for converting the message transmitted to the hologram content output unit into a voice and outputting the voice to a speaker, and a controller for reproducing music stored in the 3 D hologram display apparatus main body through an input command recognized by the voice recognizer, A music playing unit for causing the linked control unit to execute music stored in the user terminal device together with the 3 D hologram content, A customizing unit configured to apply an item including a style, a fashion, and an effect of the selected character, and a game executing unit configured to play game content in response to an operation command via the motion detecting unit and the voice recognition unit, A big data unit that collects and stores information on content of interest of each user, user request information, and textual issue information as big data, and a metadata generating unit that generates metadata for each category including each user, each content, and each field to be used as new content data based on the big data built in the big data unit, A data analyzer configured to construct analyzed analysis data, an item store configured to purchase an item provided to a customizing unit of the 3 D hologram display device, a game service unit configured to provide a game executed by a game execution unit of the 3 D hologram display device, A real-time updating unit configured to automatically transmit information on the new 3 D hologram content and a demonstration version to a 3 D hologram display apparatus of a corresponding user based on content of interest included in user registration information registered in the user information database, And a settlement unit configured to transmit a full version of the corresponding 3 D hologram content from the real-time update unit based on a settlement history of a user.



**VISION COMPENSATING HOLOGRAPHIC DISPLAY SYSTEM**

The present invention relates to a vision compensating holographic display system and a vision compensating holographic display method, and more particularly, to a vision compensating holographic display system and a vision compensating holographic display method capable of providing an appropriate hologram to an individual user by compensating for and providing a hologram in consideration of an eye structure of the individual user.



**CLAIM 1.** A vision compensating holographic display system comprising a spatial light modulator for reproducing a hologram, a filter and relay optical system, an eyepiece lens, and an actually measured portion for actually measuring an eye of a user, The measuring unit measuring the optical structure of the individual user's eyes, the spatial light modulator having a vision compensating holographic display algorithm reflecting the measured optical structure of the individual user's eyes to provide a hologram, Wherein the structure of the individual user's eyes derived according to the measurement is thickness, curvature, refractive index of the user's cornea, and thickness, curvature, and refractive index information of the user's eye lens, A curvature, a refractive index, and a thickness, a curvature, a refractive index of an eye lens of a user are parameterized in the vision correction holographic display algorithm, Assuming that an optical system composed of the spatial light modulator, a filter and relay optical system, and an eyepiece lens is a first optical system model, and assuming that an eye structure of a user is a second optical system model; Assume a steady state image formed on a retina surface of the user, assume virtual light generated on the image formed on the retina surface of the user and reaching the spatial light modulator through the first optical system model and the second optical system model, and And performing ray tracing for tracking an optical path of the virtual light to calculate a hologram reproduced by the spatial light modulator, wherein the hologram reproduced by the spatial light modulator is a hologram necessary for forming a steady state image on a retina surface of the user, The optical path of the virtual light beam is calculated by the following equations (1) and (2), and the hologram reproduced in the spatial light modulator is calculated by the following equation (3). (Equation 1) (Equation 2) : a light field of the k-th ray, : an amplitude corresponding to the retina plane (30) image (m, n), : the optical path experienced by the kth ray, : initial phase of retinal plane (30) image (m, n) : number of faces of system : the refractive index of the i-th medium for the wavelength, : k path for light rays to pass through the i-th medium mn: two-dimensional index of a point on the retinal or sensor surface k: index of light rays) (h (x, y): Hogel (x, y) ak : amplitude k: index of the light rays entering (x, y) of the SLM plane;k : Index k initial phase of ray)

## N7703

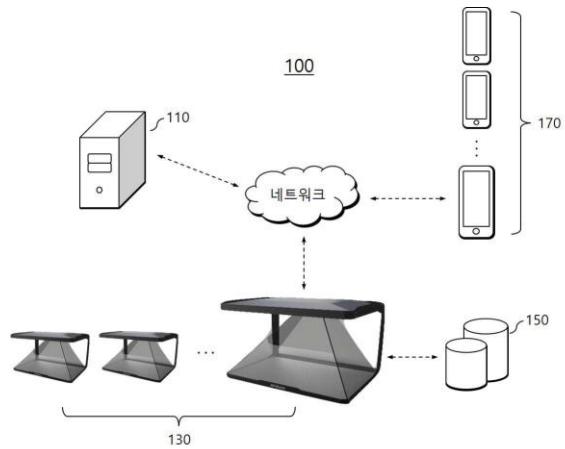
KR102231649

Priority Date: 21/10/2019

KIM, DONG WOOK

### HOLOGRAM GENERATION APPARATUS AND METHOD CAPABLE OF BIDIRECTIONAL INTERACTION USING 3 D DATA

The present invention relates to a hologram generating apparatus and method capable of bidirectional interaction, and the hologram generating apparatus includes a hologram object generating unit generating a hologram object composed of a plurality of canvas forming a screen area of a planar display panel and planar decomposed bodies of a development scheme in which a 3 D object is decomposed in at least three directions, A hologram generator configured to output the hologram target object toward reflection surfaces formed corresponding to each of the at least three directions through the planar display panel to generate a three-dimensional hologram of the 3 D object, and an interaction provider configured to provide bidirectional interaction with the three-dimensional hologram in conjunction with a user terminal.



**CLAIM 1.** A plurality of canvas each corresponding to a plurality of divided screen areas obtained by dividing a screen area of the flat display panel into trapezoids or triangles in at least three directions and formed to have a size equal to or larger than a size of the divided screen areas, A hologram object generator configured to generate a hologram object composed of planar decomposed bodies of a development view scheme obtained by decomposing a 3 D object in at least three directions on the plurality of canvas; A hologram generator configured to arrange and optimize planar decomposed bodies of the hologram target object in the plurality of canvas, respectively, and display an area where the plurality of canvas overlap the plurality of divided screen areas through the planar display panel to generate a three-dimensional hologram of the 3 D object; And an interaction providing unit configured to provide an interactive interaction with the three-dimensional hologram in cooperation with a user terminal.

## N7704

JP2021060474

Priority Date: 10/04/2019

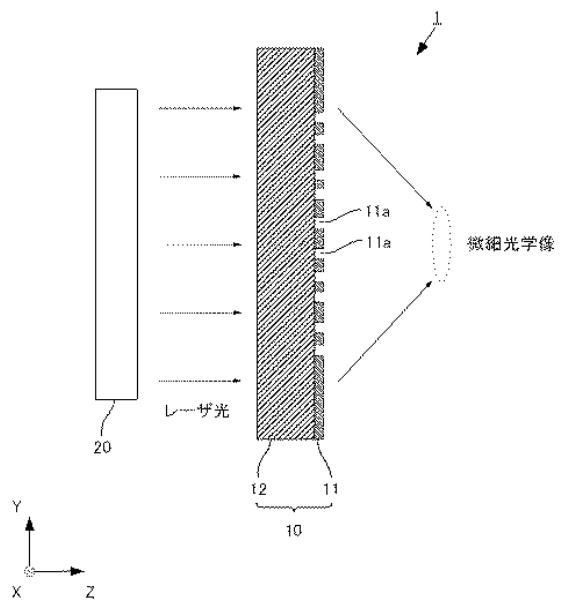
KITAMI INSTITUTE OF TECHNOLOGY

### PHOTON-SIEVE HOLOGRAM AND MICROOPTICAL IMAGE PROJECTION DEVICE

**TOPIC:** To provide a photonic hologram and a microoptical image projection device capable of easily projecting an accurate microoptical image onto an object.

**INVENTION:** a photon sieve hologram 10 includes a microstructure in which a plurality of concavities, convexities, or through-holes are arranged in a pattern in which at least two photon sieves are combined on the same plane. The microstructure may include a light shielding film 11 that blocks electromagnetic waves, and a plurality of pinholes 11 a that are formed in the light shielding film 11 and through which electromagnetic waves can pass.

**CLAIM 1.** A photon sieve hologram including a microstructure including a plurality of concavities, convexities, or through-holes arranged in a pattern in which at least two photon sieves are combined on the same plane.



N7705

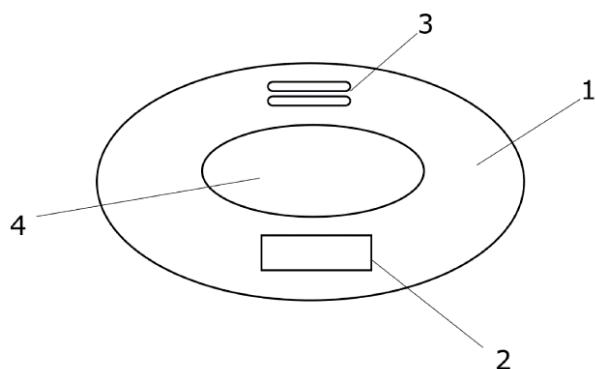
ES1262749U

Priority Date: 02/09/2021

UGOLINO CRISHTIAN

### HOLOGRAPHIC PROJECTOR DEVICE

Device with holographic projector, characterized in that it is formed by a casing (1) that houses inside a holographic projector that projects a holography on the outside, while the casing (1) has a wireless communication system, a control unit, a display (2), a microphone, a loudspeaker (3) and a power supply.



N7707

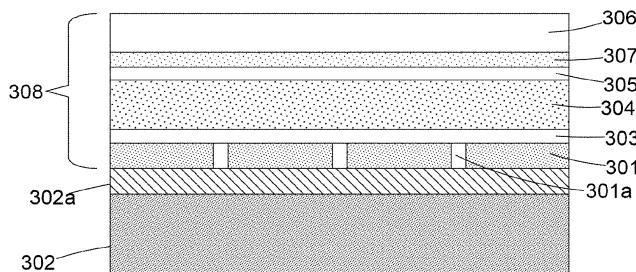
EP3799016

Priority Date: 27/09/2019

DUALITA - TOURE RITA J

### HOLOGRAM DISPLAY USING A LIQUID CRYSTAL DISPLAY DEVICE

A holographic display device comprises a liquid crystal panel, a display engine and a hologram engine, the liquid crystal display panel comprising a plurality of pixels. The display device comprises a display engine arranged to drive each pixel in accordance with a drive signal during each display interval defined by the display device. The drive signal may comprise a pixel voltage for each pixel. The display engine is arranged to invert the polarity of the drive signal every n display intervals (where n is an integer). The hologram engine is arranged to send a sequence of multi-level phase holograms for display to the display engine, whereupon the display engine displays each multi-phase level hologram in a respective display interval. The holograms are displayed in immediately consecutive (contiguous) display intervals without field inversion. An associated method of driving a display device is also described in which the multi-level phase holograms are displayed in immediately consecutive display intervals.



**CLAIM 1.** A display device comprising: a liquid crystal display panel comprising a plurality of pixels; a display engine arranged to drive each pixel of the plurality of pixels, in accordance with a drive signal, during each display interval of a plurality of display intervals defined by the display engine, wherein the display engine is arranged to invert the polarity of the drive signal every n display intervals, wherein n is an integer; a hologram engine arranged to send a sequence of multi-level phase holograms for display to the display engine; and wherein the display engine is arranged to display each multi-level phase hologram of the sequence in a respective display interval, wherein the display intervals used to display the multi-level phase holograms of the sequence are immediately consecutive.

N7708

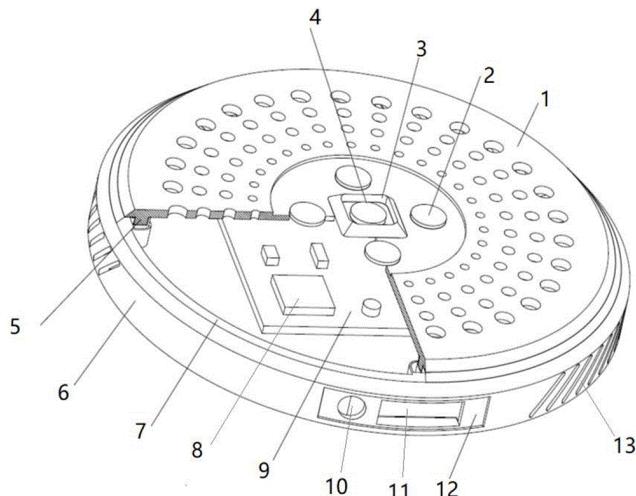
CN213024857U

Priority Date: 27/10/2020

## GUIZHOU DUOBAOLE AMUSEMENT EQUIPMENT

### HOLOGRAPHIC PROJECTION ARRANGEMENT OF CHILDREN'S EDUCATION

The utility model discloses a holographic projection device for children education, which comprises a base, wherein an information processor is arranged inside the base, and the information processor is movably connected with the base in a matching way; the upper end of the base is provided with a projection table, the projection table is movably matched and connected with the base, the middle of the projection table is provided with a plurality of holographic projection devices, and the holographic projection devices are electrically connected with the information processor; one side of the holographic projection device is provided with an intensifier which is a signal intensifier and is electrically connected with the information processor and the holographic projection device; a charging port is arranged on one side of the base, a controller is arranged on one side of the charging port, and the controller is electrically connected with the information processor; the device of the utility model is simple in structure, convenient to use, through a plurality of holographic projection arrangement and the current stabilizer that sets up, the protector and the information processor movable fit that have improved the holographic projection of the device stability through setting up are connected, improve the security of this equipment.



**CLAIM 1.** The utility model provides a holographic projection arrangement of children's education which characterized in that: the intelligent control device comprises a base, wherein an information processor is arranged in the base and is movably connected with the base in a matched manner; the upper end of the base is provided with a projection table, the projection table is movably matched and connected with the base, the middle of the projection table is provided with a plurality of holographic projection devices, and the holographic projection devices are electrically connected with the information processor; one side of the holographic projection device is provided with an intensifier which is a signal intensifier and is electrically connected with the information processor and the holographic projection device; one side of the base is provided with a charging port, one side of the charging port is provided with a controller, and the controller is electrically connected with the information processor.

N7709

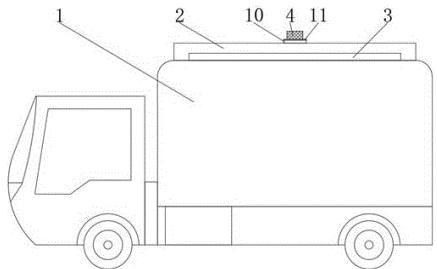
CN213024854U  
Priority Date: 30/09/2020

COLLEGE OF TOURISM & CULTURE YUNNAN UNIVERSITY

### OUTDOOR NEWS TEACHING IS WITH LED HOLOGRAPHIC PROJECTION CAR BASED ON 5G NETWORK TRANSMISSION

The utility model discloses an outdoor news teaching is with LED holographic projection car based on 5G network transmission, including the holographic projection car body, the casing is accommodated to the top fixedly connected with of holographic projection car body, the equal sliding connection in front side and the rear side of accomodating shells inner wall has the guard plate, the top fixedly connected with motor of accomodating the casing, the bottom fixedly connected with connecting rod of motor, the bottom of connecting rod runs through to the inside of accomodating the casing, the bottom fixedly connected with driving disc of connecting rod, the bottom fixedly connected with of driving disc connects the gear, the both sides of connecting the gear bottom all mesh there is drive gear, drive gear's outside fixedly connected with drive screw. The utility model provides a current holographic projection car of 5G network for sealing the design when transporting at ordinary times, can open when needing to show and conveniently watch, and just cause the holographic projection car of 5G network to damage easily if meet weather such as rain or snow when opening, influence the problem of the show of the holographic projection car of 5G network.

**CLAIM 1.** The utility model provides a teaching is with LED holographic projection car based on outdoor news of 5G network transmission, includes holographic projection car body (1), its characterized in that: the top of the holographic projection vehicle body (1) is fixedly connected with a receiving shell (2), the front side and the rear side of the inner wall of the containing shell (2) are both connected with a protection plate (3) in a sliding way, the top of the containing shell (2) is fixedly connected with a motor (4), the bottom of the motor (4) is fixedly connected with a connecting rod (5), the bottom of the connecting rod (5) penetrates into the accomodating shell (2), the bottom of the connecting rod (5) is fixedly connected with a transmission disc (6), the bottom of the transmission disc (6) is fixedly connected with a connecting gear (7), two sides of the bottom of the connecting gear (7) are respectively engaged with a transmission gear (8), the outer side of the transmission gear (8) is fixedly connected with a transmission screw (9), the outer side of the transmission screw rod (9) penetrates through the inner part of the protection plate (3) and is in threaded connection with the inner wall of the protection plate (3).



N7710

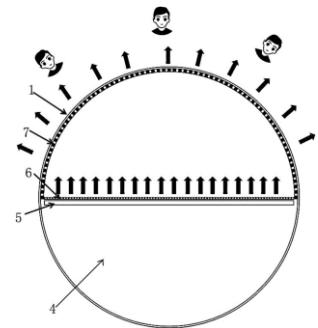
CN213023957U  
Priority Date: 10/09/2020

QU YONGQING

### HOLOGRAPHIC EFFECT IMAGE DISPLAY DEVICE

The utility model discloses a holographic effect image display device, wherein the top of a columnar shell is connected with an upper sealing body, and the bottom of the columnar shell is connected with a lower sealing seat; an accommodating space is formed between the upper sealing body and the lower sealing seat, and a display screen is filled in the accommodating space; an optical plane grating is attached to the surface of the display screen; the inner wall of the columnar shell close to one side of the optical plane grating is attached with the optical micropore grating; the optical plane grating and the optical micropore grating are arranged in a semi-cylindrical shape. According to the technical scheme, a high-resolution display screen can be used as an imaging element, so that the definition of a holographic image is greatly improved, and the holographic effect is far superior to that of the conventional holographic display scheme; the holographic display screen is not influenced by ambient light, can be viewed at any angle within 180 degrees, has strong and shocking holographic effect and the like, can be used for various industrial markets such as exhibition and display, popular science education, man-machine interaction, advertisement and the like, and has high commercial application value.

**CLAIM 1.** The holographic effect image display device is characterized by comprising a columnar shell (1), wherein the top of the columnar shell (1) is connected with an upper sealing body (2), and the bottom of the columnar shell (1) is connected with a lower sealing seat (3); an accommodating space (4) is formed between the upper sealing body (2) and the lower sealing seat (3), and a display screen (5) is filled in the accommodating space (4); an optical plane grating (6) is attached to the surface of the display screen (5); an optical micropore grating (7) is attached to the inner wall of one side, close to the optical plane grating (6), of the cylindrical shell (1); the optical plane grating (6) and the optical micropore grating (7) are in a semi-cylindrical shape after being butted.



N7711

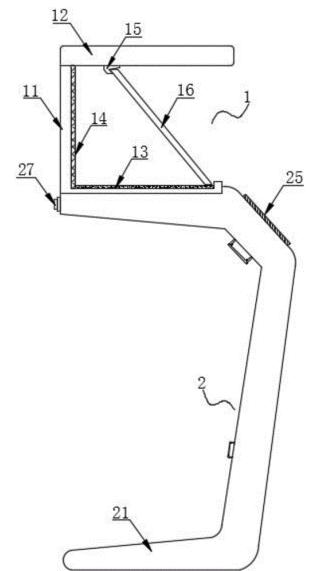
CN212990645U  
Priority Date: 30/10/2020

SHANGHAI YIRAN DIGITAL TECHNOLOGY

### DIGITAL HOLOGRAPHIC INTERACTION EQUIPMENT

The utility model discloses a digital holographic interactive installation, including projection mechanism and base mechanism, projection mechanism sets up in base mechanism's top, projection mechanism includes that equipment rack and display screen place the frame, the display screen is placed frame fixed mounting in equipment rack's top, the utility model relates to a holographic image technical field. This digital holographic interaction equipment, through the show form that combines together 3D stereographic projection effect and 3D model, make it produce three-dimensional unreal image formation, give people a virtual and reality dual world sense that combines together, compare with traditional 3D display technology, holographic projection technology need not to wear any equipment, only need with the naked eye, just can 180 degrees all-round browse, watch the combination of digital content and entity, let spectator through immersion and exist the sense, constantly strengthen its sense of reality in the digital experiment.

**CLAIM 1.** The utility model provides a digital holographic interaction equipment, includes projection mechanism (1) and base mechanism (2), projection mechanism (1) sets up in the top of base mechanism (2), its characterized in that: the projection mechanism (1) comprises an equipment frame (11) and a display screen placing frame (12), the display screen placing frame (12) is fixedly arranged at the top of the equipment frame (11), a first stainless steel plate (13) is fixedly arranged at the bottom of the inner wall of the equipment frame (11) through a groove, a second stainless steel plate (14) is fixedly arranged on one side of the inner wall of the equipment frame (11), a limiting block (15) is fixedly arranged on one side of the bottom of the display screen placing frame (12), transparent holographic glass (16) is arranged between the limiting block (15) and the first stainless steel plate (13), sliding rails (17) are fixedly arranged on two sides between the top and the bottom of the inner cavity of the display screen placing frame (12), a display screen (18) is placed between the two sliding rails (17), the top and the bottom of the display screen placing frame (12) are provided with openings matched with the display screen (18) for use.



N7712

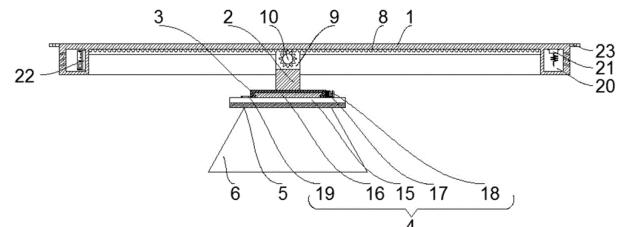
CN212986490U  
Priority Date: 07/06/2020

GUANGZHOU GRAVITATIONAL WAVE TECHNOLOGY INNOVATION DEVELOPMENT

### HOLOGRAPHIC PROJECTION DEVICE WITH MOVABLE GUIDE RAIL

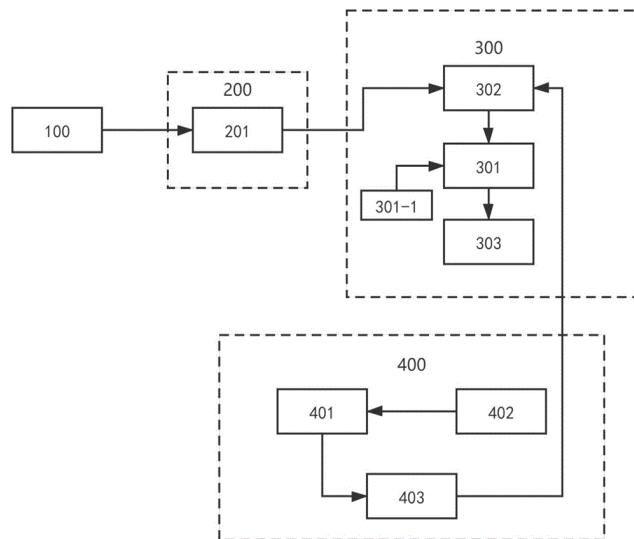
The utility model provides a holographic projection arrangement with portable guide rail has the holographic projection arrangement of portable guide rail, relates to holographic projection equipment field, including slide rail, carriage release lever, the carriage release lever joint is in inside the lower surface of slide rail, slewing mechanism and actuating mechanism, slewing mechanism rotates the joint and is in inside the lower surface of fixed disk, actuating mechanism slip joint is in one side of slide rail, just actuating mechanism's one end with the carriage release lever rotates mutually and connects. The utility model discloses a be equipped with slewing mechanism, conveniently make holographic projector carry out 360 degrees rotations on the fixed disk, be convenient for carry out the omnidirectional show to holographic projector, and through being equipped with actuating mechanism, the carriage release lever of being convenient for removes on the slide rail, and actuating mechanism drives gear through first servo motor and rotates, and the gear meshes with the rack mutually, and then is convenient for carry out accurate control and lock to the position that the carriage release lever is located on the slide rail and dies.

**CLAIM 1.** A holographic projection device with a movable guide, comprising: a slide rail (1); the movable rod (2) is clamped inside the lower surface of the sliding rail (1), and a fixed disc (3) is fixedly mounted on the lower surface of the movable rod (2); the rotating mechanism (4) is rotationally clamped inside the lower surface of the fixed disc (3), an installation frame (5) is fixedly installed on the lower surface of the rotating mechanism (4), and a holographic projector (6) is fixedly installed on the lower surface of the installation frame (5); the driving mechanism (7) is connected to one side of the sliding rail (1) in a sliding and clamping mode, and one end of the driving mechanism (7) is rotatably connected with the moving rod (2).



**INTELLIGENT HOLOGRAPHIC PROJECTION SYSTEM**

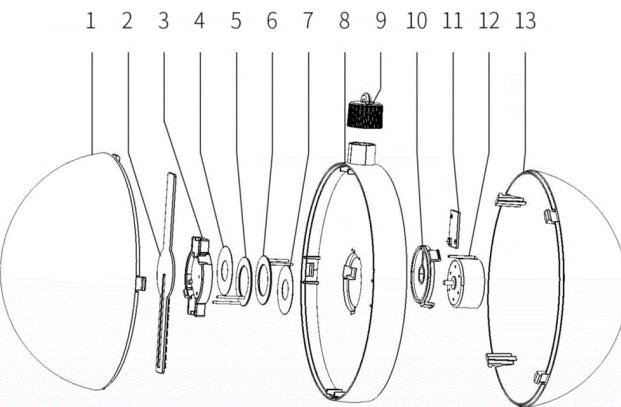
The utility model discloses a holographic projection system of intelligence, the holographic projection system of this kind of intelligence includes image processing module, transmission projection module and human-computer interaction module, and image processing module is used for handling the 3D model, and four radial views all around of intercepting 3D model are as two-dimensional image, and transmission projection module is used for receiving four two-dimensional image and projection display of image processing module, and the human-computer interaction module passes through attitude sensor communication connection transmission projection module and is used for changing the state of projection image, the utility model discloses a dismantle the projection mode of amalgamation again with the 3D model to the generation has the stereographic image of better digital visual effect, is convenient for observe and the actual use, and can the interactive regulation, compare in traditional projection more clear, the third dimension is strong, brings into the sense extremely strong.



**CLAIM 1.** An intelligent holographic projection system, comprising: comprises the steps of (a) preparing a mixture of a plurality of raw materials, the image processing module (200), the image processing module (200) is used for processing the 3D model, and four views around the 3D model in the radial direction are intercepted to be used as two-dimensional images; the transmission projection module (300), the transmission projection module (300) is used for receiving four two-dimensional images of the image processing module (200) and projecting and displaying the four two-dimensional images; the human-computer interaction module (400) is in communication connection with the transmission projection module (300) through the attitude sensor and is used for changing the state of the projected image.

**PORTABLE MINI HOLOGRAPHIC ROTARY DISPLAY DEVICE**

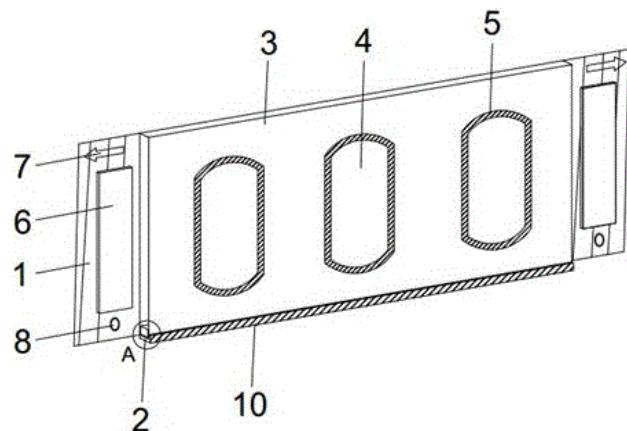
The utility model discloses a portable mini holographic rotary display device, which comprises a device body, wherein the device body is composed of a fixed component and a rotating part component, the rotating part component comprises a LED lamp panel and a main control panel, a rotating part component fixing part, a rotating part wireless power supply receiving end magnetic isolation sheet and a wireless power supply receiving end coil, the fixed component comprises a PC transparent protective shell, a wireless power supply transmitting end coil, a fixed component wireless power supply transmitting end magnetic isolation sheet, a fixed component structure middle frame, a power interface fixing part, a magnetic isolation sheet and motor fixing part, a motor driving plate, a brush driving motor and a VBS protective shell, the utility model discloses a structure design and a circuit device design are optimized, the structure size and the circuit device size of the rotary display device are reduced on the premise of realizing the display function, the cost of the rotary display device is greatly reduced, and is also suitable for display under multiple scenes.



**CLAIM 1.** The utility model provides a portable mini holographic rotary display device, includes the device body, its characterized in that: the device body comprises a fixed assembly (14) and a rotating part assembly (15), the rotating part assembly (15) comprises an LED lamp panel and a main control board (2), a rotating part assembly fixing part (3), a rotating part wireless power supply receiving end magnetic isolation sheet (4) and a wireless power supply receiving end coil (5), the fixed assembly (14) comprises a PC transparent protective shell (1), a wireless power supply transmitting end coil (6), a fixed assembly wireless power supply transmitting end magnetic isolation sheet (7), a fixed assembly structure middle frame (8), a power interface fixing part (9), a magnetic isolation sheet and motor fixing part (10), a motor drive board (11), a brush drive motor (12) and a VBS protective shell (13), the LED lamp panel and the main control board (2) are of a long rectangular middle circular plate type structure, the LED lamp panel and the main control board (2) are used for controlling an LED drive chip, and the LED lamp panel and the main control board (2) are in signal communication connection with the motor drive board (11), the rotating part assembly fixing piece (3) is of a GV type semi-surrounding structure, one side of a groove of the rotating part assembly fixing piece (3) is fixedly provided with an LED lamp panel and a main control board (2), the other side of the rotating part assembly fixing piece (3) is fixedly provided with a rotating part wireless power supply receiving end magnetism isolating sheet (4) and a wireless power supply receiving end coil (5), the rotating part assembly fixing piece (3) is arranged on a rotor rotating shaft of a brush driving motor (12), the rotating part wireless power supply receiving end magnetism isolating sheet (4) is of a circular hollow structure, the wireless power supply receiving end coil (5) is of a circular hollow structure and is fixed on the rotating part wireless power supply receiving end magnetism isolating sheet (4) and is connected with the LED lamp panel and the main control board (2), the wireless power supply receiving end coil (5) is electrically connected with the LED lamp panel and the main control board (2), and the wireless power supply, and the wireless power supply transmitting terminal coil (6) is fixed on the fixing component wireless power supply transmitting terminal magnetism isolating sheet (7) and is connected with the motor driving board (11).

**INTEGRATED DECORATIVE STRUCTURE OF CHANGEABLE HOLOGRAPHIC WALL IN BATHROOM**

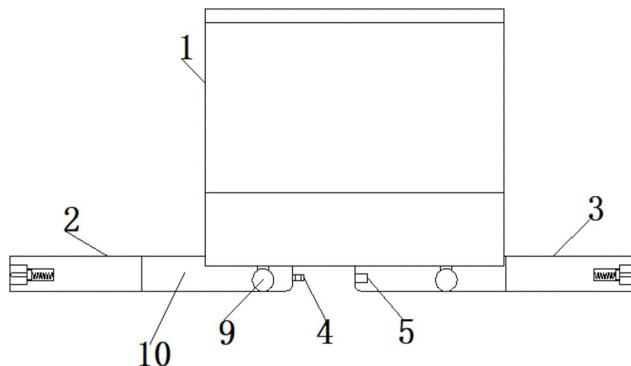
The utility model relates to a bathroom wall decoration technical field discloses a bathroom changeable holographic wall integrated decoration structure, which comprises a wall surface, the bottom of wall is equipped with the buffering base, the upper end of buffering base is equipped with the clear glass case, the even interval of surface of clear glass case is pasted and is had the level crossing, be equipped with LED lighting lamp area around the level crossing, the both sides of clear glass case are equipped with holographic changeable screen, the upper end of holographic changeable screen is equipped with the direction sign, and the below is equipped with human infrared inductor, the clear glass incasement is equipped with the controller, LED lighting lamp area, human infrared inductor with controller electric connection. The utility model discloses a decorative structure third dimension is stronger, and structural layout is harmonious, reasonable, pleasing to the eye fashion, and this decorative structure and natural environment perfect integration play and alleviate fatigue, relax the effect of mood, have great practical value.



**CLAIM 1.** The utility model provides an integrated decorative structure of changeable holographic wall in bathroom, includes wall (1), its characterized in that: the bottom of wall (1) is equipped with buffer base (2), the upper end of buffer base (2) is equipped with clear glass case (3), the even interval of surface of clear glass case (3) is pasted and is had level crossing (4), be equipped with LED lighting lamp area (5) around level crossing (4), the both sides of clear glass case (3) are equipped with holographic changeable screen (6), the upper end of holographic changeable screen (6) is equipped with direction sign (7), and the below is equipped with human infrared inductor (8), be equipped with controller (9) in clear glass case (3), LED lighting lamp area (5), human infrared inductor (8) with controller (9) electric connection.

**HOLOGRAPHIC PROJECTION ARRANGEMENT OF CONVENIENT TRANSPORTATION**

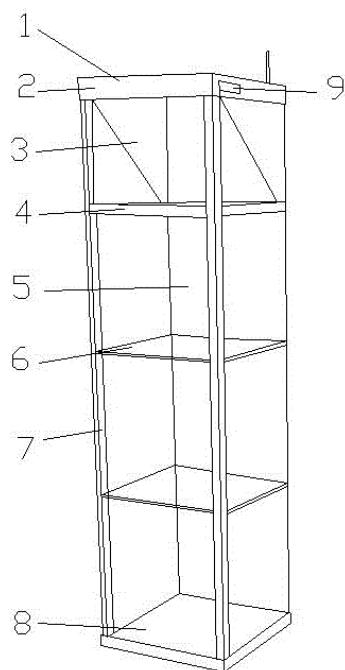
The utility model discloses a holographic projection device convenient for transportation, which comprises a projection device, a first bottom plate, a second bottom plate and a fixed plate, pulleys are fixedly connected around the bottom end of the projection device, connecting blocks are respectively fixedly connected at two ends of one side of the first bottom plate, clamping grooves are respectively arranged at the outer sides of the two connecting blocks, connecting grooves corresponding to the connecting blocks are respectively arranged at two ends of one side of the second bottom plate, threaded holes are arranged at the front end and the rear end of the second bottom plate, mounting grooves are arranged on the first bottom plate and the second bottom plate, glass plates are arranged in the mounting grooves, T-shaped grooves are respectively arranged on the first bottom plate and the second bottom plate, manpower can be saved during transportation by the pulleys arranged around the bottom end of the projection device, the projection device is stabilized by the first bottom plate and the second bottom plate when the projection device is not required to be transported, the first bottom, the problem of current holographic projection arrangement because great inconvenient transportation that leads to is solved.



**CLAIM 1.** A holographic projection device convenient to transport comprises a projection device (1), a first bottom plate (2), a second bottom plate (3) and a fixing plate (14), and is characterized in that pulleys (9) are fixedly connected to the periphery of the bottom end of the projection device (1), two ends of one side of the first bottom plate (2) are respectively and fixedly connected with connecting blocks (4), clamping grooves (6) are formed in the outer sides of the two connecting blocks (4), connecting grooves (5) corresponding to the connecting blocks (4) are formed in two ends of one side of the second bottom plate (3), threaded holes (7) are formed in the front end and the rear end of the second bottom plate (3), and threaded rods (8) are screwed in the threaded holes (7); be equipped with on the relative one side of first bottom plate (2) and second bottom plate (3) and place mouth (10), be equipped with mounting groove (11) on first bottom plate (2) and second bottom plate (3), install glass board (17) in mounting groove (11), T type groove (15) have all been seted up on first bottom plate (2) and second bottom plate (3), fixed plate (14) activity joint is in T type groove (15), two reset spring (12) of fixed plate (14) one side fixedly connected with, reset spring (12) one end fixed connection is on T type groove (15) inner wall, fixedly connected with pull rod (13) on one side of fixed plate (14) skew reset spring (12), control cabinet (16) have been placed on first bottom plate (2) and second bottom plate (3).

**NOVEL HOLOGRAPHIC GLASS SHOW CUPBOARD**

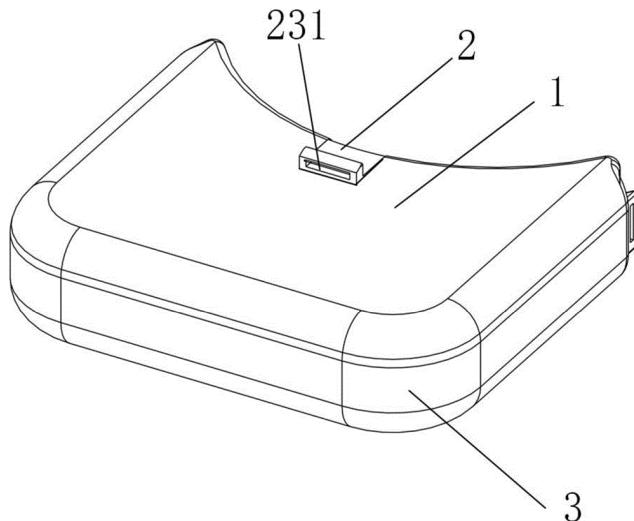
The utility model discloses a novel holographic glass display cabinet, which comprises a cabinet body, holographic glass is holographic coated glass, a holographic imaging module is a liquid crystal screen, a host module is set as a network media player, holographic visual display of the holographic imaging module and the holographic glass is synchronously controlled through a wireless network, the holographic imaging module realizes aerial phantom imaging through the holographic glass to achieve holographic D visual effect, the glass cabinet body consists of a glass plate and a stainless steel upright post, the glass cabinet body and a base are both in a cavity structure, the master control module controls the selection switching, the amplification and the reduction, the volume control and the linkage control of holographic pictures, the bottom surface display module and the holographic imaging module are linked and are controlled by the control module, the display problem of poor scene of single holographic data is solved, and the general and individual information of the data can be displayed simultaneously, meanwhile, the image observed by the holographic imaging module has a stereoscopic impression, and the visual effect can be improved.



**CLAIM 1.** The utility model provides a novel holographic glass show cupboard, includes cabinet body (1), its characterized in that: the cabinet body (1) comprises a holographic system (2), holographic glass (3), a holographic imaging module (4), a glass cabinet body (5), a glass plate (6), a stainless steel upright post (7), a base (8), a sound module (9), a host module (10) and a remote controller indicator light (11), wherein the holographic system (2) is arranged above the cabinet body (1), the holographic glass (3) is fixedly arranged on the lower surface of the holographic system (2), the holographic imaging module (4) is arranged at the other end of the holographic glass (3) and in parallel with the holographic system (2), the glass cabinet body (5) is composed of the glass plate (6) and the stainless steel upright post (7), the base (8) is arranged below the glass cabinet body (5), the sound module (9) is arranged on the side walls on the two sides of the holographic system (2), the host module (10) is arranged on the upper surface of the holographic system (2) and is far away from one end of the sound module (9), and the remote controller indicator light (11) is arranged on one side wall of the holographic system (2) and is close to one end of the host module (10).

**HOLOGRAPHIC PROJECTION GLASSES SUITABLE FOR CELL-PHONE**

The utility model relates to the technical field of holographic projection glasses, a holographic projection glasses suitable for mobile phone comprises a top cover shell, a pressure bearing shell, a glasses case shell, a circular cotton piece, a rectangular pyramid transparent body, an adjustable magnifying glass component, an iron sheet, a magnet, a screw and an earphone plug extension line which are mutually assembled; the rectangular pyramid transparent body is formed by bonding 4 same isosceles triangle transparent sheets and is fixed in the square positioning groove by glue; the pressure-bearing shell is provided with a screen projection window; the top cover shell and the pressure-bearing shell are both provided with semicircular transverse grooves for the adjustable amplifier component to transversely slide; be equipped with the headphone plug extension line so that external earphone cord, the utility model provides a holographic projection glasses suitable for cell-phone supplies the user to experience holographic projection effect.



**CLAIM 1.** A holographic projection glasses suitable for mobile phone is characterized in that: the earphone comprises a top cover shell, a pressure-bearing shell, a mirror box shell, a circular cotton sheet, a rectangular pyramid transparent body, an adjustable magnifier assembly, an iron sheet, a magnet, a screw and an earphone plug extension line which are assembled with each other; the top cover shell is provided with a screw post and a top cover buckle which are used for fixing iron sheets; the pressure-bearing shell is provided with a screen projection window, a magnifier transfer limiting hole, a head binding belt part, a magnet groove, a semicircular transverse groove of the pressure-bearing shell, an arc notch and a pressure-bearing screw hole; the mirror box shell is provided with a wall body part shaped like a Chinese character '8', a square positioning groove, a semicircular transverse groove of the mirror box shell, a side binding belt part, a concave surface of a nose bridge part, a viewing hole, an earphone socket limiting part, a screw hole of the wall body part and a middle isolation wall; the four pyramid-shaped transparent bodies are formed by bonding four same isosceles triangle transparent sheets; the adjustable magnifier assembly comprises a first shell, a second shell and a magnifier unit which are mutually assembled; the magnifier unit comprises a main shell, a magnifying lens and an auxiliary shell which are mutually assembled; the first shell is provided with a first internal cutting groove and a semicircular transverse bulge; the second shell is provided with a second inner cutting groove; the main shell is provided with a long shifting convex handle, a shifting convex handle and an inner ring groove of the main shell; the auxiliary shell is provided with an inner annular groove of the auxiliary shell; the iron sheet is provided with an iron sheet positioning screw hole; the extension line of the earphone plug is provided with a 3.5mm earphone plug, a connecting line and an earphone socket; the head bandage part is provided with a head bandage hole; the side strap members have side strap apertures.

N7720

CN212906004U

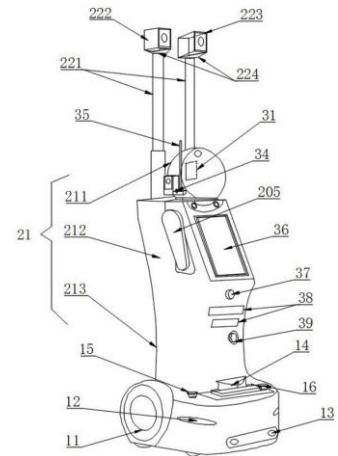
Priority Date: 15/10/2020

RUAN JINQIN

## PATROL AND EXAMINE ROBOT OF BUILT-IN HOLOGRAPHIC PROJECTION AND ASSET INVENTORY READING AND WRITING EQUIPMENT

The utility model discloses a patrol robot with a built-in holographic projection and asset checking read-write device, which comprises a driving chassis and a main body arranged above the driving chassis, wherein a driving wheel set, an environment monitoring sensor, an obstacle avoidance sensor and a laser radar are arranged on the driving chassis; the main body comprises an outer frame shell and a lifting device, and an infrared thermal imager and a high-definition camera are respectively arranged on two independent electric push rods of the lifting device; RFID asset checking read-write equipment is arranged in the head of the outer frame shell; and the two sides of the head are respectively provided with a projector, a sound pick-up and a loudspeaker, and an RFID receiving antenna is arranged at the position of the loudspeaker. Through the design, RFID asset checking read-write equipment is adopted, so that automatic checking of equipment in a machine room and acquisition of equipment information are realized; adopt intelligent holographic projector can show the inside information of computer lab all-roundly vividly, the projecting apparatus adopts the joint formula to connect simultaneously, and the projecting apparatus dismantling of being convenient for is convenient.

**CLAIM 1.** The utility model provides a built-in holographic projection and asset inventory reading and writing equipment's robot of patrolling and examining which characterized in that: the system comprises a driving chassis and a main body arranged above the driving chassis, wherein a driving wheel set, an environment monitoring sensor, an obstacle avoidance sensor and a laser radar are arranged on the driving chassis; the laser radar, the environment monitoring sensor and the obstacle avoidance sensor are all arranged on the front side of the driving chassis; the main body comprises an outer frame shell and a lifting device at the rear part of the outer frame shell; the outer frame shell is divided into a head part, a body part and a tail part, RFID asset inventory reading and writing equipment is arranged in the head part of the outer frame shell, and a face recognition camera is arranged at the top of the head part; the two sides of the head are respectively provided with a projector, a sound pick-up and a loudspeaker, an RFID receiving antenna is arranged at the position of the loudspeaker, and a display screen is arranged on the body of the outer frame shell; the tail part of the outer frame shell is sequentially provided with a wireless KVM display switching button, a storage box for storing a tablet personal computer or a wireless keyboard or a wireless mouse and an alarm indicator lamp from top to bottom.



N7721

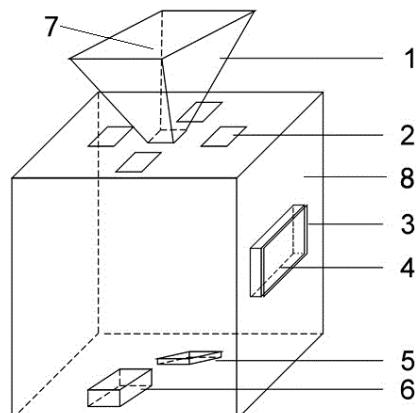
CN212873907U

Priority Date: 30/09/2020

NANJING YAXU ELECTRONIC TECHNOLOGY

## CONTENT-REPLACEABLE HOLOGRAPHIC DISPLAY EQUIPMENT WITH TOUCH INTERACTION FUNCTION

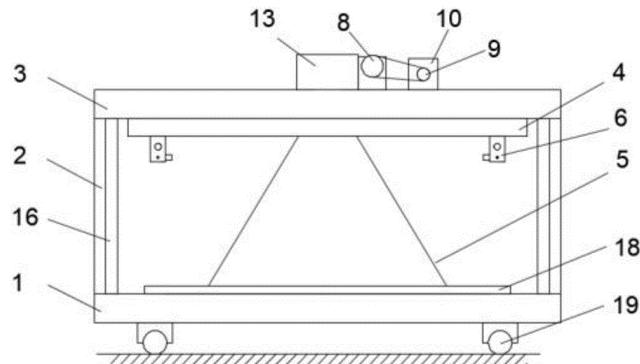
The utility model discloses an interactive holographic display device of touch of removable content, including quick-witted case, quick-witted incasement installs main frame and storage hard disk, and the side of machine case is provided with touch-sensitive screen and display, and the top surface of machine case is provided with four flat panel display, is provided with the three-dimensional show space of back taper in the middle of the top surface of machine case, and the three-dimensional show space of back taper has four toughened glass to enclose, and every flat panel display corresponds one side toughened glass. The utility model relates to a 360-degree three-dimensional holographic display device, which is provided with four flat displays, is holographic on four sides and can display 360-degree holographic images; the storage is independent, and the content can be replaced by hardware.



**CLAIM 1.** A content-replaceable, touch-interactive, holographic display device, comprising: including quick-witted case (8), install host computer (6) and storage hard disk (5) in quick-witted case (8), the side of quick-witted case (8) is provided with touch-sensitive screen (3) and display (4), the top surface of quick-witted case (8) is provided with four flat panel display (2), be provided with the three-dimensional show space of back taper (7) in the middle of the top surface of quick-witted case (8), the three-dimensional show space of back taper (7) are enclosed by four toughened glass (1), and every flat panel display (2) correspond one side toughened glass (1).

**ROTATABLE VR360 HOLOGRAPHIC PROJECTION EQUIPMENT**

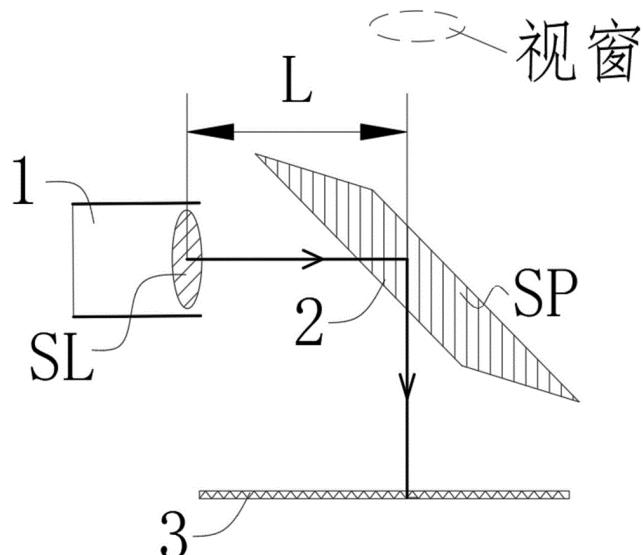
The utility model belongs to the technical field of holographic projection, in particular to a rotatable VR360 holographic projection device, aiming at the problem that the prior projection position and angle can not be moved, the following proposal is provided, which comprises a lower bottom plate, one side of the top of the lower bottom plate is fixedly connected with a supporting plate, a square frustum is fixedly connected above the lower bottom plate, the top of the supporting plate is fixedly connected with an upper bottom plate, the top of the upper bottom plate is rotatably connected with a worm wheel, the top of the upper bottom plate is fixedly connected with symmetrical supporting tables, two supporting tables are rotatably connected with the same worm, one end of the worm passes through the supporting tables and is fixedly connected with a first belt pulley, and the worm wheel are meshed with each other, thereby increasing the ornamental value of the projection.



**CLAIM 1.** The rotatable VR360 holographic projection equipment comprises a lower plate (1) and is characterized in that a supporting plate (2) is fixedly connected to one side of the top of the lower plate (1), a square terrace with edges (5) is fixedly connected to the upper portion of the lower plate (1), an upper plate (3) is fixedly connected to the top of the supporting plate (2), a worm wheel (13) is rotatably connected to the top of the upper plate (3), symmetrical supporting tables (7) are fixedly connected to the top of the upper plate (3), the two supporting tables (7) are rotatably connected with a same worm (11), one end of the worm (11) penetrates through the supporting tables (7) and is fixedly connected with a first belt pulley (8), the worm (11) and the worm wheel (13) are meshed with each other, a driving motor (10) is fixedly connected to the top of the upper plate (3), and a second belt pulley (9) is fixedly connected to an output shaft of the driving motor (10), the utility model discloses a novel projection equipment, including first belt pulley (8) and second belt pulley (9) outside cover be equipped with same belt (12), the bottom centre of a circle position fixedly connected with pivot (20) of worm wheel (13), the bottom of pivot (20) runs through upper plate (3) and rotates with upper plate (3) to be connected, the bottom fixedly connected with rolling disc (4) of pivot (20), a plurality of projection equipment (6) have been arranged to the bottom annular equidistance of rolling disc (4), the bottom of upper plate (3) is equipped with second rotating groove (21), and the top of rolling disc (4) and the top sliding connection of second rotating groove (21), the lateral wall fixedly connected with slide rail (14) of second rotating groove (21), a plurality of pulleys (15) have been arranged to the side equidistance of rolling disc (4), pulley (15) and slide rail (14) sliding connection, projection equipment (6) include casing (601), the top of the shell (601) is fixedly connected with the bottom of the rotating disc (4), a first rotating groove (602) is arranged in the shell (601), a first rotating disc (603) is rotatably connected inside the shell (601), one side, deviating from the circle center, of the first rotating disc (603) is rotatably connected with a first connecting rod (604), a round rod (610) is fixedly connected inside the shell (601), the round rod (610) is rotatably connected with a second connecting rod (605), one end of the second connecting rod (605) is rotatably connected with the bottom end of the first connecting rod (604), a second rotating disc (607) is rotatably connected inside the shell (601), one side, deviating from the circle center, of the second rotating disc (607) is rotatably connected with a third connecting rod (606), the top end of the third connecting rod (606) is rotatably connected with the other end of the second connecting rod (605), and one side, deviating from the circle center, of the second rotating disc (607) is fixedly connected with a projector (608), one side of the shell (601) is fixedly connected with a rotating motor (609), and an output shaft of the rotating motor (609) is fixedly connected with a rotating shaft of the first rotating disc (603).

## REFLECTIVE GEOMETRIC HOLOGRAPHIC DISPLAY SYSTEM WITH OPTIMIZED DISPLAY CONFIGURATION

The utility model relates to the field of 3D display, and discloses a reflective geometric holographic display system with optimized display configuration, which comprises at least one projector; an auxiliary imaging screen for splitting light; one is located at one side of the auxiliary imaging screen or two are located at both sides of the auxiliary imaging screen respectively; providing support for projectors, auxiliary imaging screens and reflective geometric holographic screensA support structure for supporting; a controller electrically connected to the projector; the display system has a plurality of viewpoints, the area of a single viewpoint is an SL square meter, the effective projection area of the auxiliary imaging screen is an SP square meter, the optical path distance between the center of the outermost lens of any projector and the center of the reflection type geometric holographic screen in a working state is L meters, and the effective ornamental solid angle of each viewpoint meets the following requirements:by carrying out global optimization constraint on all components of the whole system, the display system can be always in an optimal configuration interval, the cost is controlled, and meanwhile, the comprehensive performance of the display system can be optimized.



**CLAIM 1.** A reflective geometry holographic display system for optimizing display configuration, comprising: at least one information projector (1) for projecting a picture in space; an auxiliary imaging screen (2) for splitting light; the reflection type geometric holographic screen (3) is positioned on one side of the auxiliary imaging screen (2) or two reflection type geometric holographic screens (3) are respectively positioned on two sides of the auxiliary imaging screen (2); a support structure (4) for providing physical structure support for the projector (1), the auxiliary imaging screen (2) and the reflective geometric holographic screen (3); and a controller (5) electrically connected to the projector (1), characterized in that: the optimized display configurationThe reflection type geometric holographic display system comprises a plurality of viewpoints, and the area of a single viewpoint is  $SL \text{ m}^2$ The effective projection area of the auxiliary imaging screen (2) is  $SP \text{ m}^2$ The optical path distance between the center of the outermost lens of the single projector (1) and the center of the auxiliary imaging screen (2) is L meters, and the effective viewing solid angle of each viewpoint satisfies the following conditions:

N7725

CN212808895U

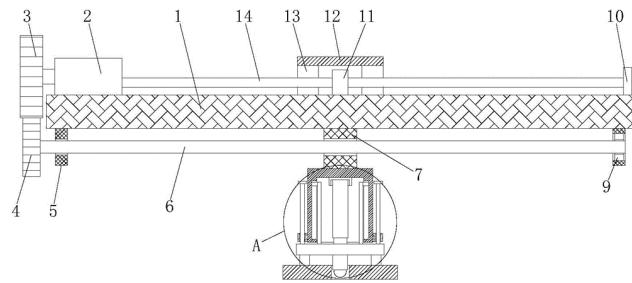
Priority Date: 21/08/2020

SHANGHAI WANXING HEALTH MANAGEMENT CONSULTING

### ARTIFICIAL INTELLIGENCE HEALTH DIAGNOSTIC DEVICE BASED ON HOLOGRAPHIC PROJECTION

The utility model relates to the technical field of medical equipment, and an artificial intelligence health diagnostic device based on holographic projection is disclosed, including the mounting panel, driving motor is installed in the left side on mounting panel top, first gear is installed to driving motor's output shaft, the movable sleeve is all installed to the both sides of mounting panel bottom. The utility model discloses a driving motor drives first gear revolve, make second gear and first gear engagement transmission drive the threaded rod and rotate, can drive the thread bush and carry out the removal about, can drive the adjustable shelf and remove appointed position, can transmit the picture of shooting inside the display instrument in real time through the camera, rotation through user control driving motor can adjust limit baffle, then drive the connecting plate through electric putter and remove, can make the image of holography equipment closely shooting health, can project the picture of shooting appointed position through holographic technique.

**CLAIM 1.** The utility model provides an artificial intelligence health diagnostic device based on holographic projection, includes mounting panel (1), its characterized in that, driving motor (2) are installed in the left side on mounting panel (1) top, first gear (3) are installed to the output shaft of driving motor (2), movable sleeve (5) are all installed to the both sides of mounting panel (1) bottom, the inside of movable sleeve (5) is installed threaded rod (6) jointly, second gear (4) are installed in the left side of threaded rod (6), first gear (3) and second gear (4) intermeshing, the middle part movable sleeve of threaded rod (6) is equipped with thread bush (7), adjustable shelf (15) is installed to the bottom of thread bush (7), the mid-mounting of roof has fixing base (16) in adjustable shelf (15), the internally mounted of fixing base (16) has electric putter (17), the bottom of electric putter (17) is worn out adjustable shelf (15) and is installed connecting plate (21), connecting block (22) are all installed to the both sides of connecting plate (21) bottom, limit baffle (23) are installed jointly to the bottom of connecting block (22), activity hole (24) have been seted up at the middle part of limit baffle (23), the mid-mounting of connecting block (22) has camera (25), camera (25) activity alternates in the inside of activity hole (24).



N7727

CN112667082

Priority Date: 28/12/2020

ZHANG SHIDI - WANG CHENYU - ZHENG YUNHUAN - ZHUANG SHANLIN - CHEN XINYU

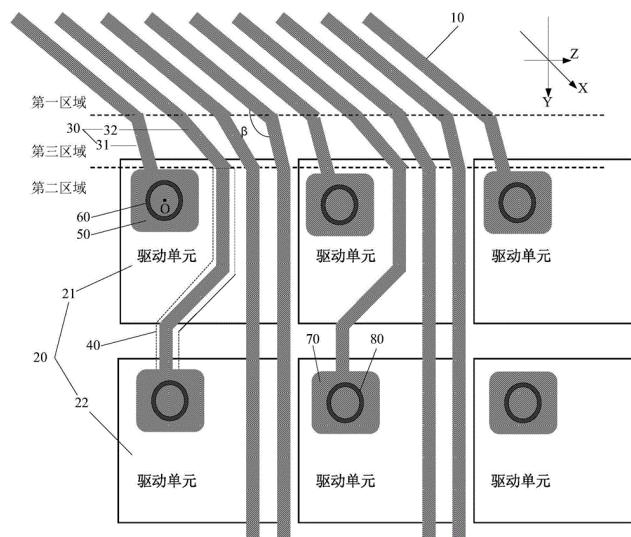
### HOLOGRAPHIC IMAGE PROJECTION SYSTEM BASED ON MR TECHNOLOGY

The invention discloses a holographic image projection system based on an MR (magnetic resonance) technology, which comprises a display unit, a computing unit, a three-dimensional space operating system, a matched MA (MA) teaching system and an AR applet, wherein the display unit comprises a projection conversion module, a projection display module and a head display equipment module; the computing unit comprises a 3D modeling module, a frame image acquisition module, a splicing area selection module and a splicing preprocessing module; the AR applet comprises a smartphone client. The full-face and detail of the holographic image are perfectly restored through 3D modeling, real-time tracking of movement can be achieved through the motion sensing device, a user cannot completely isolate reality when wearing the transparent display, can observe objects in reality without barriers, can communicate with multiple wearers in a face-to-face mode without barriers, and perfect combination of the holographic image and real life is achieved; the AR + small program designed by the invention directly takes the WeChat as an entrance, and the operation is convenient and simple.

**CLAIM 1.** A holographic image projection system based on MR technology comprises a display unit, a computing unit, a three-dimensional space operating system, a matched MA teaching system and an AR applet, and is characterized in that: the display unit comprises a projection conversion module, a projection display module and a head display equipment module; the computing unit comprises a 3D modeling module, a frame image acquisition module, a splicing area selection module and a splicing preprocessing module; the AR applet comprises a smartphone client.

**LIQUID CRYSTAL GRATING AND HOLOGRAPHIC THREE-DIMENSIONAL DISPLAY DEVICE**

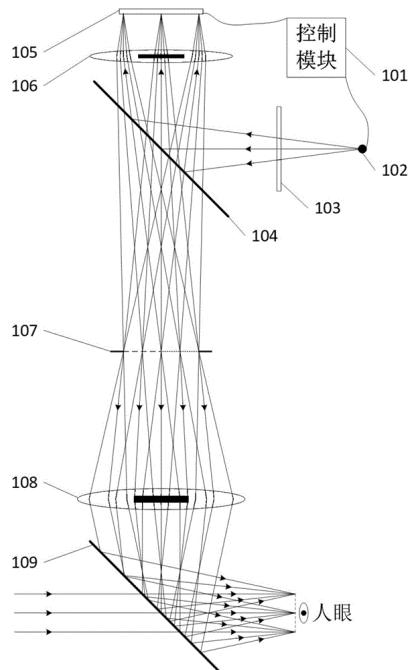
The embodiment of the application discloses liquid crystal grating and holographic three-dimensional display device, in this liquid crystal grating, many first connection lines of connecting grating electrode and drive unit are walked including at least one first son is connected to walk line and at least one second son is connected to walk the line, one first son is connected to walk the line and is corresponded one first drive unit, a second son is connected to walk the line and is corresponded one second drive unit, just second end that the line was connected to the second son is rather than the grating electrode that corresponds overlapping in the second direction, the second direction does second drive unit deviates from the direction of first drive unit, in order to reduce the second son is connected the angle undersize that forms between walking the line and the grating electrode rather than corresponding, makes there is the small-angle bending in the second son and is connected the junction of walking the grating electrode rather than corresponding, thereby leads to the probability that the second son is connected the line and takes place the damage when the bending of the grating electrode rather than corresponding is discharged .



**CLAIM 1.** A liquid crystal grating, comprising: a plurality of grating electrodes located in the first region, the grating electrodes extending in a first direction; the driving circuit comprises at least one column of driving units, each column of driving units comprises a first driving unit and at least one second driving unit, the second driving unit is positioned on one side, away from the first area, of the first driving unit, and the second area is positioned on one side of the first area; a plurality of first connection wires located in a third area, wherein a first end of each first connection wire is electrically connected with the corresponding grating electrode, a second end of each first connection wire is electrically connected with the corresponding driving unit, and the third area is located between the first area and the second area; the plurality of first connecting wires comprise at least one first sub-connecting wire and at least one second sub-connecting wire, one first sub-connecting wire corresponds to one first driving unit, one second sub-connecting wire corresponds to one second driving unit, the second end of the second sub-connecting wire and the corresponding grating electrode of the second sub-connecting wire are not overlapped in the second direction, the second direction is the direction of the second driving unit deviating from the first driving unit, and the included angle between the first direction and the second direction ranges from 0 degrees to 90 degrees and does not include an end point value.

### LARGE-FIELD-ANGLE HOLOGRAPHIC DISPLAY SYSTEM AND METHOD BASED ON SINGLE SPATIAL LIGHT MODULATOR

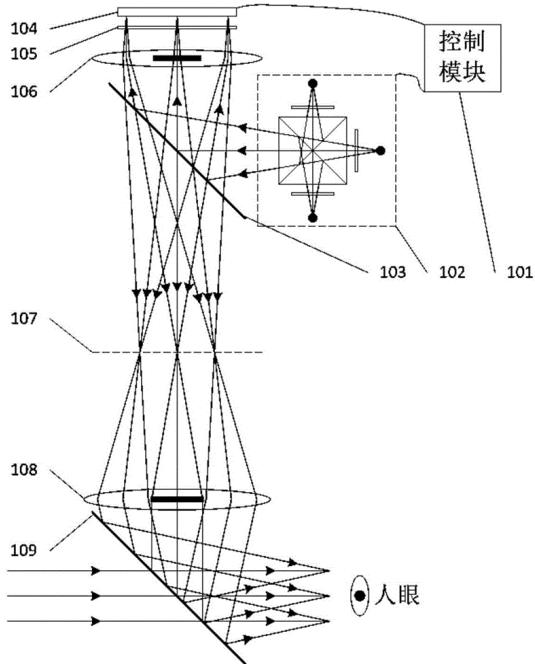
The invention provides a large-field angle holographic display system and method based on a single spatial light modulator, which comprises the following steps: the system comprises a control module, a light source, a polaroid, a first spectroscope, a Spatial Light Modulator (SLM), a first lens group, a partition shutter diaphragm, a second lens group and a second spectroscope; the invention calculates the intensity information and the depth information of the three-dimensional image into a common two-dimensional hologram through a holographic algorithm and loads the two-dimensional hologram on a liquid crystal spatial light modulator. The three-dimensional image with real depth of field information can be projected by utilizing the phase modulation capability of the spatial light modulator, so that the visual fatigue of human eyes is eliminated; and the image area of the spatial light modulator is multiplexed by combining a 4F angle of view amplifying system and a partitioned shutter diaphragm arranged on a Fourier transform surface of the 4F system through synchronous time sequence control of the spatial light modulator and the partitioned shutter diaphragm, so that the holographic near-to-eye three-dimensional display effect with a large angle of view is obtained.



**CLAIM 1.** A single spatial light modulator-based large field angle holographic display system, comprising: the device comprises a control module (101), a light source (102), a polarizing plate (103), a first spectroscope (104), a spatial light modulator (105), a first lens group (106), a partitioned shutter stop (107), a second lens group (108) and a second spectroscope (109); the control module (101) calculates three-dimensional image information to be displayed into a two-dimensional hologram, synchronously outputs and loads the two-dimensional hologram to the spatial light modulator (105) for displaying, and synchronously controls the light source (102) to emit light; divergent light emitted by the light source (102) penetrates through the polarizing plate (103), is reflected by the first light splitting mirror (104), then upwards propagates, is collimated into parallel light by the first lens group (106), and is incident on the spatial light modulator (105); after being modulated by a spatial light modulator (105), the reflected and diffracted three-dimensional imaging light beams pass through a 4F angle of view amplifying system consisting of a first lens group (106), a subarea shutter stop (107) and a second lens group (108); reflected by a second beam splitter (109) into the human eye.

**HOLOGRAPHIC AR DISPLAY SYSTEM AND METHOD BASED ON SPATIAL LIGHT MODULATOR**

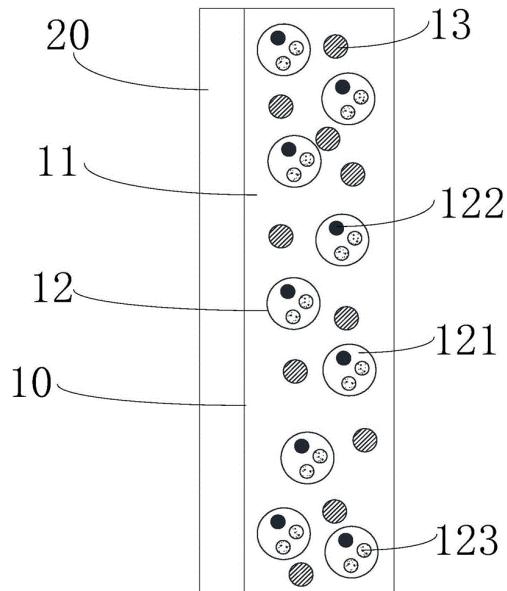
The invention provides a holographic AR display system and method based on a spatial light modulator, which comprises the following steps: the system comprises a control module (101), an RGB point light source module (102), a first spectroscope (103), an RGB filter (105), a Spatial Light Modulator (SLM) (104), a first lens group (106), a diaphragm (107), a second lens group (108) and a second spectroscope (109); according to the method, the intensity information and the depth information of the color three-dimensional image are calculated into the common two-dimensional RGB hologram through the holographic algorithm and loaded onto the liquid crystal spatial light modulator, the color three-dimensional image with the real depth of field information can be projected by utilizing the phase modulation capability of the spatial light modulator, and the visual fatigue of human eyes can be effectively eliminated.



**CLAIM 1.** A holographic AR display system based on a spatial light modulator, comprising: the system comprises a control module (101), an RGB point light source module (102), a first spectroscope (103), an RGB filter (105), a spatial light modulator (104), a first lens group (106), a diaphragm (107), a second lens group (108) and a second spectroscope (109); the control module (101) calculates color three-dimensional image information to be displayed into a two-dimensional RGB hologram, outputs the two-dimensional RGB hologram to be loaded on the spatial light modulator (104) for display, and synchronously controls the RGB point light source module (102) to emit light; divergent light emitted by the RGB point light source module (102) is reflected by the first beam splitter (103) and then upwards transmitted, collimated into parallel light through the first lens group (106), and after being converted into RGB light beams through the RGB optical filter, the RGB light beams enter the spatial light modulator (104), and after being modulated by the spatial light modulator (104), the reflected and diffracted three-dimensional imaging light beams enter human eyes after passing through a field angle amplification system formed by the first lens group (106), the diaphragm (107) and the second lens group (108) and then being reflected by the second beam splitter (109).

**ENERGY-SAVING SELF-ADAPTIVE DIMMING HOLOGRAPHIC DISPLAY MATERIAL, HOLOGRAPHIC FILM AND HOLOGRAPHIC DISPLAY GLASS**

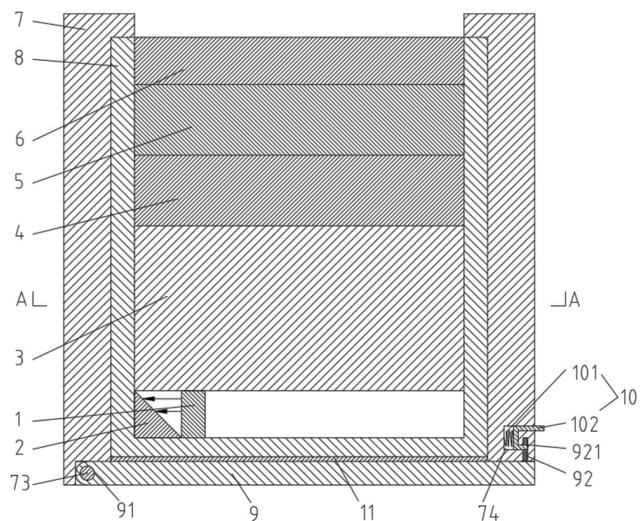
The invention provides an energy-saving self-adaptive dimming holographic display material, which comprises a resin base material and organic-inorganic composite nanoparticles dispersed in the resin base material, wherein the organic-inorganic composite nanoparticles comprise a polymer shell layer, and organic phase change particles and light scattering particles which are coated in the polymer shell layer, the organic phase change particles can perform phase transition at the temperature of 30-50 °C, the light scattering particles can scatter light with the wavelength of 390-780nm, and the weight ratio of the light scattering particles to the organic phase change particles in the organic-inorganic composite nanoparticles is (2-10): 1; the self-adaptive dimming holographic display material also comprises infrared heat-insulating nano particles, wherein the infrared heat-insulating nano particles are directly dispersed in the resin base material or coated in the polymer shell layer, the dosage of the infrared heat-insulating nano particles is 0.1-3% of the total amount of the resin base material mixture, and the dosage of the organic-inorganic composite nano particles is 0.01-5% of the total amount of the resin base material mixture.



**CLAIM 1.** An energy-saving self-adaptive dimming holographic display material is characterized by comprising a resin base material and organic-inorganic composite nanoparticles dispersed in the resin base material, wherein the organic-inorganic composite nanoparticles comprise a polymer shell layer, and organic phase change particles and light scattering particles which are coated in the polymer shell layer, the organic phase change particles can perform phase transition at the temperature of 30-50 °C, the light scattering particles can scatter light with the wavelength of 390-780nm, and the weight ratio of the light scattering particles to the organic phase change particles in the organic-inorganic composite nanoparticles is (2-10): 1; the self-adaptive dimming holographic display material also comprises infrared heat-insulating nano particles, wherein the infrared heat-insulating nano particles are directly dispersed in the resin base material or coated in the polymer shell layer, the dosage of the infrared heat-insulating nano particles is 0.1-3% of the total amount of the resin base material mixture, and the dosage of the organic-inorganic composite nano particles is 0.01-5% of the total amount of the resin base material mixture.

**PROJECTION TYPE HOLOGRAPHIC GRATING BACKLIGHT STRUCTURE**

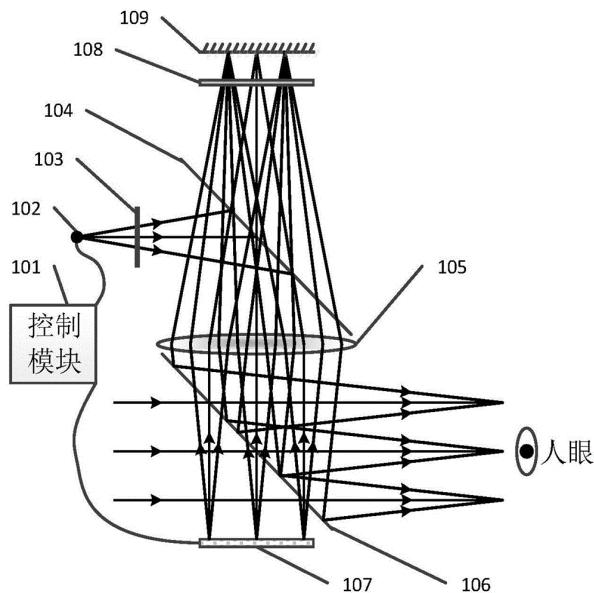
The invention discloses a projection type holographic grating backlight structure, wherein a mounting plate is provided with a sliding groove, a movable frame is connected with the mounting plate in a sliding manner, the movable frame is positioned in the sliding groove and is provided with a sliding groove, the movable frame can slide in the sliding groove, and when the backlight structure is damaged, the movable frame is moved to slide out from the sliding groove, so that a light source, a reflecting surface, a flat waveguide layer, a complex transmission holographic grating, a liquid crystal layer and a three-primary-color filter which are arranged on the movable frame can be moved out of the equipment, a worker can conveniently maintain the backlight structure, and the problem that the backlight structure is inconvenient to maintain when the backlight structure is damaged is solved.



**CLAIM 1.** A projection type holographic grating backlight structure is characterized in that, including mounting panel, adjustable shelf, light source, plane of reflection, dull and stereotyped waveguide layer, compound body transmission holographic grating, liquid crystal layer and three primary colors color filters, the adjustable shelf is the rectangle, plane of reflection fixed mounting be in the inboard of adjustable shelf, the plane of reflection is located an apex angle department of adjustable shelf, light source fixed mounting in the inboard of adjustable shelf, the light source is located the adjustable shelf is close to plane of reflection department, the plane of reflection is close to the one side slope setting of light source, dull and stereotyped waveguide layer fixed mounting be in the inboard of adjustable shelf, compound body transmission holographic grating is located dull and stereotyped waveguide layer keeps away from one side of light source, the liquid crystal layer fixed mounting be in the inboard of adjustable shelf, the liquid crystal layer is located compound body transmission holographic grating keeps away from one side of dull and stereotyped waveguide, the three-primary-color filter is fixedly arranged on the inner side of the movable frame, the three-primary-color filter is positioned on one side, away from the complex transmission holographic grating, of the liquid crystal layer, the mounting plate is provided with a sliding groove, the movable frame is connected with the mounting plate in a sliding mode, and the movable frame is positioned inside the sliding groove.

**COMPACT TYPE TRANSMISSION HOLOGRAPHIC NEAR-EYE THREE-DIMENSIONAL DISPLAY SYSTEM AND METHOD BASED ON POINT LIGHT SOURCE**

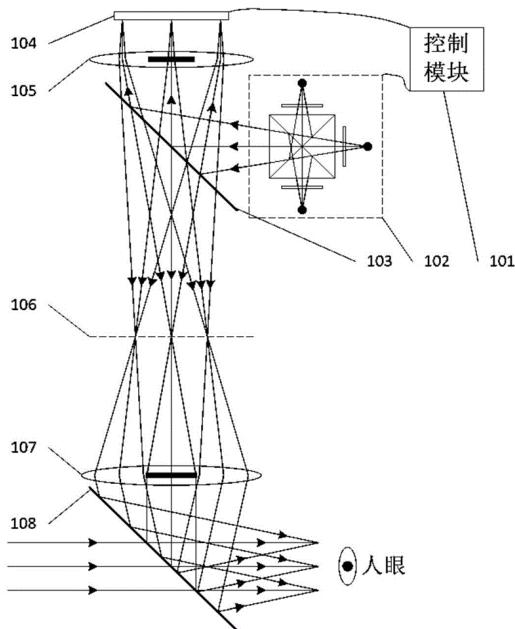
The invention provides a compact type transmission holographic near-eye three-dimensional display system and method based on a point light source, comprising the following steps: the device comprises a control module (101), a point light source (102), a polarizing plate (103), a non-polarizing beam splitter (104), a lens group 105, a polarizing beam splitter (106), a spatial light modulator (107), a quarter-wave plate (108) and a reflecting mirror (109); the intensity information and the depth information of the three-dimensional image are calculated into a common two-dimensional hologram through a holographic algorithm and loaded onto a liquid crystal spatial light modulator, and the three-dimensional image with real depth information can be projected by utilizing the phase modulation capability of the spatial light modulator, so that the visual fatigue of human eyes is eliminated; and the 4F system is simplified by turning the light path through the reflector, and a compact penetrating near-to-eye three-dimensional display system is realized.



**CLAIM 1.** A compact transmissive holographic near-to-eye three-dimensional display system based on point light sources, comprising: the device comprises a control module (101), a point light source (102), a polarizing plate (103), a non-polarizing beam splitter (104), a lens group (105), a polarizing beam splitter (106), a spatial light modulator (107), a quarter wave plate (108) and a reflecting mirror (109); the control module (101) calculates three-dimensional image information to be displayed into a two-dimensional hologram; according to the information of the two-dimensional hologram, the two-dimensional hologram output is loaded on a spatial light modulator (107) for display, and a point light source (102) is synchronously controlled to emit light; divergent light emitted by the point light source (102) penetrates through the polarizing plate (103), is reflected by the non-polarizing beam splitter (104) and propagates downwards, is collimated into parallel light through the lens group (105), and is incident on the spatial light modulator (107) after penetrating through the polarizing beam splitter (106); after the light beam is modulated by a spatial light modulator (107), the reflected and diffracted three-dimensional imaging light beam enters human eyes after passing through a compact 4F system consisting of a polarization beam splitter (106), a lens group (105), a quarter-wave plate (108) and a reflector (109), so that the human eyes observe virtual three-dimensional image information; meanwhile, the light beam of the external environment can enter the human eye through the polarization beam splitter (106).

**COLOR HOLOGRAPHIC NEAR-TO-EYE DISPLAY METHOD AND SYSTEM BASED ON SPATIAL LIGHT MODULATOR TIME DIVISION MULTIPLEXING**

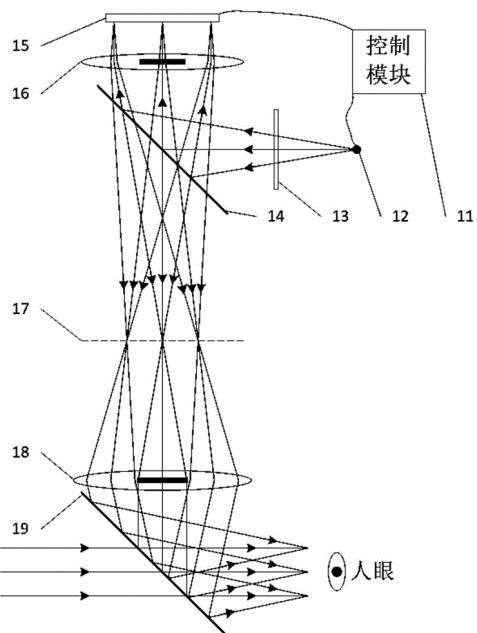
The invention provides a color holographic near-to-eye display method and a system based on spatial light modulator time division multiplexing, comprising the following steps: the system comprises a control module (101), an RGB point light source module (102), a first spectroscope (103), a Spatial Light Modulator (SLM) (104), a first lens group (105), a diaphragm (106), a second lens group (107) and a second spectroscope (108); the intensity information and the depth information of the color three-dimensional image are calculated into a common two-dimensional RGB hologram through a holographic algorithm and are loaded on a liquid crystal spatial light modulator; the invention utilizes the phase modulation capability of the spatial light modulator, can project RGB three-dimensional images with real depth of field information, and forms color images through the human eye visual persistence effect; the invention can effectively eliminate the visual fatigue of human eyes.



**CLAIM 1.** A color holographic near-eye display method based on time division multiplexing of a spatial light modulator is characterized by comprising the following steps: the system comprises a control module (101), an RGB point light source module (102), a first spectroscope (103), a spatial light modulator (104), a first lens group (105), a diaphragm (106), a second lens group (107) and a second spectroscope (108); the method comprises the steps that a control module (101) is adopted to calculate color three-dimensional image information to be displayed into a two-dimensional RGB hologram, the two-dimensional RGB hologram is output and loaded to a spatial light modulator (104) to be displayed, and an RGB point light source module (102) is synchronously controlled to emit light; divergent light emitted by the RGB point light source module (102) is reflected by the first beam splitter (103) and then upwards transmitted, collimated into parallel light by the first lens group (105), and incident on the spatial light modulator (104); after being modulated by the spatial light modulator (104), the reflected and diffracted three-dimensional imaging light beams pass through a field angle amplifying system formed by a first lens group (105), a diaphragm (106) and a second lens group (107), and then are reflected by a second beam splitter (108) to enter human eyes.

**HOLOGRAPHIC NEAR-EYE DISPLAY METHOD AND SYSTEM BASED ON SPATIAL LIGHT MODULATOR**

The invention provides a holographic near-to-eye display method and a holographic near-to-eye display system based on a spatial light modulator, which comprise the following steps: the device comprises a control module, a light source, a polaroid, a first spectroscope, a Spatial Light Modulator (SLM), a lens group, a diaphragm, a lens group and a second spectroscope; calculating three-dimensional image information to be displayed into a two-dimensional hologram by a control module through a holographic algorithm, outputting and loading the two-dimensional hologram to a spatial light modulator for displaying, and synchronously controlling a point light source to emit light; divergent light emitted by the light source penetrates through the polaroid, is reflected by the first beam splitter and then upwards transmitted, is collimated into parallel light by the lens group and is incident on the spatial light modulator; after being modulated by the spatial light modulator, the reflected and diffracted three-dimensional imaging light beams pass through a field angle amplifying system formed by a lens group, a diaphragm and a lens group and then are reflected by a second beam splitter to enter human eyes, so that the human eyes observe virtual three-dimensional image information. Meanwhile, the light beam of the external environment can enter the human eye through the spectroscope.



**CLAIM 1.** A holographic near-to-eye display system based on a spatial light modulator, comprising: the device comprises a control module (11), a light source (12), a polaroid (13), a first spectroscope (14), a spatial light modulator (15), a first lens group (16), a diaphragm (17), a second lens group (18) and a second spectroscope (19); calculating three-dimensional image information to be displayed into a two-dimensional hologram by using a control module (11), outputting and loading the two-dimensional hologram to a spatial light modulator (15) for displaying, and synchronously controlling a light source (12) to emit light; divergent light emitted by the light source (12) penetrates through the polarizing plate (13), is reflected by the first beam splitter (14), then upwards propagates, is collimated into parallel light by the first lens group (16), and is incident on the spatial light modulator (15); after being modulated by the spatial light modulator (15), the reflected and diffracted three-dimensional imaging light beams pass through a field angle amplifying system formed by a first lens group (16), a diaphragm (17) and a second lens group (18), and then are reflected by a second beam splitter (19) to enter human eyes.

N7748

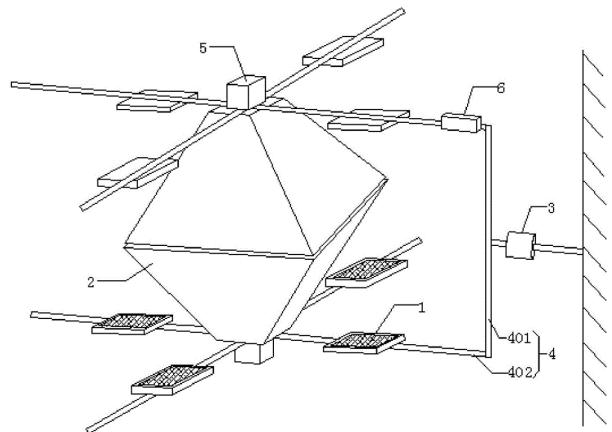
CN112578627

Priority Date: 27/09/2019

FUJIAN AGRICULTURE & FORESTRY UNIVERSITY

### HOLOGRAPHIC PROJECTION DEVICE WITH MOVABLE IMAGING

The invention relates to the technical field of 3D holographic projection, in particular to a holographic projection device with movable imaging, which comprises: the projection device comprises projection equipment, square prismatic tables, a rotary motor, a support, a driving mechanism and an inclination angle sensor, wherein the support is connected to an output shaft of the rotary motor, the driving mechanism for driving the projection equipment to synchronously move is respectively installed on the upper side and the lower side of the support, the projection equipment is respectively installed on the driving mechanism, two groups of square prismatic tables are symmetrically arranged on the upper side and the lower side of the support, and the inclination angle sensor is installed on the support; the invention can simultaneously display two related images in two square edge tables, and can move the images up and down along the central axis of the square edge table by sliding the projection equipment to change the positions of the images in the square edge tables; in addition, the invention can integrally rotate, further change into an imaging position and present brand new visual experience.



**CLAIM 1.** An imaging-shift holographic projection device, comprising: projection equipment (1), square terrace with edge (2), rotating motor (3), support (4), actuating mechanism (5) and angular transducer (6), be connected with support (4) on the output shaft of rotating motor (3), be used for the drive is installed respectively to the upper and lower both sides of support (4) projecting equipment (1) synchronous movement's actuating mechanism (5), projection equipment (1) install respectively in actuating mechanism (5) is last, the upper and lower bilateral symmetry of support (4) is provided with two sets of square terrace with edge (2), install on support (4) angular transducer (6).

N7750

CN112565720

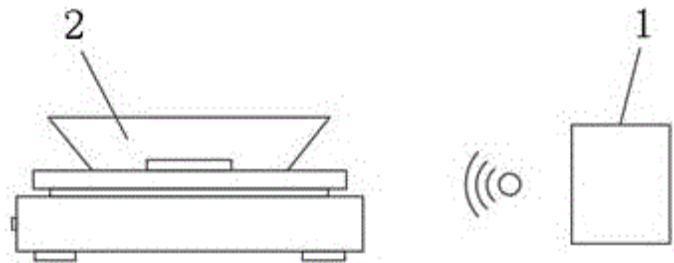
Priority Date: 17/09/2020

SUZHOU HENGCHUANG CULTURE COMMUNICATION

### 3D PROJECTION SYSTEM BASED ON HOLOGRAPHIC TECHNOLOGY

The invention provides a 3D projection system based on a holographic technology, and relates to the technical field of 3D projection. The 3D projection system based on the holographic technology comprises a control terminal and a projection terminal; the control terminal consists of a tablet terminal or a computer terminal; the projection terminal is composed of an installation base, a charging interface, a rotating disk, a glass cover, a projection mechanism, a main circuit board and a signal receiving device, the control terminal is connected with the projection terminal through wireless signals, the projection mechanism comprises a holographic projection module, an intelligent voice module and a man-machine intelligent interaction module, S1, power supplies of the control terminal and the projection terminal are firstly respectively connected, S2, 3D projection software on the panel terminal or the computer terminal is opened, and the panel terminal or the computer terminal is connected with a WIFI wireless network. Through simple design control terminal and projection terminal, can realize remote signal fast and connect, can carry out holographic projection to participant and three-dimensional product model moreover to make its work efficiency improve greatly, be worth wideling popularize.

**CLAIM 1.** A 3D projection system based on holographic technique, characterized in that: comprises a control terminal (1) and a projection terminal (2); the control terminal (1) is composed of a tablet terminal (101) or a computer terminal (102); the projection terminal (2) is composed of a mounting base (201), a charging interface (202), a rotating disk (203), a glass cover (204), a projection mechanism (205), a main circuit board (206) and a signal receiving device (207).



N7751

CN112562433

Priority Date: 30/12/2020

CENTRAL CHINA NORMAL UNIVERSITY

## 5G STRONG INTERACTION REMOTE DELIVERY TEACHING SYSTEM BASED ON HOLOGRAPHIC TERMINAL AND WORKING METHOD THEREOF

The invention belongs to the teaching application field of information technology, and provides a 5G strong interaction remote delivery teaching system based on a holographic terminal and a working method thereof, wherein the remote delivery teaching system comprises a data acquisition module, a data transmission module, a 5G cloud rendering module, a natural interaction module, a holographic display module and a teaching service module; the method of the invention collects diversified teaching behaviors and holographic images of a lecture teacher in a lecture classroom in real time by means of recorded broadcast collection equipment and a sensor; data transmission among the classroom end, the cloud server and the rendering cluster is realized through a 5G network link; and (3) carrying out links such as cloud decoding, scene matching, GPU real-time rendering, cloud coding and the like on the data such as audio/video streams and holographic images, and pushing the rendered holographic images to a holographic display terminal at a classroom end. The invention is beneficial to meeting the requirement of remote delivery teaching and provides a new holographic presentation mode and interaction form for a delivery classroom.

**CLAIM 1.** The utility model provides a 5G strong interactive remote special delivery teaching system based on holographic terminal which characterized in that: the system comprises a data acquisition module, a data transmission module, a 5G cloud rendering module, a natural interaction module, a holographic display module and a teaching service module; the data acquisition module is used for acquiring various teaching behavior data of the teacher-student listening link and the teacher-student interaction link in the lecture classroom and the lecture classroom; the data transmission module is used for realizing audio and video stream and holographic image data transmission between a lecture hall and a 5G cloud rendering engine and between holographic terminals of a lecture hall; the 5G cloud rendering module is used for realizing high-speed rendering of teaching video streams and holographic images at a classroom end, wherein the classroom end refers to a lecture room and a lecture listening room; the natural interaction module realizes interaction between the teacher and holographic teaching resources and teaching environment in the teaching process by sensing various interaction behaviors of the teacher; the holographic display module provides a display platform for holographic teaching resources and natural interaction; the teaching service module provides teaching resources, teaching behavior and process analysis and teaching service management for various users.

---

N7753

CN112558198

Priority Date: 26/09/2019

ZHEJIANG PRISM CULTURE MEDIA

## HOLOGRAPHIC LENS, HOLOGRAPHIC LENS ASSEMBLY AND DISPLAY SYSTEM

The invention provides a holographic lens, a holographic lens component applying the holographic lens and a display system. The holographic lens comprises a first lens, a transmission layer and a second lens which are arranged in a laminated mode; a first sawtooth array is formed on the first lens and comprises a plurality of first sawteeth, and the cross section of each first sawtooth comprises a right-angled edge and a hypotenuse edge; a second sawtooth array is formed on the second lens and comprises a plurality of second sawteeth, and the cross section of each second sawtooth comprises a right-angled edge and a hypotenuse edge; the refractive index of the first lens is equal to that of the second lens, and the extending direction of the first sawtooth line shape is perpendicular to that of the second sawtooth line shape. The holographic lens provided by the invention utilizes the total reflection of light rays on the right-angle side, so that an image emitted by an image source is projected to a space, and further, the naked eye 3D imaging is realized in a real sense.

**CLAIM 1.** A holographic lens includes a first lens, a transmission layer, and a second lens stacked in layers; the first lens is outwards convexly arranged on one side, facing the transmission layer, of the first lens to form a first sawtooth array, the first sawtooth array comprises a plurality of first sawteeth, each first sawtooth extends along a linear shape, the first sawteeth are parallel to each other and are arranged at equal intervals, and the cross section of each first sawtooth comprises a right-angle side perpendicular to the first lens and a bevel side inclined to the first lens at an angle of 45 degrees; the second lens is outwards convexly arranged on one side, facing the transmission layer, of the second lens to form a second sawtooth array, the second sawtooth array comprises a plurality of second sawteeth, each second sawtooth extends along a linear shape, the second sawteeth are parallel to each other and are arranged at equal intervals, and the cross section of each second sawtooth comprises a right-angle side perpendicular to the second lens and a bevel side inclined to the second lens at an angle of 45 degrees; the transmission layer is embedded between the first sawtooth array and the second sawtooth array; the refractive index of the first lens is equal to that of the second lens, and the extending direction of the first sawtooth line is perpendicular to that of the second sawtooth line.

*Click on the title to return to table of contents*

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

N7686

WO202176075

Priority Date: 14/10/2019

IZMIR YUKSEK TEKNOLOJİ ENSTITUSU

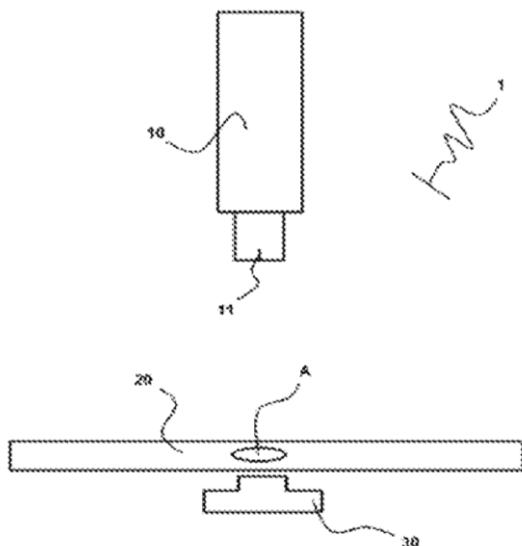
### CELL VIABILITY ANALYSIS AND COUNTING FROM HOLOGRAMS BY USING DEEP LEARNING AND APPROPRIATE LENSLESS HOLOGRAPHIC MICROSCOPE

The invention is a holographic microscope (1) which detects the difference between the dead and live cells directly from the hologram images by training the deep learning based convolutional neural network and then makes predictions for viability analysis from the cell holograms obtained from the new samples (A) that were not used for training, and does not contain lens, mirror and similar optical elements, characterized in that, it comprises the following; a light source (10) which can be a laser or a light emitting diode (LED), an image sensor (30) which captures the images, a microfluidic chip (20) where the sample (A) located, a convolutional neural network which is formed in a server, is trained by predefining the hologram and/or phase images of dead and live cells, which are stained with Trypan blue or not and are stationary or flowing, and enable to make viability analysis to the samples (A).

### ANALYSE ET COMPTAGE DE VIABILITÉ CELLULAIRE À PARTIR D'HOLOGRAMMES PAR APPRENTISSAGE PROFOND ET MICROSCOPE HOLOGRAPHIQUE SANS LENTILLE APPROPRIÉ

La présente invention concerne un microscope holographique (1) qui détecte la différence entre les cellules mortes et vivantes directement à partir des images d'hologramme par formation du réseau neuronal convolutionnel basé sur l'apprentissage profond, puis effectue des prédictions pour une analyse de viabilité à partir des hologrammes de cellule obtenus à partir des nouveaux échantillons (A) qui n'ont pas été utilisés pour l'apprentissage, et ne contient pas de lentille, de miroir et d'éléments optiques similaires, caractérisé en ce qu'il comprend les éléments suivants : une source de lumière (10) qui peut être un laser ou une diode électroluminescente (LED), un capteur d'image (30) qui capture les images, une puce microfluidique (20) dans laquelle l'échantillon (A) est situé, un réseau neuronal convolutionnel qui est formé dans un serveur, est formé par définition préalable de l'hologramme et/ou des images de phase de cellules mortes et vivantes, qui sont colorées au bleu Trypan ou non et qui sont stationnaires ou mobiles, et permettent d'effectuer une analyse de viabilité sur les échantillons (A).

**CLAIM 1.** Holographic microscope (1) which detects the difference between the dead and live cells directly from the hologram images by training the deep learning based convolutional neural network and then makes predictions for viability analysis from the cell holograms obtained from the new samples (A) that were not used for training and does not contain lens, mirror and similar optical elements, characterized in that, it comprises the following; - at least one light source (10) - at least one image sensor (30) that captures the images at least one microfluidic chip (20) where the sample (A) is located - convolutional neural network which is formed in a server, is trained by predefining the hologram and/or phase images of dead and live cells, which are stained with Trypan blue or not and are stationary or flowing, and enable to make viability analysis to the samples (A).



N7735

CN112634253

Priority Date: 30/12/2020

NANJING UNIVERSITY OF SCIENCE & TECHNOLOGY

### HOLOGRAPHIC PARTICLE DETECTION METHOD BASED ON DEEP LEARNING

The invention discloses a holographic particle detection method based on deep learning, which comprises the following steps: collecting a particle field hologram; data enhancement; labeling the data set, and dividing the data set into a training data set, a testing data set and a verification data set; constructing a Yolo detection model on a Keras deep learning framework, and designing a lightweight dense connection network to extract particle characteristics; inputting a training data set into the deep learning model for training, verifying the trained network by using a verification data set, and finally storing the trained network model; and inputting the test data set into the trained model, and outputting the type and spatial position information of the particles. Compared with the traditional detection method, the particle classification accuracy, the positioning accuracy and the detection efficiency are improved, and the particle false detection rate is reduced; compared with the traditional method, the particle detection method has wider application range, reduces the cost and improves the detection efficiency and the real-time property.

**CLAIM 1.** A holographic particle detection method based on deep learning is characterized by comprising the following steps: s01, collecting a particle field hologram; s02, enhancing the image; s03, labeling the data set, and dividing the data set into a training data set, a testing data set and a verification data set; s04, constructing a Yolo detection model on a Keras deep learning framework, and designing a light dense connection network to extract particle characteristics; s05, inputting a training data set into the deep learning model for training, verifying the trained network by using a verification data set, and finally storing the trained network model; and S06, inputting the test data set into the trained model, and outputting the type and spatial position information of the particles.

N7737

CN112630987

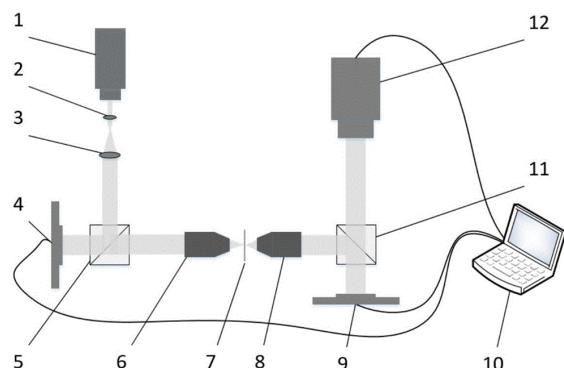
Priority Date: 12/01/2020

TSINGHUA SHENZHEN INTERNATIONAL GRADUATE SCHOOL

### RAPID SUPER-RESOLUTION COMPRESSION DIGITAL HOLOGRAPHIC MICROSCOPIC IMAGING SYSTEM AND METHOD

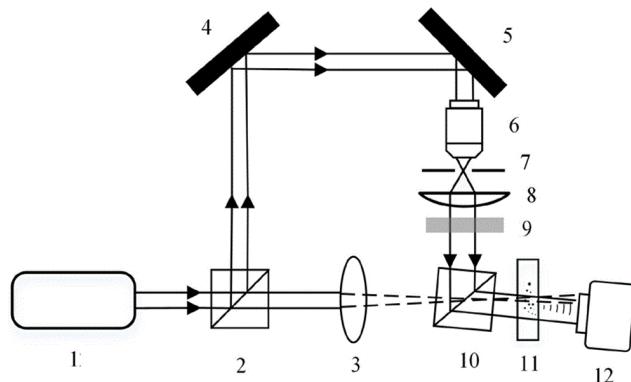
The invention discloses a fast super-resolution compression digital holographic microscopic imaging system and a fast super-resolution compression digital holographic microscopic imaging method. In the invention, in an exposure period of the image sensor, a plurality of structural light modulated object images are sampled, a plurality of sampled images are compressed and imaged in the same image, and the image reconstruction is carried out by a compressed sensing algorithm and a structural light reconstruction algorithm, so that a plurality of structural light illuminated holograms can be imaged in a very short time, and the problems of long time consumption and complicated operation steps of the traditional image acquisition method are solved.

**CLAIM 1.** A fast super-resolution compression digital holographic microscopic imaging system is characterized by comprising a laser, a beam expanding and collimating unit, a first beam splitting cube, a first spatial light modulator, a first microobjective, a second beam splitting cube, a second spatial light modulator and an image sensor, wherein the laser, the beam expanding and collimating unit, the first beam splitting cube, the first spatial light modulator, the first microobjective, the second beam splitting cube, the second spatial light modulator and the image sensor are arranged in; the light emitted by the laser is collimated by the beam expanding and collimating unit to become parallel light beams, the parallel light beams are projected onto the first spatial light modulator through the first beam splitting cube and then enter the first microscope objective after being reflected, the light after passing through the first microscope objective irradiates a measured sample, then sequentially passes through the second microscope objective and the second beam splitting cube, and is projected onto the second spatial light modulator through the second beam splitting cube, a sampling matrix is loaded on the second spatial light modulator, the measured sample illuminated by the structured light is sampled, and the sampled sample is collected by the image sensor after being reflected by the second spatial light modulator; the first spatial light modulator, the second spatial light modulator and the image sensor are respectively connected with a computer.



**METHOD AND DEVICE FOR MEASURING THREE-DIMENSIONAL DISTRIBUTION OF PARTICLE SIZES OF NANOPARTICLES IN SOLUTION**

The invention discloses a method for measuring three-dimensional distribution of nanometer particle size in a solution, which comprises the following steps: irradiating the nanoparticles by using laser beams, forming holographic interference fringes by interference of formed scattered light and reference light modulated by a light path, and recording the holographic interference fringes on a camera to obtain a nanoparticle digital hologram; performing three-dimensional reconstruction on the digital hologram to obtain a focused image of the nano-particles; and (4) according to the scattering signal in the focused image, and based on the dynamic light scattering principle and the correlation between the particle size of the nano particles and the diffusion coefficient, obtaining the particle size of the nano particles. The invention also discloses a device for measuring the three-dimensional distribution of the particle size of the nano particles in the solution, which comprises the following steps: the signal transmitting unit comprises a continuous laser and a light path adjusting section; a signal receiving unit including a camera recording holographic interference fringes; and the signal processing unit is connected behind the signal receiving unit and is used for processing the nanoparticle digital hologram. The method and the device realize the in-situ measurement of the instantaneous particle size distribution of the nanoparticles at the three-dimensional position in the sample cell.



**CLAIM 1.** A method for measuring the three-dimensional distribution of the particle size of nanoparticles in a solution, comprising the steps of: (1) irradiating nanoparticles in a sample cell by using laser beams, interfering scattered light formed by the nanoparticles with reference light modulated by a light path to form holographic interference fringes, and recording the holographic interference fringes on a camera photosensitive chip at a time interval of delta tau and an angle theta to obtain a series of digital holograms of the nanoparticles which do Brownian motion in a measurement period; (2) performing three-dimensional reconstruction on the nanoparticle digital hologram recorded in the step (1) to obtain a focused image of nanoparticles in a sample cell on any x-y section, wherein the x-y section is a section vertical to incident light; (3) according to the scattering signal in the focused image in the step (2), based on the dynamic light scattering principle, according to the granularity D and the diffusion coefficient D of the nano-particles, the particle size d of the nanoparticles in the cross section is obtained.

*Click on the title to return to table of contents*

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

**N7688**

WO202171293

SON, GUNHO

*Priority Date:* **10/10/2019**

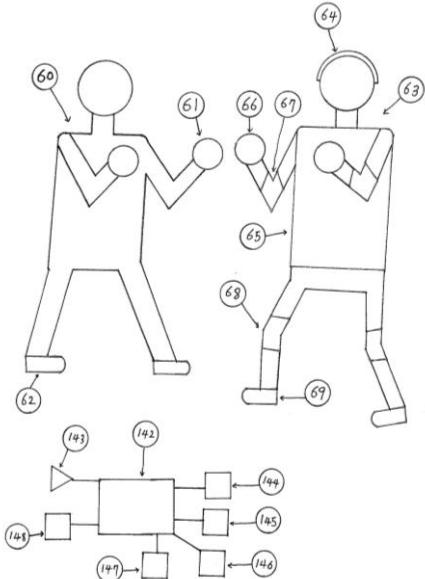
# AMUSEMENT GAME USING HOLOGRAM

An amusement game using a 3D hologram is not dangerous and gives a feeling of actually playing a game or a musical instrument, so that the player can have fun and exercise effects.

## **JEU DE DIVERTISSEMENT UTILISANT UN HOLOGRAMME**

L'invention concerne un jeu de divertissement utilisant un hologramme 3D, lequel jeu n'est pas dangereux et procure une sensation de jouer réellement à un jeu ou à un instrument de musique, de telle sorte que le joueur peut obtenir des effets de divertissement et d'exercice.

**CLAIM 1.** In a septum entertainment using a 3 D hologram, Holography (142) to make a 3 D hologram; A 3 D holographic person 60 that moves to create and obscure holography 142; A 3 D holographic zoom (61) in which the holography (142) is made to move and strike; A 3 D hologram foot 62 on which the holography 142 is made to move and hit; A person 63 equipped with a helmet device 64, a chute device 65, a glove device 66, an elbow device 67, a knee device 68 and a shoe device 69; A glove device 66 comprising a hole 70, a sensor 71 for sensing light and color, a light emitting device 73, a control device 75, a wireless transmitting/receiving device 76, a vibrator 72, an accelerometer 77, a battery 78, a speaker 74, a motion image camera 130 and a motion analyzer 131, which feel a sense of hitting and sound as when a 3 D holographic person 60 is directly hitting the 3 D holographic person 60; An elbow device (67) comprising a hole (79), a sensor (80) for sensing light and color, a light emitting device (82), a control device (84), a wireless transmitting/receiving device (85), a vibrator (81), an accelerometer (86), a battery (87), a speaker (83), a moving image camera (132), and a motion analyzer (133), wherein the elbow device (67) senses the feeling of hitting and sounds when a 3 D hologram person (60) is directly hitted as when a real person is hitted; A knee device 68 comprising a hole 88, a sensor 89 for sensing light and color, a light emitting device 90, a control device 93, a wireless transmitting/receiving device 94, a vibrator 92, an accelerometer 95, a battery 96, a speaker 91, a motion image camera 134 and a motion analyzer 135 for feeling the sense of hitting and sounding the 3 D hologram person 60 when directly hitting the 3 D holographic person 60; A light emitting device 99, a control device 102, a wireless transceiver 103, a vibrator 100, an accelerometer 104, and a battery 105; A shoes device 69 composed of a speaker 101, a moving image camera 136, and a motion analyzer 137, which, when directly striking a 3 D holographic person 60, feel a sense of hitting and sound as when striking a real person; A mobile terminal comprising: a hole (107); a sensor 108 for sensing light and color; a light-emitting device 109; a control device 110; a wireless transceiver 111; a vibrator 106; an accelerometer 112; a battery 114; a speaker 113; A helmet device 64 composed of a moving image camera 138 and a motion analyzer 139, which, when directly fitted to a 3 D hologram zooming 61 and a 3 D hologram foot 62, gives a sense of hitting and sounds as when fitted to a real person; A light emitting device 116, a control device 119, a wireless transceiver 120, a vibrator 117, an accelerometer 121, and a battery 123; A shoot device (65) comprising a speaker (122), a moving image camera (140), and a motion analyzer (141), the shoot device (65) giving a sense of hitting and sound when directly fitted to a 3 D hologram zooming (61) and a 3 D hologram foot (62) as when fitted to a real person; A septum entertainment using a 3 D hologram in which a control device (146) as an external device, a moving image camera (144), a motion analyzer (145), a wireless transmitting/receiving device (147), and a speaker (143) are combined, and a 3 D hologram person (60) and a person (63) directly feel a feeling of striking each other and strike a sound while striking each other.

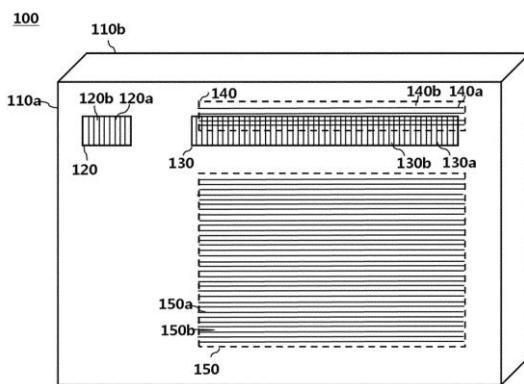


**HOLOGRAPHIC LIGHT GUIDE PLATE**

A holographic light guide plate according to an embodiment of the present invention comprises: a light guide unit for guiding light; a first holographic optical element arranged on one surface or an opposite surface of the light guide unit so that light output from a light source can be input and guided onto the light guide unit, to thereby diffract the input light; a second holographic optical element arranged on one of the one surface and the opposite surface of the light guide unit to receive light guided through the light guide unit by being diffracted from the first holographic optical element, and to partially diffract the received light so that the received light is directed to the other of the one surface and the opposite surface of the light guide unit; a third holographic optical element arranged on a surface opposite to a surface on which the second holographic optical element of the light guide portion is arranged to receive light diffracted from the second holographic optical element and to guide, by diffraction, the received light to a region different from regions in which the first and second holographic optical elements are arranged on the light guide portion; and a fourth holographic optical element receiving the light diffracted from the third holographic optical element and outputting, by diffraction, the received light, from the light guide unit.

**PLAQUE DE GUIDAGE DE LUMIÈRE HOLOGRAPHIQUE**

Une plaque de guidage de lumière holographique selon un mode de réalisation de la présente invention comprend : une unité de guidage de lumière pour guider la lumière ; un premier élément optique holographique disposé sur une surface ou une surface opposée de l'unité de guidage de lumière de telle sorte que la lumière émise par une source de lumière peut être entrée et guidée sur l'unité de guidage de lumière, pour ainsi diffracter la lumière d'entrée ; un deuxième élément optique holographique agencé sur l'une de la première surface et de la surface opposée de l'unité de guidage de lumière pour recevoir la lumière guidée à travers l'unité de guidage de lumière en étant diffractée à partir du premier élément optique holographique, et pour diffracter partiellement la lumière reçue de telle sorte que la lumière reçue soit dirigée vers l'autre parmi la surface et la surface opposée de l'unité de guidage de lumière ; un troisième élément optique holographique disposé sur une surface opposée à une surface sur laquelle le deuxième élément optique holographique de la partie de guidage de lumière est agencé pour recevoir la lumière diffractée à partir du deuxième élément optique holographique et pour guider, par diffraction, la lumière reçue vers une région différente des régions dans lesquelles les premier et deuxième éléments optiques holographiques sont agencés sur la partie de guidage de lumière ; et un quatrième élément optique holographique recevant la lumière diffractée à partir du troisième élément optique holographique et délivrant, par diffraction, la lumière reçue, à partir de l'unité de guidage de lumière.



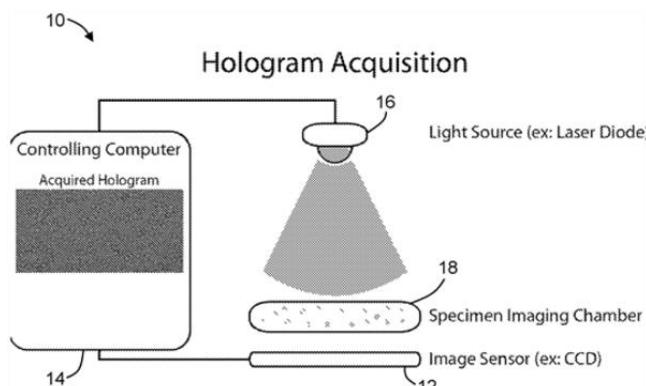
**CLAIM 1.** A light guide portion for guiding light; A first holographic optical device configured to diffract light output from a light source, the first holographic optical device being disposed on one surface or the other surface of the light guide unit such that the light output from the light source is input and guided on the light guide unit; A second holographic optical device disposed on one of one surface and the other surface of the light guide unit and configured to receive light diffracted from the first holographic optical device and guided through the light guide unit, and to partially direct the received light to the other one of the one surface and the other surface of the light guide unit by diffraction; A third holographic optical element disposed on a surface of the light guide part opposite to a surface on which the second holographic optical element is disposed, the third holographic optical element being configured to receive light diffracted from the second holographic optical element, and the received light being capable of being guided by diffraction to a region different from a region on which the first and second holographic optical elements are disposed on the light guide part; and A fourth holographic optical element configured to receive light diffracted from the third holographic optical element and output the received light from the light guide portion by diffraction.

**SYSTEM AND METHOD FOR OBJECT DETECTION IN HOLOGRAPHIC LENS-FREE IMAGING BY CONVOLUTIONAL DICTIONARY LEARNING AND ENCODING WITH PHASE RECOVERY**

Systems and methods for detecting objects in a holographic image are provided. The techniques include obtaining a holographic image having one or more objects depicted therein. A set of object templates is obtained. The set of object templates represents objects to be detected in the holographic image. One or more objects are detected in the holographic image using the set of object templates by iteratively computing a phase ( $\theta$ ) of the optical wavefront at the hologram plane, background illumination ( $\mu$ ) and encoding coefficients (A) for the set of object templates, until converged.

**SYSTÈME ET PROCÉDÉ DE DÉTECTION D'OBJET DANS UNE IMAGERIE HOLOGRAPHIQUE SANS LENTILLE PAR APPRENTISSAGE ET CODAGE DE DICTIONNAIRE CONVOLUTIF À RÉCUPÉRATION DE PHASE**

L'invention concerne des systèmes et des procédés pour détecter des objets dans une image holographique. Les techniques comprennent l'obtention d'une image holographique comportant un ou plusieurs objets y étant représentés. Un ensemble de modèles d'objets est obtenu. L'ensemble de modèles d'objets représente des objets à détecter dans l'image holographique. Un ou plusieurs objets sont détectés dans l'image holographique à l'aide de l'ensemble de modèles d'objets par calcul itératif d'une phase ( $\theta$ ) du front d'onde optique au niveau du plan d'hologramme, par éclairage de l'arrière-plan ( $\mu$ ) et par codage de coefficients (A) pour l'ensemble de modèles d'objets, jusqu'à ce qu'ils convergent.



**CLAIM 1.** A method for detecting objects in a holographic image, comprising: obtaining a holographic image (H) having one or more objects depicted therein and a focal depth (z) of the holographic image; obtaining a set of object templates {d} representing objects to be detected in the holographic image, wherein the set includes a known number (j) of object templates; and detecting one or more objects in the holographic image using the set of object templates by iteratively computing a phase (θ) of the optical wavefront at the hologram plane, background illumination (μ), and encoding coefficients (A) for the set of object templates, until converged.

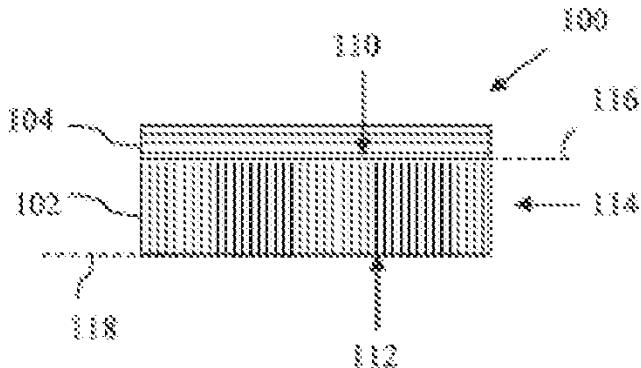
N7693

US20210094865  
Priority Date: 10/01/2019

CORNING

### METHODS OF FORMING GLASS-POLYMER STACKS FOR HOLOGRAPHIC OPTICAL STRUCTURE

A method for forming a glass stack, comprising: obtaining a glass sheet; selecting a plurality of portions of the glass sheet having a matching glass characteristic, wherein the glass characteristic is at least one of warp, bow, total thickness variation (TTV), and wedge; cutting a plurality of glass wafers from the selected portions of the glass sheet, and stacking the plurality of glass wafers to form a glass stack.



**CLAIM 1.** A method for forming a glass-polymer stack, comprising: obtaining a glass sheet; selecting a plurality of portions of the glass sheet having a matching glass characteristic, wherein the glass characteristic is at least one of warp, bow, total thickness variation (TTV), stress, and wedge; cutting a plurality of glass wafers from the selected portions of the glass sheet; and stacking the plurality of glass wafers to form a glass stack.

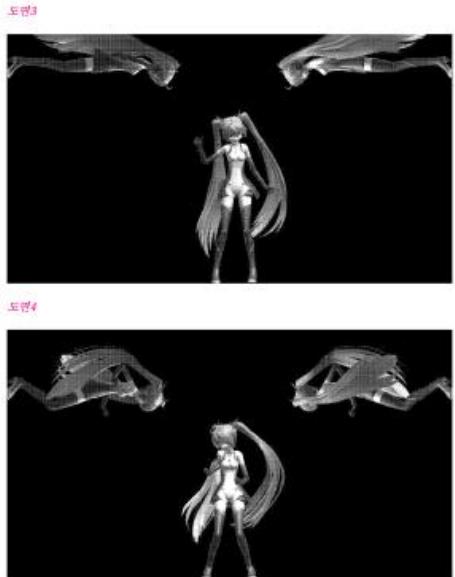
N7698

KR20210031802  
Priority Date: 21/08/2019

JEONG, JI WON - LEE, JUN HEOK - JANGMINKI - KIM, JIN-WOO

### METHOD, SYSTEM AND NON-TRANSITORY COMPUTER-READABLE RECORDING MEDIUM FOR PROVIDING FLOATING HOLOGRAMS OF AN OBJECT

According to one aspect of the present invention, there is provided a method for providing a floating hologram for an object, the method comprising the steps of: obtaining an image source for the object, Converting the acquired image source into three-dimensional modeling data about the object, and generating an image for a floating hologram about the object by dynamically referring to the converted three-dimensional modeling data.



**CLAIM 1.** A method for providing a floating hologram for an object, the method comprising: obtaining an image source for the object, Converting the acquired image source into three-dimensional modeling data about the object, and generating an image for a floating hologram about the object by dynamically referring to the converted three-dimensional modeling data.

N7706

EP3809208

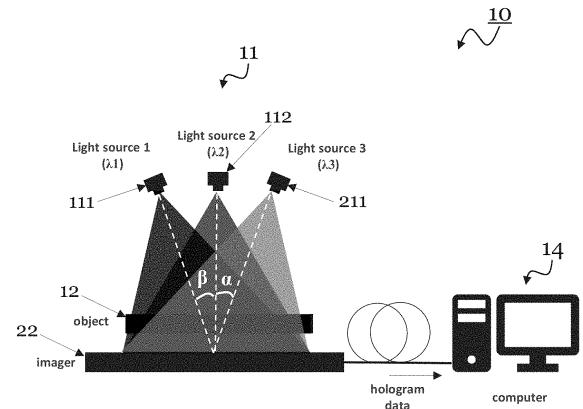
Priority Date: 18/10/2019

IMEC-INTERUNIVERSITAIR MICRO ELECTRONICA CENTRUM VZW

### HOLOGRAPHIC IMAGING DEVICE AND METHOD

The present invention relates to a holographic imaging device. The holographic imaging device comprising an imaging unit (11) comprising at least two light sources (111,112) configured to illuminate an object (12) by emitting at least two light beams, wherein a first light beam has a first wave-vector and a first wavelength and a second light beam has a second wave-vector that is different from the first wave-vector and a second wavelength that is different from the first wavelength. The holographic imaging device further comprising a processing unit (13) configured to obtain at least two holograms of the object by controlling the imaging unit to sequentially illuminate the object with respectively the first light beam and the second light beam, construct at least two two-dimensional (2D) image slices based on the at least two holograms, wherein each 2D image slice is constructed at a determined depth within the object volume, and generate a three-dimensional (3D) image of the object based on a combination of the 2D image slices.

**CLAIM 1.** A holographic imaging device (10) comprising: an imaging unit (11) comprising at least two light sources (111, 112), wherein the imaging unit (11) is configured to: - illuminate an object (12) by emitting at least two light beams with the at least two light sources (111, 112), wherein a first light beam has a first wave-vector and a first wavelength and a second light beam has a second wave-vector that is different from the first wave-vector and a second wavelength that is different from the first wavelength; and a processing unit (13) configured to: - obtain at least two holograms of the object (12) by controlling the imaging unit (11) to sequentially illuminate the object (12) with respectively the first light beam and the second light beam, construct at least two two-dimensional, 2D, image slices based on the at least two holograms, wherein each 2D image slice is constructed at a determined depth within the object volume, and generate a three-dimensional, 3D, image of the object (12) based on a combination of the 2D image slices.



N7726

CN112682732

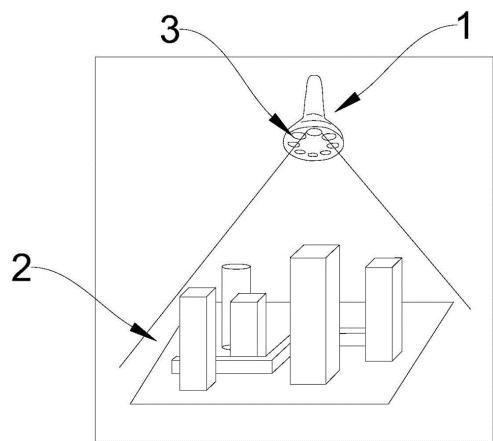
Priority Date: 01/08/2021

SHENZHEN ZHENXIANG TECHNOLOGY

### LIGHTING DEVICE AND LIGHTING METHOD FOR HOLOGRAPHIC 3D PRINTED PHOTO

The invention relates to an illumination device and an illumination method for holographically 3D printed photos, wherein the device comprises a plurality of small light sources, each small light source emits white light and can be independently controlled to be switched on and switched off; the color wheel is arranged at the emitting ends of the small light sources, a plurality of different filtering parts are arranged on the color wheel, and the filtering parts and the small light sources are in one-to-one correspondence so that the white light emitted by each small light source emits light rays with corresponding wave bands after passing through the corresponding filtering part. The device can rapidly switch light rays with different wave bands or wave band combinations for illumination, and when the device is applied to holographic 3D photo display, the device can rapidly and simply realize the display of different elements of the model through the illumination of the light rays with different wave bands or wave band combinations.

**CLAIM 1.** An illumination device, characterized in that the illumination device comprises: a plurality of small light sources, each of which emits white light and can be independently controlled to be switched on and off; the color wheel is arranged at the emitting ends of the small light sources, a plurality of light filtering parts are arranged on the color wheel, and the plurality of light filtering parts and the plurality of small light sources are in one-to-one correspondence, so that white light emitted by each small light source emits light rays with corresponding wave bands after passing through the corresponding light filtering part; the plurality of filter portions are different from each other.



N7731

**CN112663394**

Priority Date: 14/12/2020

**HUBEI YI EMMETT HOLOGRAPHIC TECHNOLOGY**

### **MODIFIED SILICONE-ACRYLATE HEAT-INSULATING COATING FOR HOLOGRAPHIC WATER TRANSFER PRINTING PAPER AND PREPARATION METHOD THEREOF**

The invention relates to a preparation method of a modified silicon-acrylic heat-insulating coating and an application of the modified silicon-acrylic heat-insulating coating in holographic water transfer printing paper, wherein the silicon-acrylic heat-insulating coating comprises the following components in parts by weight: 32-40 parts of modified silicone-acrylate emulsion, 3-10 parts of heat insulation material, 15-25 parts of filler, 2-4 parts of film forming additive, 0.1-0.3 part of dispersing agent, 0.1-0.3 part of defoaming agent, 0.1-0.6 part of thickening agent and 18-25 parts of deionized water; the glass transition temperature of the modified silicone-acrylate emulsion is 40-65 °C, the molecular weight is 3-20 ten thousand, the silicon content is 10-23%, the microscopic form of the modified silicone-acrylate emulsion is spherical, and the diameter of the modified silicone-acrylate emulsion is 40-100 nm; the heat insulating material is one of superfine vitrified micro bubbles and hollow silicon dioxide; the particle size of the heat-insulating material ultrafine vitrified microsphere is 100-300 nm, and the heat conductivity coefficient is as low as 0.039W/(m.K); the particle size of the hollow silicon dioxide of the heat insulation material is 150-400 nm, and the heat conductivity coefficient is as low as 0.08W/(m.K). The invention overcomes the defect of poor holographic effect in the prior art, and ensures that the pattern does not change color, lose color and crack when the holographic water transfer printing paper is baked at high temperature.

**CLAIM 1.** A modified silicone-acrylate heat insulation coating used in holographic water transfer printing paper is characterized in that: the modified silicon-acrylic heat-insulating coating comprises the following components in parts by weight: 32-40 parts of modified silicone-acrylate emulsion, 3-10 parts of heat insulation material, 15-25 parts of filler, 2-4 parts of film forming additive, 0.1-0.3 part of dispersing agent, 0.1-0.3 part of defoaming agent, 0.1-0.6 part of thickening agent and 18-25 parts of deionized water.

N7736

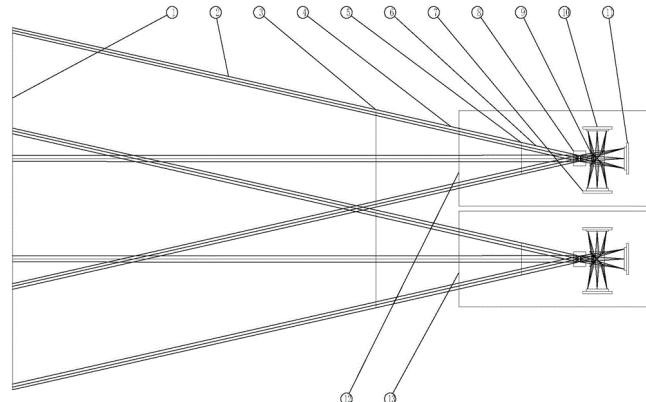
**CN112631101**

Priority Date: 30/12/2020

**SONG JIANMING**

### **HOLOGRAPHIC THREE-DIMENSIONAL SPACE IMAGING METHOD, DEVICE AND SYSTEM**

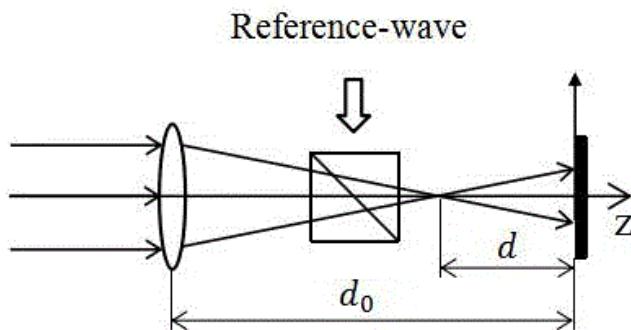
The invention relates to the technical field of imaging, in particular to a holographic three-dimensional space imaging method, a holographic three-dimensional space imaging device and a holographic three-dimensional space imaging system, which comprise the steps of simultaneously imaging targets with different distances in the same target range through an imaging objective lens; taking out target images with different distances formed by the imaging objective lens by utilizing a prism light splitting mode; and respectively irradiating the target images with different distances onto the corresponding sensors. The invention utilizes the imaging objective lens to be matched with the three-split prism to simultaneously image different distances in the same observation environment target range, and the sensor can record the shot whole space pattern information, thereby reproducing pictures and images with different distances and angles in the shooting environment and at any angle, ensuring that any observation distance in the whole observation range is real and clear, and breaking the shooting distance and angle limitation of a photographer.



**CLAIM 1.** A holographic three-dimensional space imaging method is characterized in that: it comprises the steps of S1, simultaneously imaging the targets with different distances in the same target range through the imaging objective lens; S2, taking out target images with different distances formed by the imaging objective lens in a prism light splitting mode; and S3, respectively irradiating the target images with different distances onto the corresponding sensors.

**LENS FOCAL LENGTH MEASURING DEVICE AND METHOD BASED ON DIGITAL HOLOGRAPHY**

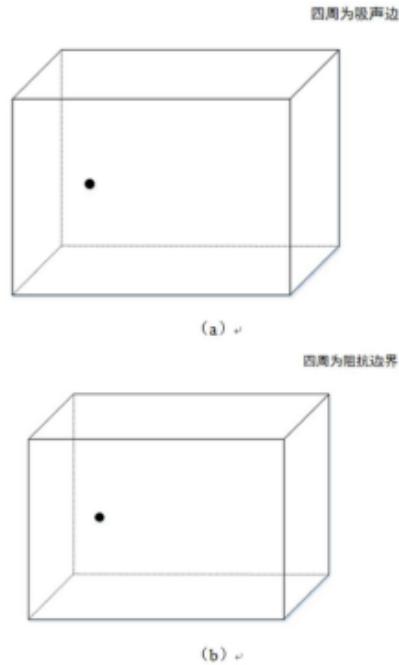
The invention discloses a lens focal length measuring device and method based on digital holography, and belongs to the technical field of lens focal length measurement. The method of the invention leads object light wave passing through a lens to be measured to interfere with a beam of reference light wave, changes the radius of the reference light wave surface, records interference images in an interference field by using a charge coupling device, and measures the focal length value of the lens to be measured by analyzing the information of the interference images and the change amount of the radius of the reference light wave surface; the method does not relate to direct measurement of complex optical path, does not need to correct the measurement result, reduces experimental error, and provides beneficial reference for the digital hologram reconstruction and the lens focal length measurement method.



**CLAIM 1.** A lens focal length measuring device based on digital holography is characterized in that: the device comprises a laser (1), a beam splitter prism I (2), a beam splitter prism II (3), an optical reflector I (4), an optical reflector II (5), a beam expander I (6), a beam expander II (7), a pinhole filter I (8), a pinhole filter II (9), a collimating lens (10), a concave lens (11) to be tested, a photoelectric charge coupling device (12) and a computer (13); the laser (1) emits laser to irradiate on the beam splitting prism I (2); the optical system comprises a beam splitter prism I (2), a beam splitter prism II (3), an optical reflector I (4) and an optical reflector II (5), wherein the beam splitter prism I (2) and the optical reflector I (4) are on the same vertical line, the beam splitter prism I (2) and the optical reflector II (5) are on the same horizontal line, the optical reflector II (5) and the beam splitter prism II (3) are on the same vertical line, and the beam splitter prism II (3) and the optical reflector I (4) are on the same horizontal line; a beam expander I (6), a pinhole filter I (8), a collimating lens (10) and a concave lens (11) to be detected are sequentially arranged between the optical reflector I (4) and the beam splitter prism II (3); a beam expander II (7) and a pinhole filter II (9) are sequentially arranged between the optical reflector II (5) and the beam splitter prism II (3); the photoelectric charge coupling device (12) is a CCD, is arranged behind the beam splitter prism II (3), is used for recording a reference object light interference hologram in a range capable of receiving interference spherical waves, and is transmitted to the computer (13) to be reproduced through the computer (13) numerical value.

**FINITE SPACE PLANE NEAR-FIELD ACOUSTIC HOLOGRAPHY MEASURING METHOD BASED ON SPACE FOURIER TRANSFORM**

The invention discloses a finite space plane near-field acoustic holography measuring method based on space Fourier transform, which comprises the following steps: and establishing a free field and finite space radiation sound field model based on the point sound source, and extracting complex sound pressure of a point sound source reconstruction surface in the free field and complex sound pressure data on a holographic surface in the finite space. Step two: calculating the sound pressure angle spectrum of the point source reconstruction surface in the free field and the point source holographic surface in the finite space, and calculating the transfer operator G of the reconstruction surface and the holographic surface-1. Step three: measuring to obtain complex sound pressure data on a holographic surface with a reconstructed sound source in a limited space; and calculate the holographic surface sound pressure angle spectrum. Step four: combining the holographic surface sound pressure angle spectrum in the third step with the transfer operator G in the second step-1Multiplying to obtain the sound pressure angle spectrum on the reconstruction surface. Step five: and windowing the sound pressure angle spectrum of the reconstruction surface in a wave number domain. And carrying out Fourier inverse transformation on the windowed reconstructed sound pressure angle spectrum to obtain reconstructed surface sound pressure. The invention considers finite space test environment, and solves the transfer operator in free field and finite spaceThe reconstruction accuracy is high.



**CLAIM 1.** The finite space plane near-field acoustic holography measuring method based on the space Fourier transform is characterized by comprising the following steps of: the method comprises the following steps: establishing a free field and finite space radiation sound field model based on a point sound source, and extracting complex sound pressure of a point sound source reconstruction surface in the free field and complex sound pressure data on a holographic surface in the finite space; step two: calculating the sound pressure angle spectrum of the reconstruction surface and the holographic surface, and calculating the transfer operator G of the reconstruction surface and the holographic surface-1; Step three: measuring to obtain complex sound pressure data on a holographic surface with a reconstructed sound source in a limited space; and calculating a holographic surface sound pressure angle spectrum; step four: combining the holographic surface sound pressure angle spectrum in the third step with the transfer operator G in the second step-1Multiplying to obtain a sound pressure angle spectrum on a reconstruction surface; step five: and windowing the sound pressure angle spectrum of the reconstruction surface in a wave number domain, and carrying out Fourier inverse transformation on the windowed reconstruction sound pressure angle spectrum to obtain the reconstruction surface complex sound pressure.

# IHMA - APRIL 2021 - 124 ISSUED PATENTS - PAGE 1

## HOLOGRAMS - 23 PATENTS

REFERENCE	COUNTRY	PATENT NUMBER	PUBLICATION DATE Day-Month-Year	APPLICANT	PRIORITY	PRIORITY DATE Day-Month-Year	PRIORITY NUMBER	EQUIVALENTS	TITLE	KEY WORDS
<a href="#">P33205</a>	WO	202173991	22/04/2021	LEONHARD KURZ STIFTUNG	DE	15/10/2019	DE201910127734	DE102019127734 WO202173991	TRANSFER FILM, COMPONENT AND METHOD FOR THE PRODUCTION THEREOF	
<a href="#">P33250</a>	JP	2021053855	08/04/2021	DAI NIPPON PRINTING	JP	27/09/2019	JP2019000177617	JP2021053855	INTERMEDIATE TRANSFER MEDIUM, METHOD FOR PRODUCING PRINTED MATTER, AND COMBINATION OF HEAT TRANSFER SHEET AND INTERMEDIATE TRANSFER MEDIUM	
<a href="#">P33256</a>	JP	2021047412	25/03/2021	TOPPAN PRINTING	JP	21/10/2020	JP2020000176712	JP2021047412	TRANSFER FOIL AND METHOD OF MAKING SAME	
<a href="#">P33257</a>	JP	2021047411	25/03/2021	TOPPAN PRINTING	JP	21/10/2020	JP2020000176710	JP2021047411	TRANSFER FOIL AND METHOD OF MAKING SAME	
<a href="#">P33258</a>	JP	2021047410	25/03/2021	TOPPAN PRINTING	JP	21/10/2020	JP2020000176707	JP2021047410	TRANSFER FOIL AND METHOD OF MAKING SAME	
<a href="#">P33270</a>	EP	3321092	27/02/2019	ALISE DEVICES - UNIVERSIDAD POLITECNICA DE MADRID	AU	12/03/2021	AU2021000201592	AU2021000201592 EP3321092 EP3321092 US20190070888 US20180201045 US10800202 WO201709494 AU2015402332 AU2015402332 CN107921803 CN107921803B	METHOD AND DEVICE FOR ACHIEVING DOCUMENT SECURITY BY GENERATING MULTIPLE REFLEXIVE AND TRANSMISSIVE LATENT IMAGES	
<a href="#">P33281</a>	CN	212966803	13/04/2021	SHANGHAI ZHENGWEI PRINTING	CN	01/09/2020	CN2020001876901	CN212966803U	NOVEL PERSPECTIVE HOLOGRAPHIC ANTI-COUNTERFEIT LABEL	
<a href="#">P33293</a>	CN	212873852	02/04/2021	HENAN WEIQUN TECHNOLOGY DEVELOPMENT	CN	11/08/2020	CN2020001659130	CN212873852U	HOLOGRAPHIC 3D LASER EMBOSSED ANTI-COUNTERFEITING WATER LABEL	
<a href="#">P33298</a>	CN	212830230	30/03/2021	SHANDONG TAIBAO INFORMATION TECHNOLOGY GROUP	CN	12/06/2020	CN2020001084073	CN212830230U	POINT LIGHT SOURCE READING LASER ENCRYPTED HOLOGRAPHIC ANTI-COUNTERFEITING GASKET	
<a href="#">P33299</a>	CN	212829596	30/03/2021	WUXI QUNHUAN PACKING MATERIAL	CN	04/08/2020	CN2020001590566	CN212829596U	AUTOMATIC IN-FILM LABELING STRUCTURE BASED ON DIGITAL HOLOGRAPHIC ANTI-COUNTERFEITING	
<a href="#">P33300</a>	CN	212809579	26/03/2021	SHANDONG TAIBAO INFORMATION TECHNOLOGY GROUP	CN	09/09/2020	CN2020001956676	CN212809579U	HOLOGRAPHIC PLASTIC FILM POSITIVE AND NEGATIVE CODE CORRESPONDING ANTI-COUNTERFEITING MARK	
<a href="#">P33309</a>	CN	112644152	13/04/2021	WUHAN HUAGONG IMAGE TECHNOLOGY & DEVELOPMENT	CN	18/12/2020	CN2020001504109	CN112644152	METHOD FOR MANUFACTURING HOLOGRAPHIC FRAME PAPER	
<a href="#">P33311</a>	CN	112634742	09/04/2021	GUANGZHOU TIMES PRINTING FACTORY	CN	30/12/2020	CN2020001604679	CN112634742	NOVEL ANTI-COUNTERFEIT LABEL AND MANUFACTURING METHOD THEREOF	
<a href="#">P33321</a>	CN	112606613	06/04/2021	HUBEI YI EMMETT HOLOGRAPHIC TECHNOLOGY	CN	14/12/2020	CN2020001466967	CN112606613	FLUORESCENCE AND HOLOGRAPHIC DOUBLE ANTI-COUNTERFEITING BRONZING FILM AND PREPARATION METHOD THEREOF	
<a href="#">P33322</a>	CN	112606588	06/04/2021	PENG LIANG	CN	17/01/2021	CN2021000059061	CN112606588	OPTICAL COLOR-CHANGING GOLD STAMPING MATERIAL	
<a href="#">P33323</a>	CN	112606582	06/04/2021	SHENZHEN JINJIA	CN	17/11/2020	CN2020001290651	CN112606582	LASER FILM, LOCAL POSITIONING LASER PAPER AND PREPARATION METHOD THEREOF	
<a href="#">P33327</a>	CN	112597989	02/04/2021	SHANGHAI INSTITUTE OF MICROSYSTEM & INFORMATION TECHNOLOGY CHINESE ACADEMY OF SCIENCES	CN	18/12/2020	CN2020001507928	CN112597989	MILLIMETER WAVE THREE-DIMENSIONAL HOLOGRAPHIC IMAGE CONCEALED ARTICLE DETECTION METHOD AND SYSTEM	
<a href="#">P33330</a>	CN	112590380	02/04/2021	SHENZHEN YONGFENGJI TECHNOLOGY	CN	26/12/2020	CN2020001570060	CN112590380	PRINTING DEVICE FOR HIGH-BRIGHTNESS HOLOGRAPHIC GOLD STAMPING ANTI-COUNTERFEIT LABEL	
<a href="#">P33336</a>	CN	112571942	30/03/2021	SHANGHAI SECURITY PRINTING	CN	29/12/2020	CN2020001595588	CN112571942	HOLOGRAPHIC ANTI-COUNTERFEITING MARK HIGH-PRECISION POSITIONING HOT STAMPING DEVICE AND WORKING METHOD THEREOF	
<a href="#">P33338</a>	CN	112562489	26/03/2021	WUHAN HUAGONG IMAGE TECHNOLOGY & DEVELOPMENT	CN	15/12/2020	CN2020001473555	CN112562489	VARIABLE DYNAMIC HOLOGRAPHIC ANTI-COUNTERFEITING MARK AND PREPARATION METHOD THEREOF	OVD - Microlens
<a href="#">P33339</a>	CN	112562488	26/03/2021	WUHAN HUAGONG IMAGE TECHNOLOGY & DEVELOPMENT	CN	12/12/2020	CN2020001449653	CN112562488	DYNAMIC OPTICALLY VARIABLE ANTI-COUNTERFEITING ELEMENT AND PREPARATION METHOD THEREOF	
<a href="#">P33340</a>	CN	112562487	26/03/2021	SHAANXI YICHENG ANTI COUNTERFEITING PRINTING	CN	30/11/2020	CN2020001372928	CN112562487	POSITIONING PAPER HOLOGRAPHIC PRINTING COMBINED MARK AND PREPARATION METHOD THEREOF	
<a href="#">P33345</a>	CN	112549734	26/03/2021	CHANGYUAN TEFA TECHNOLOGY	CN	26/12/2020	CN2020001570071	CN112549734	HOLOGRAPHIC THERMOGRAPHIC CHARACTERISTIC IDENTIFICATION ANTI-COUNTERFEITING MARK AND PREPARATION METHOD THEREOF	

# IHMA - APRIL 2021 - 124 ISSUED PATENTS - PAGE 2

## VARIOUS OPTICAL EFFECTS - 34 PATENTS

REFERENCE	COUNTRY	PATENT NUMBER	PUBLICATION DATE Day-Month-Year	APPLICANT	PRIORITY	PRIORITY DATE Day-Month-Year	PRIORITY NUMBER	EQUIVALENTS	TITLE	KEY WORDS
<a href="#">P33207</a>	WO	202172006	15/04/2021	INDIANA UNIVERSITY	US	09/10/2019	US2019000912755	WO202172006	SYSTEM AND METHOD OF USING PLASMONIC NANOPARTICLES FOR ANTI-COUNTERFEIT APPLICATIONS	
<a href="#">P33208</a>	WO	202169919	15/04/2021	DE LA RUE INTERNATIONAL	GB	11/10/2019	GB2019000014760	WO202169919 GB201914760 GB2588181	A METHOD AND APPARATUS FOR INSPECTING A LIGHT CONTROL LAYER FOR A SECURITY DEVICE	Microlens
<a href="#">P33209</a>	WO	202169918	15/04/2021	DE LA RUE INTERNATIONAL	GB	11/10/2019	GB2019000014770	WO202169918 GB201914770 GB2588183	OPTICAL DEVICE AND METHOD OF MANUFACTURE THEREOF	
<a href="#">P33210</a>	WO	202169096	15/04/2021	GIESECKE & DEVRIENT CURRENCY TECHNOLOGY	DE	08/10/2019	DE201910006977	DE102019006977 WO202169096	SECURITY ELEMENT TRANSFER MATERIAL, METHOD FOR THE PRODUCTION THEREOF AND USE THEREOF	
<a href="#">P33217</a>	WO	202163213	08/04/2021	CHINA BANKNOTE PRINTING & MINT	CN	30/09/2019	CN2019000943319	CN112572013 WO202163213	OPTICAL ANTI-COUNTERFEITING ELEMENT AND ANTI-COUNTERFEITING PRODUCT	
<a href="#">P33218</a>	WO	202163126	08/04/2021	CHINA BANKNOTE PRINTING & MINT	CN	30/09/2019	CN2019000943326	CN112572015 WO202163126	OPTICAL ANTI-COUNTERFEITING ELEMENT AND ANTI-COUNTERFEITING PRODUCT	
<a href="#">P33219</a>	WO	202163121	08/04/2021	CHINA BANKNOTE PRINTING & MINT	CN	30/09/2019	CN2019000945159	CN112572014 WO202163121	OPTICAL ANTI-COUNTERFEITING ELEMENT AND ANTI-COUNTERFEITING PRODUCT	
<a href="#">P33220</a>	WO	202160543	01/04/2021	TOPPAN PRINTING	JP	25/09/2019	JP2019000174228	WO202160543	COLOR DISPLAY BODY, AUTHENTICATION MEDIUM AND AUTHENTICITY DETERMINATION METHOD OF COLOR DISPLAY BODY	
<a href="#">P33222</a>	WO	202158671	01/04/2021	OPTRICAL	GB	26/09/2019	GB201900013913	WO202158671 GB201913913	IMPROVEMENTS IN AND RELATING TO SECURITY DEVICES	Microlens
<a href="#">P33223</a>	WO	202157574	01/04/2021	CHINA BANKNOTE PRINTING & MINT - ZHONGCHAO SPECIAL SECURITY TECHNOLOGY	CN	29/09/2019	CN2019000932440	WO202157574 CN112572018	MULTILAYER BODY OPTICAL ANTI-COUNTERFEITING ELEMENT AND FABRICATION METHOD THEREFOR	
<a href="#">P33234</a>	US	20210101402	08/04/2021	VIAVI SOLUTIONS	US	08/10/2019	US2019000912518	US20210101402 WO202172105	SECURITY PIGMENT AND OPTICAL SECURITY ELEMENT	
<a href="#">P33239</a>	KR	20210037976	07/04/2021	NANO BRICK	KR	30/09/2019	KR2019000120548	KR20210037976	A METHOD OF MANUFACTURING A FORGERY AND TAMPER-RESISTANT DEVICE.	
<a href="#">P33244</a>	JP	2021059025	15/04/2021	TOPPAN INFOMEDIA	JP	03/10/2019	JP2019000182874	JP2021059025	SECURITY LABEL	Microlens
<a href="#">P33245</a>	JP	2021059024	15/04/2021	KYODO PRINTING	JP	03/10/2019	JP2019000182815	JP2021059024	PRINTING MEDIUM	Photochromic pearl pigment
<a href="#">P33260</a>	JP	2021045910	25/03/2021	TOPPAN PRINTING	JP	19/09/2019	JP2019000170319	JP2021045910	VISUALIZER WITH GUIDE, DISPLAY KIT, LIGHT TRANSMISSION LAYER, AND MOLD	Microlens
<a href="#">P33266</a>	EP	3800063	07/04/2021	HUECK FOLIEN	EP	03/10/2019	EP2019000201230	EP3800063	SECURITY ELEMENT FOR SECURITIES OR SECURITY PAPERS	
<a href="#">P33267</a>	EP	3800062	07/04/2021	HUECK FOLIEN	EP	03/10/2019	EP2019000201229	EP3800062 WO202163702	SECURITY ELEMENT COMPRISING AN OPTICAL EFFECT LAYER FORMED AS A THIN FILM ELEMENT	Magnetic pigment
<a href="#">P33268</a>	EP	3800061	07/04/2021	HUECK FOLIEN	EP	03/10/2019	EP2019000201226	EP3800061 WO202163693	SECURITY ELEMENT WITH AN OPTICAL EFFECT LAYER	
<a href="#">P33269</a>	EP	3800060	07/04/2021	HUECK FOLIEN	EP	03/10/2019	EP2019000201223	EP3800060 WO202163691	SECURITY ELEMENT WITH AT LEAST ONE COLOUR CHANGE AREA	
<a href="#">P33271</a>	EP	3249459	15/01/2020	TOPPAN PRINTING	JP	20/01/2015	JP201500008667	US20210094338 EP3249459 EP3249459 EP3249459 US20170322472 WO2016117336 JP2016117336W JP6658547	DISPLAY MEDIUM PROVIDED WITH DIFFRACTION STRUCTURE AND LIGHT CONTROL ELEMENT	
<a href="#">P33277</a>	CN	213012663	20/04/2021	JIANGYIN TONGLI OPTOELECTRONIC TECHNOLOGY	CN	19/06/2020	CN2020001144181	CN213012663U	ANTI-COUNTERFEITING INDICATING ADHESIVE TAPE	Microlens
<a href="#">P33284</a>	CN	212920898	09/04/2021	JIANGSU WEIGE NEW MATERIAL SCIENCE & TECHNOLOGY - SVG TECHNOLOGY	CN	13/03/2020	CN2020000313280	CN212920898U	ANTI-FAKE CERTIFICATE CARD	

## IHMA - APRIL 2021 - 124 ISSUED PATENTS - PAGE 3

### VARIOUS OPTICAL EFFECTS - 34 PATENTS (continuation)

REFERENCE	COUNTRY	PATENT NUMBER	PUBLICATION DATE Day-Month-Year	APPLICANT	PRIORITY	PRIORITY DATE Day-Month-Year	PRIORITY NUMBER	EQUIVALENTS	TITLE	KEY WORDS
<a href="#">P33285</a>	CN	212920874	09/04/2021	JIANGSU WEIGE NEW MATERIAL SCIENCE & TECHNOLOGY - SVG TECHNOLOGY	CN	13/03/2020	CN2020000313306	CN212920874U	ANTI-COUNTERFEITING HOT STAMPING FILM	
<a href="#">P33307</a>	CN	112644200	13/04/2021	PENG LIANG	CN	05/01/2021	CN2021000005324	CN112644200	PHASE-CHANGE OPTICAL ANTI-COUNTERFEITING ELEMENT	
<a href="#">P33310</a>	CN	112634743	09/04/2021	JI HUA LABORATORY	CN	31/12/2020	CN2020001620687	CN112634743	OPTICAL ANTI-COUNTERFEITING STRUCTURE AND MANUFACTURING METHOD THEREOF	
<a href="#">P33316</a>	CN	112622467	09/04/2021	PEOPLE S PRINTING PLANT OF GUANGZHOU	CN	18/12/2020	CN2020001511544	CN112622467	PREPARATION METHOD OF ANGLE-DEPENDENT COLOR-CHANGING POLARIZATION HIDDEN IMAGE-TEXT	
<a href="#">P33317</a>	CN	112622462	09/04/2021	PEOPLE S PRINTING PLANT OF GUANGZHOU	CN	18/12/2020	CN2020001511532	CN112622462	IMAGE HIDING ANTI-COUNTERFEITING METHOD FOR MULTI-ANGLE OBSERVATION OF COLOR CHANGE	
<a href="#">P33318</a>	CN	112613591	06/04/2021	SUZHOU IMAGE LASER TECHNOLOGY	CN	29/12/2020	CN2020001593887	CN112613591	ANTI-COUNTERFEIT LABEL AND PREPARATION METHOD THEREOF	
<a href="#">P33329</a>	CN	112590419	02/04/2021	HUNAN UNIVERSITY	CN	24/11/2020	CN2020001332570	CN112590419	OPTICAL ANTI-COUNTERFEITING MARK WITH NANO COMPOSITE STRUCTURE	
<a href="#">P33333</a>	CN	112572019	30/03/2021	CHINA BANKNOTE PRINTING & MINT	CN	30/09/2019	CN2019000943321	CN112572019	OPTICAL ANTI-COUNTERFEITING ELEMENT AND ANTI-COUNTERFEITING PRODUCT	
<a href="#">P33334</a>	CN	112572017	30/03/2021	CHINA BANKNOTE PRINTING & MINT	CN	29/09/2019	CN2019000932005	CN112572017	OPTICAL ANTI-COUNTERFEITING ELEMENT CAPABLE OF BEING OBSERVED FROM TWO SIDES	
<a href="#">P33335</a>	CN	112572016	30/03/2021	CHINA BANKNOTE PRINTING & MINT	CN	30/09/2019	CN2019000943342	CN112572016	OPTICAL ANTI-COUNTERFEITING ELEMENT AND ANTI-COUNTERFEITING PRODUCT	
<a href="#">P33338</a>	CN	112562489	26/03/2021	WUHAN HUAGONG IMAGE TECHNOLOGY & DEVELOPMENT	CN	15/12/2020	CN2020001473555	CN112562489	VARIABLE DYNAMIC HOLOGRAPHIC ANTI-COUNTERFEITING MARK AND PREPARATION METHOD THEREOF	Hologram - Microlens
<a href="#">P33343</a>	CN	112552557	26/03/2021	JIANGNAN UNIVERSITY	CN	19/12/2020	CN2020001508911	CN112552557	MAGNETIC FIELD RESPONSE PHOTONIC CRYSTAL ANTI-COUNTERFEITING FILM AND PREPARATION METHOD AND APPLICATION THEREOF	Photonic film

### NON SECURITY HOLOGRAMS - 68 PATENTS

REFERENCE	COUNTRY	PATENT NUMBER	PUBLICATION DATE Day-Month-Year	APPLICANT	PRIORITY	PRIORITY DATE Day-Month-Year	PRIORITY NUMBER	EQUIVALENTS	TITLE	KEY WORDS
<a href="#">N7686</a>	WO	202176075	22/04/2021	IZMIR YUKSEK TEKNOLOJİ ENSTİTÜSÜ	TR	14/10/2019	TR201900015794	WO202176075	CELL VIABILITY ANALYSIS AND COUNTING FROM HOLOGRAMS BY USING DEEP LEARNING AND APPROPRIATE LENSLESS HOLOGRAPHIC MICROSCOPE	
<a href="#">N7687</a>	WO	202173086	22/04/2021	NUCTECH - TSINGHUA UNIVERSITY	CN	16/10/2019	CN2019000985840	WO202173086 CN112666816	MOVABLE HOLOGRAPHIC PROJECTION DEVICE AND HOLOGRAPHIC PROJECTION METHOD	
<a href="#">N7688</a>	WO	202171293	15/04/2021	SON, GUNHO	KR	10/10/2019	KR2019000125373	WO202171293	AMUSEMENT GAME USING HOLOGRAM	
<a href="#">N7689</a>	WO	202171210	15/04/2021	LG CHEM	KR	07/10/2019	KR2019000124013	WO202171210 KR20210041378	HOLOGRAPHIC LIGHT GUIDE PLATE	
<a href="#">N7690</a>	WO	202169973	15/04/2021	MIDIAGNOSTICS	US	11/10/2019	US2019000914405	WO202169973	SYSTEM AND METHOD FOR OBJECT DETECTION IN HOLOGRAPHIC LENS-FREE IMAGING BY CONVOLUTIONAL DICTIONARY LEARNING AND ENCODING WITH PHASE RECOVERY	
<a href="#">N7691</a>	WO	202166391	08/04/2021	LG CHEM	KR	30/09/2019	KR2019000121206	WO202166391 KR20210038342	HOLOGRAPHIC OPTICAL DEVICE AND MANUFACTURING METHOD THEREFOR	
<a href="#">N7692</a>	WO	202166207	08/04/2021	KOREA ELECTRONICS TECHNOLOGY INSTITUTE	KR	30/09/2019	KR2019000120306	WO202166207 KR20210037862	DEVICE AND METHOD FOR TRANSMITTING HOLOGRAM USING UPDATABLE HOLOGRAPHIC MATERIAL	
<a href="#">N7693</a>	US	20210094865	01/04/2021	CORNING	US	01/10/2019	US2019000908680	US20210094865 WO202167180	METHODS OF FORMING GLASS-POLYMER STACKS FOR HOLOGRAPHIC OPTICAL STRUCTURE	

**IHMA - APRIL 2021 - 124 ISSUED PATENTS - PAGE 4**

**NON SECURITY HOLOGRAMS - 68 PATENTS (continuation)**

REFERENCE	COUNTRY	PATENT NUMBER	PUBLICATION DATE Day-Month-Year	APPLICANT	PRIORITY	PRIORITY DATE Day-Month-Year	PRIORITY NUMBER	EQUIVALENTS	TITLE	KEY WORDS
<a href="#">N7694</a>	US	10969599	06/04/2021	FACEBOOK TECHNOLOGIES	US	18/12/2018	US2018000224760	US10969599	POLARIZATION CONVERSION USING GEOMETRIC PHASE AND POLARIZATION VOLUME HOLOGRAM OPTICAL ELEMENTS	
<a href="#">N7695</a>	RU	2746239	09/04/2021	SKRIPKIN ALEKSANDR A,SU	RU	21/08/2020	RU2020000128061	RU2746239	DEVICE FOR CREATING DYNAMIC HOLOGRAPHIC IMAGES IN SPACE	
<a href="#">N7696</a>	RU	2745540	26/03/2021	SAMSUNG ELECTRONICS	RU	25/08/2020	RU2020000128284	RU2745540	AUGMENTED REALITY DEVICE BASED ON WAVEGUIDES WITH THE STRUCTURE OF HOLOGRAPHIC DIFFRACTION GRIDS, DEVICE FOR RECORDING THE STRUCTURE OF HOLOGRAPHIC DIFFRACTION GRIDS	
<a href="#">N7697</a>	KR	20210032778	25/03/2021	LG CHEM	KR	17/09/2019	KR2019000114219	KR20210032778	HOLOGRAPHIC OPTICAL ELEMENT AND E-NORTH DISPLAY INCLUDING THE SAME	
<a href="#">N7698</a>	KR	20210031802	23/03/2021	JEONG, JI WON - LEE, JUN HEOK - JANGMINKI - KIM, JIN-WOO	KR	21/08/2019	KR2019000102701	KR20210031802	METHOD, SYSTEM AND NON-TRANSITORY COMPUTER-READABLE RECORDING MEDIUM FOR PROVIDING FLOATING HOLOGRAMS OF AN OBJECT	
<a href="#">N7699</a>	KR	102241148	15/04/2021	SHINSUNG UNIVERSITY	KR	31/12/2019	KR2019000179572	KR102241148	HOLOGRAM TRIPOD FOR VEHICLE SAFETY DISPLAY AND METHOD FOR PROCESSING THE SAME	
<a href="#">N7700</a>	KR	102240477	15/04/2021	KOREA UNIVERSITY INDUSTRIAL & ACADEMIC COLLABORATION FOUNDATION	KR	05/12/2019	KR2019000160635	KR102240477	IMAGE PROJECTION APPARATUS AND METHOD USING HOLOGRAM FILM	
<a href="#">N7701</a>	KR	102236914	06/04/2021	CELLBIG	KR	29/10/2019	KR2019000135904	KR102236914	BIDIRECTIONAL COMMUNICATION SERVICE SYSTEM BASED ON 3 D HOLOGRAM DISPLAY DEVICE	
<a href="#">N7702</a>	KR	102235646	02/04/2021	SEOUL NATIONAL UNIVERSITY R&DB FOUNDATION	KR	12/12/2019	KR2019000165987	KR102235646	VISION COMPENSATING HOLOGRAPHIC DISPLAY SYSTEM	
<a href="#">N7703</a>	KR	102231649	24/03/2021	KIM, DONG WOOK	KR	21/10/2019	KR2019000130440	KR102231649	HOLOGRAM GENERATION APPARATUS AND METHOD CAPABLE OF BIDIRECTIONAL INTERACTION USING 3 D DATA	
<a href="#">N7704</a>	JP	2021060474	15/04/2021	KITAMI INSTITUTE OF TECHNOLOGY	JP	04/10/2019	JP2019000183428	JP2021060474	PHOTON-SIEVE HOLOGRAM AND MICROOPTICAL IMAGE PROJECTION DEVICE	
<a href="#">N7705</a>	ES	1262749	16/03/2021	UGOLINO CRISHTIAN	ES	09/02/2021	ES2021000030245	ES1262749U	HOLOGRAPHIC PROJECTOR DEVICE	
<a href="#">N7706</a>	EP	3809208	21/04/2021	IMEC-INTERUNIVERSITAIR MICRO ELECTRONICA CENTRUM VZW	EP	18/10/2019	EP2019000204031	EP3809208 US20210116863	HOLOGRAPHIC IMAGING DEVICE AND METHOD	
<a href="#">N7707</a>	EP	3799016	31/03/2021	DUALITA - TOURE RITA J	GB	27/09/2019	GB2019000013947	EP3799016 US20210096512 GB201913947 GB2587400 JP2021056496 CN112578657 KR20210037523	HOLOGRAM DISPLAY USING A LIQUID CRYSTAL DISPLAY DEVICE	
<a href="#">N7708</a>	CN	213024857	20/04/2021	GUIZHOU DUOBAOLE AMUSEMENT EQUIPMENT	CN	27/10/2020	CN2020002412203	CN213024857U	HOLOGRAPHIC PROJECTION ARRANGEMENT OF CHILDREN'S EDUCATION	
<a href="#">N7709</a>	CN	213024854	20/04/2021	COLLEGE OF TOURISM & CULTURE YUNNAN UNIVERSITY	CN	30/09/2020	CN2020002202814	CN213024854U	OUTDOOR NEWS TEACHING IS WITH LED HOLOGRAPHIC PROJECTION CAR BASED ON 5G NETWORK TRANSMISSION	
<a href="#">N7710</a>	CN	213023957	20/04/2021	QU YONGQING	CN	09/10/2020	CN2020002229312	CN213023957U	HOLOGRAPHIC EFFECT IMAGE DISPLAY DEVICE	
<a href="#">N7711</a>	CN	212990645	16/04/2021	SHANGHAI YIRAN DIGITAL TECHNOLOGY	CN	30/10/2020	CN2020002473053	CN212990645U	DIGITAL HOLOGRAPHIC INTERACTION EQUIPMENT	
<a href="#">N7712</a>	CN	212986490	16/04/2021	GUANGZHOU GRAVITATIONAL WAVE TECHNOLOGY INNOVATION DEVELOPMENT	CN	06/07/2020	CN2020001302072	CN212986490U	HOLOGRAPHIC PROJECTION DEVICE WITH MOVABLE GUIDE RAIL	
<a href="#">N7713</a>	CN	212969906	13/04/2021	NANJING UNIVERSITY OF SCIENCE & TECHNOLOGY	CN	24/04/2020	CN2020000631958	CN212969906U	INTELLIGENT HOLOGRAPHIC PROJECTION SYSTEM	
<a href="#">N7714</a>	CN	212966933	13/04/2021	SHENZHEN JIWOKOS TECHNOLOGY	CN	09/10/2020	CN2020002233340	CN212966933U	PORTABLE MINI HOLOGRAPHIC ROTARY DISPLAY DEVICE	
<a href="#">N7715</a>	CN	212961122	13/04/2021	SHENZHEN HONG YUAN CONSTRUCTION PROJECT	CN	09/09/2020	CN2020001955784	CN212961122U	INTEGRATED DECORATIVE STRUCTURE OF CHANGEABLE HOLOGRAPHIC WALL IN BATHROOM	

**IHMA - APRIL 2021 - 124 ISSUED PATENTS - PAGE 5**

**NON SECURITY HOLOGRAMS - 68 PATENTS (continuation)**

REFERENCE	COUNTRY	PATENT NUMBER	PUBLICATION DATE Day-Month-Year	APPLICANT	PRIORITY	PRIORITY DATE Day-Month-Year	PRIORITY NUMBER	EQUIVALENTS	TITLE	KEY WORDS
<a href="#">N7716</a>	CN	212934101	09/04/2021	DALIAN MORDEN TECHNOLOGY	CN	20/08/2020	CN2020001758940	CN212934101U	HOLOGRAPHIC PROJECTION ARRANGEMENT OF CONVENIENT TRANSPORTATION	
<a href="#">N7717</a>	CN	212933247	09/04/2021	ORIENTAL ANIME ELECTRONIC TECHNOLOGY	CN	23/10/2020	CN2020002381372	CN212933247U	NOVEL HOLOGRAPHIC GLASS SHOW CUPBOARD	
<a href="#">N7718</a>	CN	212933140	09/04/2021	PUTIAN HUJIAITENG ELECTRONIC TECHNOLOGY	CN	19/09/2020	CN2020002062201	CN212933140U	HOLOGRAPHIC PROJECTION GLASSES SUITABLE FOR CELL-PHONE	
<a href="#">N7719</a>	CN	212931344	09/04/2021	FUJIAN NORMAL UNIVERSITY	CN	14/10/2020	CN2020002283897	CN212931344U	PHASE ENCODING AND DECODING DEVICE FOR SINGLE INTERFERENCE READING PHASE	
<a href="#">N7720</a>	CN	212906004	06/04/2021	RUAN JINQIN	CN	15/10/2020	CN2020002298459	CN212906004U	PATROL AND EXAMINE ROBOT OF BUILT-IN HOLOGRAPHIC PROJECTION AND ASSET INVENTORY READING AND WRITING EQUIPMENT	
<a href="#">N7721</a>	CN	212873907	02/04/2021	NANJING YAXU ELECTRONIC TECHNOLOGY	CN	30/09/2020	CN2020002210709	CN212873907U	CONTENT-REPLACEABLE HOLOGRAPHIC DISPLAY EQUIPMENT WITH TOUCH INTERACTION FUNCTION	
<a href="#">N7722</a>	CN	212873182	02/04/2021	SKYLINE TECHNOLOGY	CN	04/08/2020	CN2020001596879	CN212873182U	ROTATABLE VR360 HOLOGRAPHIC PROJECTION EQUIPMENT	
<a href="#">N7723</a>	CN	212846007	30/03/2021	UNIVERSITY OF XIAMEN	CN	13/12/2019	CN2019002242104	CN212846007U	EQUIPMENT FOR PREPARING HOLOGRAPHIC GRATING WITH SMALL ASPECT RATIO BY UTILIZING HOLOGRAPHIC INTERFERENCE RECORDING MEANS	
<a href="#">N7724</a>	CN	212808904	26/03/2021	JINGMEN TANMENG TECHNOLOGY	CN	06/08/2020	CN2020001615859	CN212808904U	REFLECTIVE GEOMETRIC HOLOGRAPHIC DISPLAY SYSTEM WITH OPTIMIZED DISPLAY CONFIGURATION	
<a href="#">N7725</a>	CN	212808895	26/03/2021	SHANGHAI WANXING HEALTH MANAGEMENT CONSULTING	CN	21/08/2020	CN2020001770709	CN212808895U	ARTIFICIAL INTELLIGENCE HEALTH DIAGNOSTIC DEVICE BASED ON HOLOGRAPHIC PROJECTION	
<a href="#">N7726</a>	CN	112682732	20/04/2021	SHENZHEN ZHENXIANG TECHNOLOGY	CN	08/01/2021	CN2021000025140	CN112682732	LIGHTING DEVICE AND LIGHTING METHOD FOR HOLOGRAPHIC 3D PRINTED PHOTO	
<a href="#">N7727</a>	CN	112667082	16/04/2021	ZHANG SHIDI - WANG CHENYU - ZHENG YUNHUAN - ZHUANG SHANLIN - CHEN XINYU	CN	28/12/2020	CN2020001596151	CN112667082	HOLOGRAPHIC IMAGE PROJECTION SYSTEM BASED ON MR TECHNOLOGY	
<a href="#">N7728</a>	CN	112666815	16/04/2021	BEIJING UNIVERSITY OF TECHNOLOGY	CN	26/12/2020	CN2020001569757	CN112666815	CONTINUOUS TERAHERTZ WAVE LENS-FREE FOURIER TRANSFORM DIGITAL HOLOGRAPHIC IMAGING METHOD	
<a href="#">N7729</a>	CN	112666814	16/04/2021	BEIJING UNIVERSITY OF TECHNOLOGY	CN	26/12/2020	CN2020001569706	CN112666814	OFF-AXIS DIGITAL HOLOGRAPHIC DIFFRACTION TOMOGRAPHY METHOD BASED ON CONTINUOUS TERAHERTZ WAVES	
<a href="#">N7730</a>	CN	112666762	16/04/2021	TIANMA MICROELECTRONICS	CN	28/12/2020	CN2020001606856	CN112666762	LIQUID CRYSTAL GRATING AND HOLOGRAPHIC THREE-DIMENSIONAL DISPLAY DEVICE	
<a href="#">N7731</a>	CN	112663394	16/04/2021	HUBEI YI EMMETT HOLOGRAPHIC TECHNOLOGY	CN	14/12/2020	CN2020001466974	CN112663394	MODIFIED SILICONE-ACRYLATE HEAT-INSULATING COATING FOR HOLOGRAPHIC WATER TRANSFER PRINTING PAPER AND PREPARATION METHOD THEREOF	
<a href="#">N7732</a>	CN	112649962	13/04/2021	SHANGHAI QULI INFORMATION TECHNOLOGY	CN	22/12/2020	CN2020001529289	CN112649962	LARGE-FIELD-ANGLE HOLOGRAPHIC DISPLAY SYSTEM AND METHOD BASED ON SINGLE SPATIAL LIGHT MODULATOR	
<a href="#">N7733</a>	CN	112649961	13/04/2021	SHANGHAI QULI INFORMATION TECHNOLOGY	CN	22/12/2020	CN2020001529278	CN112649961	HOLOGRAPHIC AR DISPLAY SYSTEM AND METHOD BASED ON SPATIAL LIGHT MODULATOR	
<a href="#">N7734</a>	CN	112647824	13/04/2021	SINO SINGAPORE INTERNATIONAL JOINT RESEARCH INSTITUTE	CN	21/12/2020	CN2020001518476	CN112647824	ENERGY-SAVING SELF-ADAPTIVE DIMMING HOLOGRAPHIC DISPLAY MATERIAL, HOLOGRAPHIC FILM AND HOLOGRAPHIC DISPLAY GLASS	
<a href="#">N7735</a>	CN	112634253	09/04/2021	NANJING UNIVERSITY OF SCIENCE & TECHNOLOGY	CN	30/12/2020	CN2020001608438	CN112634253	HOLOGRAPHIC PARTICLE DETECTION METHOD BASED ON DEEP LEARNING	
<a href="#">N7736</a>	CN	112631101	09/04/2021	SONG JIANMING	CN	30/12/2020	CN2020001615771	CN112631101	HOLOGRAPHIC THREE-DIMENSIONAL SPACE IMAGING METHOD, DEVICE AND SYSTEM	
<a href="#">N7737</a>	CN	112630987	09/04/2021	TSINGHUA SHENZHEN INTERNATIONAL GRADUATE SCHOOL	CN	01/12/2020	CN2020001387437	CN112630987	RAPID SUPER-RESOLUTION COMPRESSION DIGITAL HOLOGRAPHIC MICROSCOPIC IMAGING SYSTEM AND METHOD	
<a href="#">N7738</a>	CN	112622466	09/04/2021	JIANGSU JINHENG NEW PACKAGING MATERIAL	CN	04/12/2020	CN2020001408982	CN112622466	HOLOGRAPHIC DOUBLE-ZERO ALUMINUM FOIL PRODUCTION PROCESS	

**IHMA - APRIL 2021 - 124 ISSUED PATENTS - PAGE 6**

**NON SECURITY HOLOGRAMS - 68 PATENTS (continuation)**

REFERENCE	COUNTRY	PATENT NUMBER	PUBLICATION DATE Day-Month-Year	APPLICANT	PRIORITY	PRIORITY DATE Day-Month-Year	PRIORITY NUMBER	EQUIVALENTS	TITLE	KEY WORDS
<a href="#">N7739</a>	CN	112613487	06/04/2021	KUNMING UNIVERSITY OF SCIENCE & TECHNOLOGY	CN	07/01/2021	CN2021000017546	CN112613487	FINGERPRINT IDENTIFICATION DEVICE AND METHOD BASED ON HOLOGRAPHIC OPTICAL PATH PHASE IDENTIFICATION TECHNOLOGY	
<a href="#">N7740</a>	CN	112611548	06/04/2021	KUNMING UNIVERSITY OF SCIENCE & TECHNOLOGY	CN	07/01/2021	CN2021000017744	CN112611548	LENS FOCAL LENGTH MEASURING DEVICE AND METHOD BASED ON DIGITAL HOLOGRAPHY	
<a href="#">N7741</a>	CN	112596362	02/04/2021	KUNMING UNIVERSITY OF SCIENCE & TECHNOLOGY	CN	18/12/2020	CN2020001500693	CN112596362	FULL-FIELD SUPER-RESOLUTION DIGITAL HOLOGRAPHIC DEVICE AND IMAGING METHOD	
<a href="#">N7742</a>	CN	112596296	02/04/2021	JIANGSU SHENGHUI OPTOELECTRONIC	CN	31/12/2020	CN2020001631430	CN112596296	PROJECTION TYPE HOLOGRAPHIC GRATING BACKLIGHT STRUCTURE	
<a href="#">N7743</a>	CN	112596262	02/04/2021	BEIHANG UNIVERSITY OF AERONAUTICS & ASTRONAUTICS	CN	14/12/2020	CN2020001479541	CN112596262	HOLOGRAPHIC TRUE 3D DISPLAY SYSTEM AND METHOD BASED ON ADJUSTABLE LIQUID CRYSTAL GRATING	
<a href="#">N7744</a>	CN	112596243	02/04/2021	SHANGHAI QULI INFORMATION TECHNOLOGY	CN	22/12/2020	CN2020001532961	CN112596243	COMPACT TYPE TRANSMISSION HOLOGRAPHIC NEAR-EYE THREE-DIMENSIONAL DISPLAY SYSTEM AND METHOD BASED ON POINT LIGHT SOURCE	
<a href="#">N7745</a>	CN	112596242	02/04/2021	SHANGHAI QULI INFORMATION TECHNOLOGY	CN	22/12/2020	CN2020001532923	CN112596242	COLOR HOLOGRAPHIC NEAR-TO-EYE DISPLAY METHOD AND SYSTEM BASED ON SPATIAL LIGHT MODULATOR TIME DIVISION MULTIPLEXING	
<a href="#">N7746</a>	CN	112596239	02/04/2021	SHANGHAI QULI INFORMATION TECHNOLOGY	CN	22/12/2020	CN2020001529327	CN112596239	HOLOGRAPHIC NEAR-EYE DISPLAY METHOD AND SYSTEM BASED ON SPATIAL LIGHT MODULATOR	
<a href="#">N7747</a>	CN	112595635	02/04/2021	ZHEJIANG UNIVERSITY	CN	15/12/2020	CN2020001479142	CN112595635	METHOD AND DEVICE FOR MEASURING THREE-DIMENSIONAL DISTRIBUTION OF PARTICLE SIZES OF NANOPARTICLES IN SOLUTION	
<a href="#">N7748</a>	CN	112578627	30/03/2021	FUJIAN AGRICULTURE & FORESTRY UNIVERSITY	CN	27/09/2019	CN2019000925086	CN112578627	HOLOGRAPHIC PROJECTION DEVICE WITH MOVABLE IMAGING	
<a href="#">N7749</a>	CN	112577592	30/03/2021	HARBIN ENGINEERING UNIVERSITY	CN	27/11/2020	CN2020001352356	CN112577592	FINITE SPACE PLANE NEAR-FIELD ACOUSTIC HOLOGRAPHY MEASURING METHOD BASED ON SPACE FOURIER TRANSFORM	
<a href="#">N7750</a>	CN	112565720	26/03/2021	SUZHOU HENGCHUANG CULTURE COMMUNICATION	CN	17/09/2020	CN2020000978552	CN112565720	3D PROJECTION SYSTEM BASED ON HOLOGRAPHIC TECHNOLOGY	
<a href="#">N7751</a>	CN	112562433	26/03/2021	CENTRAL CHINA NORMAL UNIVERSITY	CN	30/12/2020	CN2020001604676	CN112562433	5G STRONG INTERACTION REMOTE DELIVERY TEACHING SYSTEM BASED ON HOLOGRAPHIC TERMINAL AND WORKING METHOD THEREOF	
<a href="#">N7752</a>	CN	112558451	26/03/2021	SICHUAN UNIVERSITY	CN	15/12/2020	CN2020001470287	CN112558451	TWO-DIMENSIONAL ANGLE MULTIPLEXING METHOD BASED ON SPHERICAL HOLOGRAPHY	
<a href="#">N7753</a>	CN	112558198	26/03/2021	ZHEJIANG PRISM CULTURE MEDIA	CN	26/09/2019	CN2019000919095	CN112558198	HOLOGRAPHIC LENS, HOLOGRAPHIC LENS ASSEMBLY AND DISPLAY SYSTEM	