

# IHMA PATENT NEWSLETTER

*Limited circulation patent news bulletin for the Holography Industry*

## OCTOBER 2021 – 95 PATENTS

Published and granted patents

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Please note that:

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

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**N8145**

**HOLOGRAPHY TECHNIQUE'S COLUMN**

**US11150605**

**FACEBOOK TECHNOLOGIES**

**Inventor:**

XIAO LEI ; MAIMONE ANDREW ; SWANSON ROBIN JOSEPH ; LANMAN DOUGLAS ROBERT

**Application Nber / Date:**

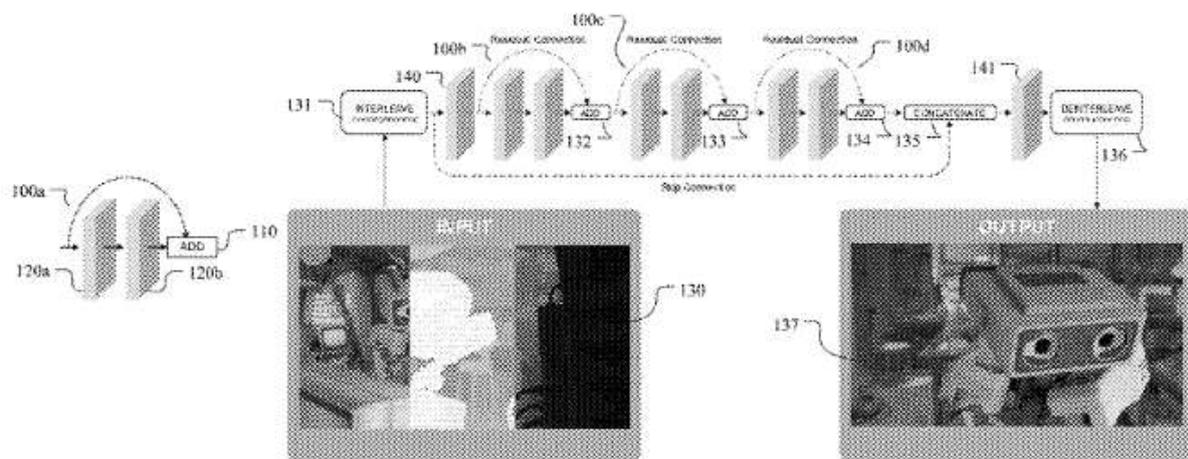
US16/517850 2019-07-22

**Priority Nber / Date / Country:**

2019US-16517850 2019-07-22

**SYSTEMS AND METHODS FOR GENERATING HOLOGRAMS USING DEEP LEARNING**

In one embodiment, a system may generate a hologram by processing a first image using a machine-learning model. The system may generate a second image based on at least a portion of the hologram using a processing model that is configured to simulate interactions between a light source and the hologram. The system may compare the second image to the first image to calculate a loss based on a loss function. The system may update the machine-learning model based on the loss between the first image and the second image. The updated machine-learning model is configured to process one or more input images to generate one or more corresponding holograms.



**CLAIM 1.** A method comprising, by a computing system: generating a hologram by processing a first natural image using a machine-learning model, wherein the first natural image that is provided to the machine-learning model is a photograph of a real world; generating a second image that is a reproduced representation of the first natural image by processing at least a portion of the hologram using a processing model that is configured to simulate interactions between a light source and the hologram; comparing (1) the second image generated after the processing of the hologram and (2) the first natural image resulting before the processing of the hologram to calculate a loss based on a loss function; and training the machine-learning model by iteratively updating the machine-learning model based on the loss between the first natural image and the second image, wherein the trained machine-learning model is configured to receive as an input a single natural image on which to add holographic effect and the trained machine-learning model is further configured to generate a final hologram based on the single natural image for display via a holographic display device.

**No equivalent**

**Status:** Granted

**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**

**P34023**

**US20210323338**

*Priority Date: 17/04/2020*

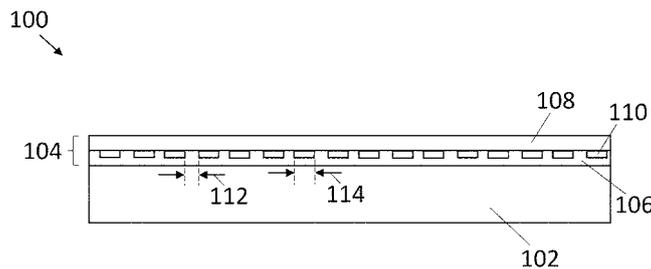
**ITW - ILLINOIS TOOL WORKS**

**EMBOSSED FILM ASSEMBLY HAVING PASTEL HOLOGRAPHIC SECURITY FEATURES**

An embossed film assembly is provided that includes a substrate and at least one security layer formed from a polymer layer having an image formed therein and a high refractive index (HRI) layer on the polymer layer. The polymer layer and the HRI layer form a holographic security feature on the substrate. The image in the polymer layer is formed from low frequency gratings configured to generate a pastel color in the holographic security feature.

**ENSEMBLE FILM GAUFRÉ COMPRENANT DES ÉLÉMENTS DE SÉCURITÉ HOLOGRAPHIQUE PASTELS**

L'invention concerne un ensemble film gaufré qui comprend un substrat et au moins une couche de sécurité formée à partir d'une couche de polymère comprenant une image formée en son sein et d'une couche à indice de réfraction élevé (HRI) sur la couche de polymère. La couche de polymère et la couche HRI forment un élément de sécurité holographique sur le substrat. L'image dans la couche de polymère est formée à partir de réseaux basse fréquence conçus pour générer une couleur pastel dans l'élément de sécurité holographique.



**CLAIM 1.** An embossed film assembly comprising: a substrate; and at least one security layer formed from a polymer layer having an image formed therein and a high refractive index (HRI) layer on the polymer layer, the polymer layer and the HRI layer forming a holographic security feature on the substrate, wherein the image in the polymer layer is formed from low frequency gratings configured to generate a pastel color in the holographic security feature.

P34038

CARD

KR20210114743

BIOSMART

Priority Date: 11/03/2020

### METHOD FOR MANUFACTURING DEPOSITION HOLOGRAM CARD

The present invention relates to a method for manufacturing a deposition hologram card. The present invention first forms a hologram layer 130 by laser processing for a deposition processed film 210 formed of a metal deposition layer 110 and a deposition film 120, then adheres a functional core sheet 140 in the direction of the metal deposition layer 110 by a first adhesive a to produce a hologram functional sheet 250, And then applying both sides of the hologram functional sheet (250) using a second adhesive (b), and then attaching the upper printing sheet (150) and the lower printing sheet (160), respectively. Since hologram features can be variously designed and applied in consideration of the taste or character of the user layer of the card, a user-oriented and customer-targeted hologram card can be manufactured and used.



**CLAIM 1.** A method of manufacturing a hologram recording medium, comprising: a first step (s 210) of manufacturing a deposition processed film 210 formed of a metal deposition layer 110 and a deposition film 120 by depositing a metal component on one surface of the deposition film; a second step (s 210) of forming a hologram layer 130 therein by taking the deposition processed film 210 and irradiating the deposition processed film 210 with a laser beam, A second step (s 220) of forming a hologram composite film 230 composed of the metal deposition layer 110, the hologram layer 130 and the deposition film layer 120; and a third step (s 220) of taking the hologram composite film 230, applying a first adhesive a to the surface of the metal deposition layer 110, A third step (s 230) of preparing a hologram functional sheet (250); a fourth step (s 240) of taking the hologram functional sheet (250) and applying a second adhesive (b) to the surfaces of the deposited film layer (120) and the functional core sheet (140), respectively, to form an adhesive layer; a third step (s 230) of taking the hologram functional sheet (250) applied to both surfaces thereof with the second adhesive (b), And a fifth step (s 250) of attaching an upper printing sheet (150) to an upper portion of the vapor deposition film layer (120), attaching a lower printing sheet (160) to a lower portion of the functional core sheet (140), and laminating the upper printing sheet and the lower printing sheet (160) together.

P34044

CARD

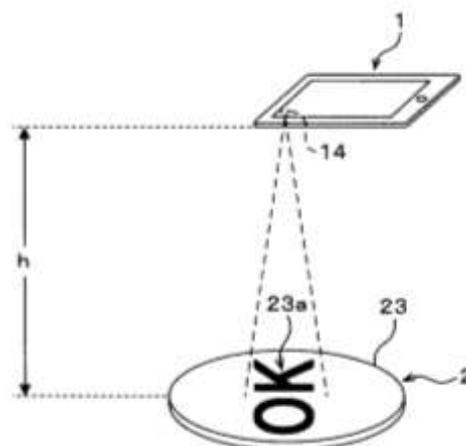
JP2021163166

DAI NIPPON PRINTING

Priority Date: 31/03/2020

**PROGRAM, AUTHENTICITY DETERMINATION METHOD, AND AUTHENTICITY DETERMINATION APPARATUS**

TOPIC: To provide a program, an authenticity determination method, and an authenticity determination apparatus capable of easily performing authenticity determination without requiring special skill. INVENTION: An authenticity determination apparatus 1 captures an image of a light modulation element 2 on which a reproduced image is generated while changing an image capturing distance h, and performs authenticity determination on the basis of the captured image including an outer frame 23 and characters 23 a of the reproduced image. When the size of the character 23 a in the image does not change as the imaging distance h changes, the object to be determined is determined to be true, and when the size of the character 23 a in the image changes as the imaging distance h changes, the object to be determined is determined to be false.



**CLAIM 1.** A program for determining authenticity of an object to be determined provided with a light modulating element that produces, by light from a point light source, a regenerated image having a size corresponding to a distance from the point light source, the program comprising: acquiring an image obtained by capturing, at a plurality of image capturing distances, the light modulating element in which the regenerated image is produced; Determining authenticity of the object to be determined based on size change of a reproduced image in a plurality of acquired images; and outputting a result of the determination.

P34050

PRINTING

JP2021154636

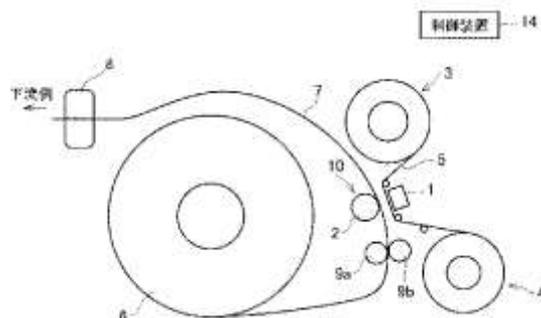
DAI NIPPON PRINTING

Priority Date: 27/03/2020

**METHOD FOR PRODUCING PRINTED PRODUCT AND HEAT TRANSFER PRINTING APPARATUS**

TOPIC: To form a recess in a desired region and manufacture a printed product having high stereoscopic effect. INVENTION: a method for manufacturing a printed matter includes: sandwiching a heat transfer sheet, in which a color material layer and a protective layer are provided on a base material sheet, and an image receiving sheet, in which a thermosensitive concave forming layer and an receiving layer are laminated on a base material, between a thermal head and a platen roll, and heating the heat transfer sheet by the thermal head; A step of transferring a color material from the heat transfer sheet to the receiving layer of the image receiving sheet to form an image; and a step of heating the heat transfer sheet by the thermal head to transfer the protective layer from the heat transfer sheet onto the image of the image receiving sheet. The printing pressure by a printing portion including the thermal head and the platen roll during the transfer of the protective layer is greater than the printing pressure by the printing portion during the image formation. At the time of transfer of the protective layer, the energy applied by the thermal head is changed depending on the region, and a concavity is formed in the image receiving sheet.

**CLAIM 1.** Sandwiching a heat transfer sheet, in which a color material layer and a protective layer are provided on a base material sheet, and an image receiving sheet, in which a thermosensitive recess forming layer and an receiving layer are laminated on a base material, between a thermal head and a platen roll; Forming an image by heating the heat transfer sheet by the thermal head and transferring a color material from the heat transfer sheet to the receiving layer of the image receiving sheet; and Transferring the protective layer from the heat transfer sheet onto the image of the image receiving sheet, wherein the printing pressure by a printing part including the thermal head and the platen roll during the transfer of the protective layer is adjusted by Printing pressure from the printed portion at the time of image formation, and a concave portion is formed in the image receiving sheet by changing the applied energy from the thermal head depending on regions at the time of transfer of the protective layer.



P34060

## PRINTING – CARD

JP2021146550

DAI NIPPON PRINTING

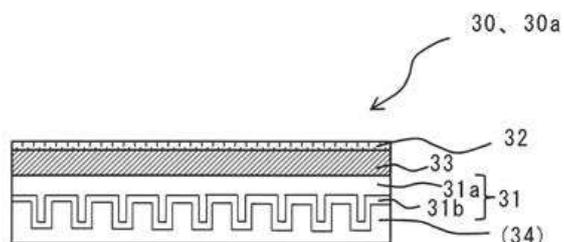
Priority Date: 17/03/2020

### INFORMATION RECORDING MATERIAL AND PRINTED MATERIAL PROVIDED WITH INFORMATION RECORDING MATERIAL

TOPIC: To provide an information recording material that does not impair design and makes it difficult to replicate embedded information.

INVENTION: An information recording material 30 including a composite image including a first image formed on a hologram layer 31 and a second image formed on the first image, wherein the second image is printed with inks having different reflected light amounts depending on observation angles, and One image of the composite image can be recognized by a reading apparatus according to an observation angle, and the second image is an image that is meaningless by a person only at a glance and has regularity in feature points in a spatial frequency domain.

**CLAIM 1.** An information recording material comprising a composite image including a first image formed on a hologram layer and a second image formed on the first image, wherein the second image is printed with ink having different reflected light amounts depending on an observation angle, and the composite image comprises: One image can be recognized by a reading apparatus according to an observation angle, and the second image is an image that is meaningless at a glance by a person, and has regularity in feature points in a spatial frequency domain.



P34073

## LABEL

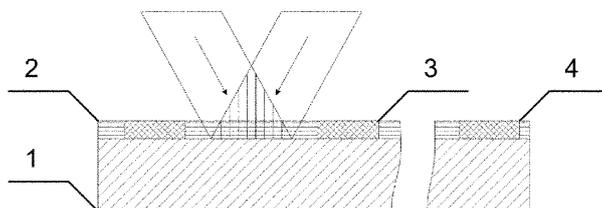
EP3896529

KAUNAS UNIVERSITY OF TECHNOLOGY

Priority Date: 13/04/2020

### FABRICATION METHOD OF HOLOGRAPHIC SECURITY LABEL

The present invention discloses a method that combines two different hologram origination processes in a single photoresist layer by using an interlayer to transfer structures exposed by electron beam lithography into overlapped with dot-matrix hologram areas, and fabricated holographic structures are replicated in multilayer polymer films. Dot-matrix technique is low cost process, which has high origination speed and can be used for the patterning of large areas of holograms with high diffraction efficiency. Electron beam lithography allows the formation of high resolution structures. The proposed manufacturing method allows combining these two technologies so that the final security device could contain electron beam patterned high resolution diffraction gratings, computer generated holograms, as well as dot-matrix laser patterned large hologram areas with high diffraction efficiency, providing an increased level of protection.



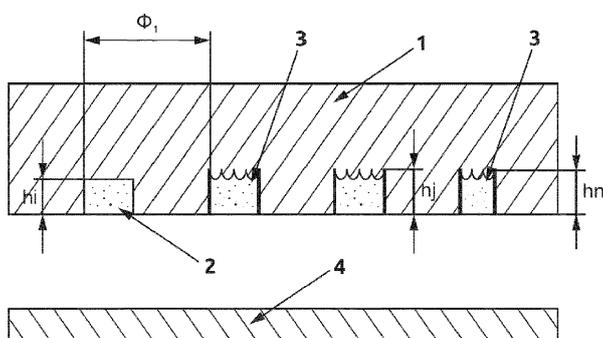
**CLAIM 1.** A method of fabricating a holographic security label comprising steps of: dot-matrix laser patterning of a hologram and alignment marks in defined areas of an art design; developing the alignment marks on far side of a specimen; depositing in vacuum of an auxiliary aluminium film with a thickness of 100-200 nm; spin coating of a single layer of PMMA; precisely performing alignment and angle correction between dot-matrix and electron beam patterning areas by scanning electron microscope; patterning by focused electron beam; developing development of PMMA; etching of the aluminium film using  $\text{Ce}(\text{NH}_4)_2(\text{NO}_3)_6:\text{HNO}_3$ ; performing photoresist exposure ( $\approx 405$  nm); etching of the aluminium layer and lift-off of PMMA using  $\text{Ce}(\text{NH}_4)_2(\text{NO}_3)_6:\text{HNO}_3$ ; developing of the photoresist thus fabricating aligned areas of dot-matrix and electron beam patterned hologram; depositing of a silver film in vacuum; depositing of a nickel film using electrochemical means; producing of a nickel shim for roll-to-roll replication; replicating the holograms in a multilayer metallized or transparent polymer film; and coating the film with pressure-sensitive, thermoplastic or thermosetting adhesive and dividing the film into individual labels.

### A METHOD OF MANUFACTURING A DISCRETIZED OPTICAL SECURITY MICROSTRUCTURE ON A SUBSTRATE AND A SHIM FOR USE IN THE METHOD

The present invention relates to a field of securing against counterfeiting things such as documents or money. The present invention relates particularly to a manufacturing of a discretized optical security microstructure. A method of manufacturing a discretized optical security microstructure (2) on a substrate (4) is disclosed, wherein the method comprising steps of a) providing an ink into one or more cavities of a shim (1), wherein said one or more cavities of the shim represent said discretized optical security microstructure (2), b) pressing the shim (1) against the substrate (4), c) removing the shim (1) from the substrate (4) such that ink remains on a surface of the substrate (4), forming a discretized optical security microstructure (1). A shim for use in the method according to the invention is disclosed, wherein the shim (1) comprising a number of cavities, wherein said cavities of the shim (1) are a negative of a discretized optical security microstructure (2) representing diffractive or another optically active surface (3), preferably in a form of macro and/or micro relief, or simply curved shape with or without grating/hologram micro relief, and wherein the characteristic size of individual cavity, such as its width and the length, is from 80  $\mu\text{m}$  to 50cm and the depth of individual cavity is from 300 nm to 100  $\mu\text{m}$ .

### PROCÉDÉ DE FABRICATION D'UNE MICROSTRUCTURE DE SÉCURITÉ OPTIQUE DISCRÉTISÉE SUR UN SUBSTRAT ET SHIM À UTILISER DANS LE PROCÉDÉ

La présente invention se rapporte au domaine de la protection contre la contrefaçon de choses, telles que des documents ou de l'argent. La présente invention concerne, en particulier, une fabrication d'une microstructure de sécurité optique discrétisée. La présente invention concerne également un procédé de fabrication d'une microstructure de sécurité optique discrétisée (2) sur un substrat (4), le procédé consistant à : a) fournir une encre dans une ou plusieurs cavités d'une cale (1), ladite ou lesdites cavités de la cale représentant ladite microstructure de sécurité optique discrétisée (2), b) presser la cale (1) contre le substrat (4), c) retirer la cale (1) à partir du substrat (4), dans l'étape c), la cale (1) étant retirée à partir du substrat (4) de telle sorte que l'encre reste sur une surface du substrat (4) formant une microstructure de sécurité optique discrétisée (1). L'invention concerne également une cale destinée à être utilisée dans le procédé, ladite cale (1) comprenant un certain nombre de cavités et la taille caractéristique d'une cavité individuelle, telle que sa largeur et la longueur, étant de 80  $\mu\text{m}$  à 50 cm et la profondeur d'une cavité individuelle étant de 300 nm à 100  $\mu\text{m}$ , lesdites cavités de la cale (1) représentant une microstructure de sécurité optique discrétisée (2) représentant une surface de diffraction ou une autre surface optiquement active (3), de préférence sous une forme de macro- et/ou de micro-relief, ou simplement de forme incurvée avec ou sans micro-relief en réseau/hologramme.



**CLAIM 1.** A method of manufacturing a discretized optical security microstructure (2) on a substrate (4) comprising steps of a) providing an ink into one or more cavities of a shim (1), wherein said one or more cavities of the shim represent said discretized optical security microstructure (2), b) pressing the shim (1) against the substrate (4), c) removing the shim (1) from the substrate (4) such that ink remains on a surface of the substrate (4), forming a discretized optical security microstructure (1).

P34086

**BRAND PROTECTION**

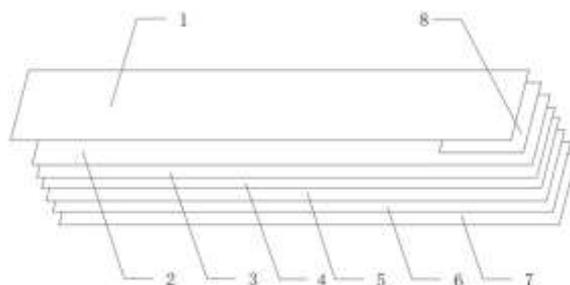
CN214401213U

Priority Date: 09/11/2020

SHANGHAI SHUNHO NEW MAT TECHNOLOGY

**TRANSFER PAPER FOR POSITIONING TRANSVERSE CUTTING**

The utility model discloses a transfer paper for fixing a position crosscut includes that from the top down sets gradually: coating one side; a release layer; a microstructure image layer; a color-forming layer; an adhesive layer; a base paper layer; and a back coating; the face coating with from being equipped with a local location rete between the type layer, it includes that from the top down sets gradually: a vacuum aluminum plating layer; a positioning image layer provided with a transverse positioning cursor, a transverse pagoda tangent, a longitudinal cutting cursor and a longitudinal pagoda tangent; and a PET base film layer. The utility model discloses it is controllable to have not only manufacturing cost, and location discernment is accurate moreover.



**CLAIM 1.** A transfer paper for positioning crosscut, characterized in that it comprises, arranged in succession from top to bottom: coating one side; a release layer; a microstructure image layer; a color-forming layer; an adhesive layer; a base paper layer; and a back coating layer; the top coating with be equipped with a local location rete from between the type layer, it includes that from the top down sets gradually: a vacuum aluminum plating layer; a positioning image layer provided with a transverse positioning cursor, a transverse pagoda tangent, a longitudinal cutting cursor and a longitudinal pagoda tangent; and a PET base film layer.

P34087

**BRAND PROTECTION**

CN214396044U

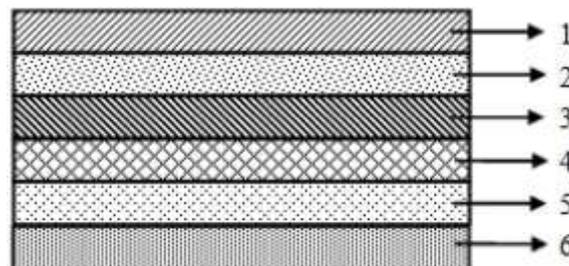
Priority Date: 20/10/2020

FOSHAN SAIHE FILM TECHNOLOGY

**TRANSFER BASE FILM BASED ON PET MATERIAL**

The utility model discloses a transfer base film based on PET material, including PET transfer base film, peel ply, moulded layer, aluminize layer, adhesive layer and ply, PET transfer base film is connected with the peel ply, and the peel ply obtains the moulded layer through radium-shine mould pressing, and the surface on moulded layer carries out vacuum aluminizing and obtains the aluminize layer, and the aluminize layer passes through adhesive layer and connects the ply. The transfer base film has no plastic component which is difficult to degrade, has good heat resistance, is not easy to deform, can be used for multiple times after transfer stripping, is beneficial to environmental protection and has high recovery rate; the pattern is accurately positioned during mould pressing; compared with aluminum foil paper, the folding strength is met, and the cost is greatly reduced. The holographic pattern of the holographic paper is brilliant and vivid, has irreplaceable anti-counterfeiting function, integrates environmental protection, decoration and anti-counterfeiting functions, is widely used for packaging cigarettes, wine, medicines, foods, cosmetics and the like, and is an environment-friendly packaging printing anti-counterfeiting material.

**CLAIM 1.** The utility model provides a transfer base film based on PET material, includes PET transfer base film, peel ply, mould pressing layer, aluminize layer, adhesive layer and ply, its characterized in that: the PET transfer base film is connected with a stripping layer, the stripping layer is subjected to laser mould pressing to obtain a mould pressing layer, the surface of the mould pressing layer is subjected to vacuum aluminizing to obtain an aluminizing layer, and the aluminizing layer is connected with the paper layer through an adhesive layer.



P34092

PRINTING

CN214336160U

SHANDONG TAIBAO INFORMATION TECHNOLOGY GROUP

Priority Date: 31/03/2021

**HOLOGRAPHIC RAINBOW LASER SECRET TYPE ANTI-COUNTERFEITING MARK**

The utility model belongs to the technical field of the false proof mark, concretely relates to holographic rainbow laser secret type false proof mark. The mark comprises a plastic film layer, a coating, a die-pressing holographic information layer, a transfer coating, a polyamide layer, a printing layer, a pressure-sensitive adhesive layer, a holographic rainbow transfer layer, a first glue layer, a fragile paper layer and a second glue layer which are arranged in sequence from top to bottom; the holographic rainbow transfer layer comprises a laser molding information layer and an aluminum-plated layer, and the laser molding information layer is positioned above the aluminum-plated layer; the 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 transfer coating, and the bottom-remaining part is a part below the transfer coating and below the transfer coating. The utility model discloses the back is uncovered to the sign, peels off the partial upper and lower two sides and all shows hidden laser effect, stays the laser effect that the end part shows rainbow holographic effect and hides, and the consumer judges the sign true and false through distinguishing hidden information, when bonding together again, and hidden laser information still shows.



**CLAIM 1.** The utility model provides a holographic rainbow laser cryptomorphic false proof mark which characterized in that: the holographic rainbow film comprises a plastic film layer (1), a coating layer (2), a die pressing holographic information layer (3), a transfer coating layer (4), a polyamide layer (5), a printing layer (6), a pressure-sensitive adhesive layer (7), a holographic rainbow transfer layer, a first glue layer (10), a fragile paper layer (11) and a second glue layer (12) which are arranged from top to bottom in sequence; the holographic rainbow transfer layer comprises a laser die-pressing information layer (8) and an aluminum-plated layer (9), wherein the laser die-pressing information layer (8) is positioned above the aluminum-plated layer (9); 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 transfer coating (4), and the reserved part is the transfer coating (4) and a part below the transfer coating (4).

P34093

PRINTING

CN214336159U

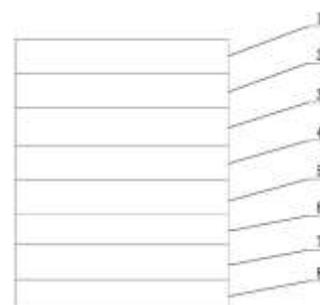
SHANDONG TAIBAO INFORMATION TECHNOLOGY GROUP

Priority Date: 31/03/2021

**LASER CONCEALED ANTI-FAKE MARK**

The utility model belongs to the technical field of the false proof mark, concretely relates to laser cryptotype false proof mark. The mark comprises a plastic film layer, a coating, a die-pressing holographic information layer, a local transfer coating, a polyamide layer, a printing layer, a color ink layer and a pressure-sensitive adhesive layer which are arranged from top to bottom in sequence; the anti-counterfeiting mark can be uncovered, the stripping part is a part above the local transfer coating, and the bottom remaining part is the local transfer coating and a part below the local transfer coating. The utility model has good temperature and humidity resistance effect, unique anti-counterfeiting information, difficult counterfeiting and quick identification, layered damage, no integral transfer and effective prevention of secondary use; after the anti-counterfeiting mark is uncovered, the upper surface and the lower surface of the peeling part both display hidden laser effects, the bottom retaining part also displays hidden laser information, a consumer judges the authenticity of the mark by identifying the hidden information, and when the mark is adhered together, the hidden laser information is still displayed, so that the mark has exclusivity.

**CLAIM 1.** A laser hidden anti-counterfeiting mark is characterized in that: the transfer printing ink comprises a plastic film layer (1), a coating (2), a die pressing holographic information layer (3), a local transfer coating (4), a polyamide layer (5), a printing layer (6), a color ink layer (7) and a pressure sensitive adhesive layer (8) 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 local transfer coating (4), and the reserved part is the part below the local transfer coating (4) and the local transfer coating (4).



P34094

PRINTING – CARD

CN214336158U

Priority Date: 31/03/2021

SHANDONG TAIBAO INFORMATION TECHNOLOGY GROUP

ANTI-FAKE CARD WITH OPENED VERIFICATION INFORMATION

The utility model belongs to the technical field of the false proof mark, concretely relates to take off verification information anti-fake card. The transfer printing film comprises a plastic film layer, a coating, a die-pressing holographic information layer, a transfer coating, a polyamide layer, a first printing layer, a pressure-sensitive adhesive layer, a holographic rainbow transfer layer, a first adhesive layer and a base material layer which are arranged in sequence from top to bottom; the holographic rainbow transfer layer comprises a laser molding information layer and an aluminum-plated layer, and the laser molding information layer is positioned above the aluminum-plated layer; the anti-counterfeiting card can be uncovered and is divided into a stripping part and a bottom retaining part, wherein the stripping part is a part above the transfer coating, and the bottom retaining part is a part below the transfer coating and below the transfer coating. The utility model discloses anti-fake card opens the back, peels off the partial upper and lower two sides and all shows hidden laser effect, stays the laser effect that the end part shows rainbow holographic effect and hides, and the consumer is through distinguishing hidden information, judges the sign true and false, when the bonding is in the same place again, and hidden laser information still shows.

**CLAIM 1.** An anti-counterfeiting card for uncovering authentication information is characterized in that: the transfer printing film comprises a plastic film layer (1), a coating (2), a die pressing holographic information layer (3), a transfer coating (4), a polyamide layer (5), a first printing layer (6), a pressure-sensitive adhesive layer (7), a holographic rainbow transfer layer, a first adhesive layer (10) and a base material layer (11) which are arranged from top to bottom in sequence; the holographic rainbow transfer layer comprises a laser die-pressing information layer (8) and an aluminum-plated layer (9), wherein the laser die-pressing information layer (8) is positioned above the aluminum-plated layer (9); the anti-counterfeiting card can be uncovered and is divided into a stripping part and a reserved part, wherein the stripping part is a part above the transfer coating (4), and the reserved part is the transfer coating (4) and a part below the transfer coating (4).

P34097

PRINTING – LABEL

CN214336149U

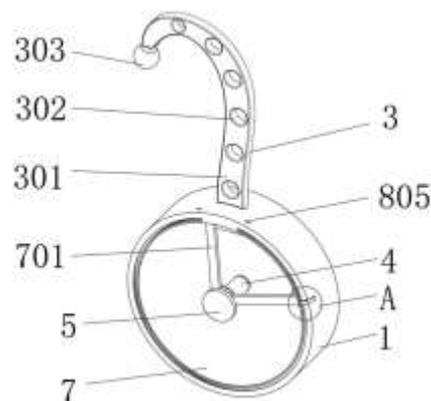
Priority Date: 09/03/2021

HUBEI GEDIAN DEVELOPMENT REGION CHENGUANG INDUSTRIAL

HOLOGRAPHIC ANTI-COUNTERFEIT LABEL WITH HIDDEN CODED INFORMATION

The utility model provides a hidden holographic anti-counterfeit label of coded information, which relates to the technical field of anti-counterfeit labels and comprises a label main body, wherein the front surface of the label main body is provided with a covering device, the covering device comprises a fixed rod, a movable rod and covering cloth, the bottom surface inside the label main body is provided with a label groove, the central position of the label groove is fixedly provided with a support column, the top surface of the support column is provided with an adjusting disc, the bottom of the adjusting disc is in shaft joint with the support column, the side surface of the adjusting disc is provided with an adjusting ring groove, the covering device is positioned between the front edge of the label main body and the side surface of the adjusting disc, the movable rod is matched with the covering cloth to open the front surface of the label main body, the information on the surface of the label groove is inspected, the UV ink coating and the covering device on the surface of the adjusting disc are used for protecting the anti-counterfeit label, the label code of the anti-counterfeit label is effectively protected by adopting water dominance, the anti-counterfeiting performance is greatly improved, and the information of the anti-counterfeiting label is conveniently hidden.

**CLAIM 1.** A holographic antifalsification label that coded information can be hidden, includes label main part (1), its characterized in that: label main part (1) openly is equipped with covering device (7), covering device (7) include dead lever (701), movable rod (706) and cover cloth (704), the inside bottom surface of label main part (1) is equipped with label groove (2), label groove (2) central point puts fixedly and is equipped with support column (4), support column (4) top surface is equipped with adjusting disc (5), and adjusts disc (5) bottom and support column (4) coupling, adjusting ring groove (6) have been seted up to adjusting disc (5) side, covering device (7) are located between label main part (1) openly edge and adjusting disc (5) side, the one end that adjusting disc (5) were kept away from in movable rod (706) is equipped with stop device (8), label main part (1) top surface is equipped with fixing device (3).



P34098

**LABEL**

CN214335765U

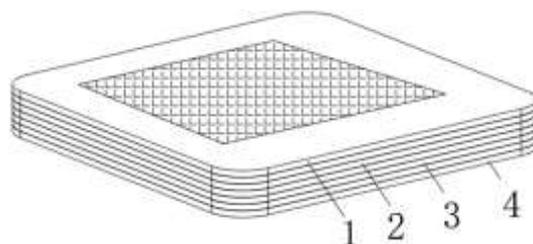
Priority Date: 09/03/2021

HUBEI GEDIAN DEVELOPMENT REGION CHENGUANG INDUSTRIAL

**LASER TWO-DIMENSIONAL CODE PREVENTS TAKING OFF SAFETY SIGN**

The utility model provides a safety sign is taken off in preventing of laser two-dimensional code relates to antifalsification label technical field, including the matte layer, the bottom of matte layer is equipped with first viscose layer, the bottom on first viscose layer is equipped with holographic information layer, and holographic information layer and matte layer closely laminate through first viscose layer, the matte layer is located the outside of sign, the matte layer adopts the resin to carry out less polishing on the surface and handles and make. By adopting the design of the matte layer and the holographic information layer, the laser two-dimensional code is covered and protected by the matte layer, the surface of the matte layer is uneven, other marks are not easy to adhere, the holographic information layer is easy to break and damage under the pulling of the first adhesive layer, the laser two-dimensional code is not only difficult to adhere and cover, but also breaks and damages when being uncovered by a counterfeiter, the marks are damaged and cannot be used, and the benefits of manufacturers and consumers are protected.

**CLAIM 1.** The utility model provides a laser two-dimensional code's tamper-evident safety sign, includes matte layer (1), its characterized in that: the bottom of matte layer (1) is equipped with first viscose layer (6), the bottom of first viscose layer (6) is equipped with holographic information layer (2), and holographic information layer (2) and matte layer (1) closely laminate through first viscose layer (6), matte layer (1) is located the outside of sign, matte layer (1) adopts resin to carry out less polishing on the surface and handles and make.



P34099

**HOLOGRAPHY PROCESS**

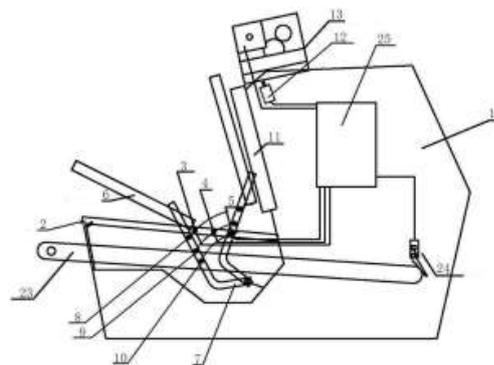
CN214324589U

Priority Date: 29/12/2020

SHANGHAI SECURITY PRINTING

**HOLOGRAPHIC ANTI-COUNTERFEITING MARK HIGH-PRECISION POSITIONING HOT STAMPING DEVICE**

The utility model belongs to the technical field of the location thermoprint technique and specifically relates to a holographic false proof mark high accuracy location thermoprint device. 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 pressing plate, and a cursor detector is arranged below the material dragging equipment. 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.

P34109

CN113512364

Priority Date: 26/04/2021

CHUZHOU JQDK NEW MAT

### EB (ELECTRON BEAM) CURING OPTICAL COLOR-CHANGING HOLOGRAPHIC ANTI-COUNTERFEITING COMPOSITE FILM GLUE

The invention discloses EB (Epstein-Barr) curing optical discoloration holographic anti-counterfeiting composite film glue which comprises the following components in parts by weight: 42-56 parts of polymethyl methacrylate, 30-40 parts of phenyl hydrogen-containing silicone resin, 9-15 parts of trimethylolpropane triacrylate and 0.1-3 parts of an auxiliary agent. The invention adopts the mutual synergistic effect of the components of polymethyl methacrylate, high-refractive-index resin phenyl hydrogen-containing silicon resin, crosslinking monomer trimethylolpropane triacrylate and the like with better optical effect to ensure that the coating has good heat resistance and adhesive force, high refractive index and clear pattern formation.

**CLAIM 1.** The EB (Epstein-Barr) curing optical color-changing holographic anti-counterfeiting composite film glue is characterized by comprising the following components in parts by weight: 42-56 parts of polymethyl methacrylate, 30-40 parts of phenyl hydrogen-containing silicone resin, 9-15 parts of trimethylolpropane triacrylate and 0.1-3 parts of an auxiliary agent.

P34113

BRAND PROTECTION

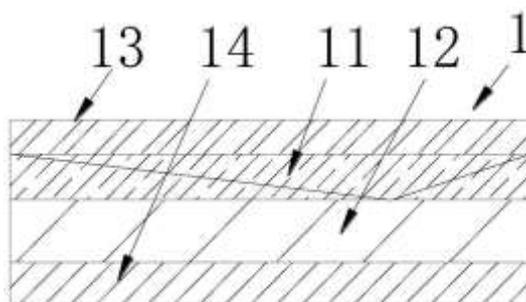
CN113480948

Priority Date: 02/07/2021

ZHEJIANG CHUNYU PACKAGING MATERIAL

### ANTI-COUNTERFEITING STRUCTURE, HOLOGRAPHIC THERMOPRINT ANTI-COUNTERFEITING FILM AND PREPARATION METHOD THEREOF

The invention relates to the technical field of anti-counterfeiting, and discloses an anti-counterfeiting structure, a holographic hot stamping anti-counterfeiting film and a preparation method thereof. According to the anti-counterfeiting structure, the holographic hot-stamping anti-counterfeiting film and the preparation method thereof, the inclination angle is arranged in the color development layer, so that the hot-stamping pattern can be observed when the color development layer is inclined, meanwhile, the protective layer can be removed from the disposable protective film after the product is sold, so that the hot-stamping pattern anti-counterfeiting layer can be exposed, and after authenticity is identified, the surface of the anti-counterfeiting structure is polished or oxidized, so that the anti-counterfeiting film can be prevented from being put into use again.



**CLAIM 1.** The utility model provides an anti-fake structure, holographic thermoprint anti-fake film and preparation method thereof, includes disposable anti-fake film (1), cuts save set (2) and the preparation method of disposable anti-fake film (1), its characterized in that: the disposable anti-counterfeiting film (1) comprises a color development layer (11), a hot stamping pattern anti-counterfeiting layer (12), a protective layer (13) and a gum layer (14); the preparation method of the disposable anti-counterfeiting film (1) comprises the following steps: s1: designing a pattern, and determining the anti-counterfeiting pattern by designing an anti-counterfeiting mark by a designer; s2: plate-making and die-pressing, wherein a master plate is manufactured by a professional laser plate-making factory according to the anti-counterfeiting pattern, and a corresponding laser holographic film is die-pressed; s3: carrying out adhesive coating, laminating and die cutting to form a holographic anti-counterfeiting mark; s4: cutting and storing, namely cutting and sealing the manufactured anti-counterfeiting film; cutting save set (2) are including twining in preservation cylinder (21) of disposable anti-fake membrane (1) internal surface, the surface joint of preserving cylinder (21) has cutting blade (22), just the bottom of preserving cylinder (21) is provided with cutting bed (23), motor (24) are preserved in the top fixedly connected with cutting of cutting bed (23), just the top joint of cutting bed (23) has protective sealing section of thick bamboo (25).

P34120

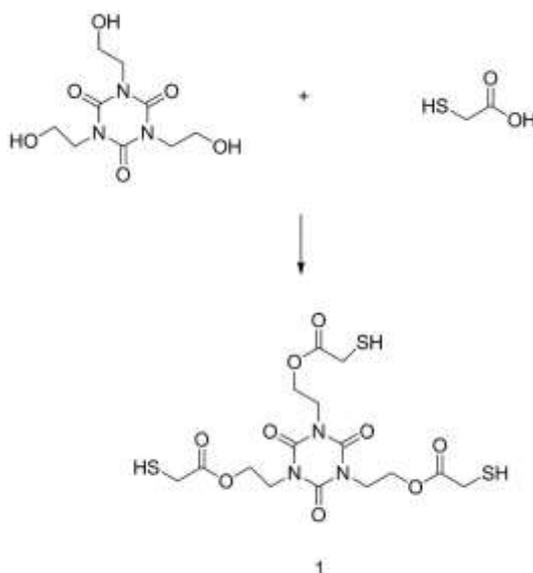
CN113442627

Priority Date: 05/07/2021

## ANHUI SHUNTONG PACKAGING MATERIAL

### LASER HOLOGRAPHIC ANTI-COUNTERFEITING FILM AND PREPARATION METHOD THEREOF

The invention discloses a laser holographic anti-counterfeiting film and a preparation method thereof, wherein the preparation method comprises the following steps: firstly, compounding an information bearing layer on the surface of a base film layer to prepare a composite film; secondly, the working plate is arranged on a plate roller of a double-roller molding press, the prepared composite film passes through the plate roller and a compression roller at the transmission speed of 5-10m/min, the plate roller is heated to 100 °C, and the pressure of the two rollers is adjusted to be 2-4kg/cm<sup>2</sup>. Copying the grating stripes on the template to the information bearing layer to form a laser holographic anti-counterfeiting film; the refractive index of the information bearing layer can be improved by introducing the sulfur element, and the refractive index of the information bearing layer can be further improved by taking the titanium dioxide coated with the zirconium oxide as an inorganic filler, so that the performance of the anti-counterfeiting film for showing laser holographic images is improved.



**CLAIM 1.** The laser holographic anti-counterfeiting film comprises an information bearing layer and a base film layer, wherein the information bearing layer is compounded on the surface of the base film layer, and the laser holographic anti-counterfeiting film is characterized in that the information bearing layer is prepared by the following steps: step S1, adding 1, 3, 5-tris (2-hydroxyethyl) -1, 3, 5-triazine-2, 4, 6-trione into toluene, adding p-toluenesulfonic acid, adding thioglycolic acid while stirring at a constant speed, introducing nitrogen, heating to reflux the system, monitoring the acid value in the system, stopping the reaction when the acid value is not reduced, cooling to room temperature, washing with a sodium hydroxide solution with the mass fraction of 15% until the formed organic layer is neutral, washing with deionized water for three times, drying the organic layer, performing rotary evaporation, and removing the toluene to obtain an intermediate 1; step S2, adding the prepared intermediate 1 and toluene into a three-neck flask, adding glycidyl methacrylate, heating and stirring for reacting for 4 hours, washing, layering, drying, filtering, decompressing and rotary steaming to remove toluene after the reaction is finished to prepare a compound 2, and controlling the molar ratio of the intermediate 1 to the glycidyl methacrylate to be 1: 3; step S3, tetrabutyl titanate, absolute ethyl alcohol and carboxylic acid are uniformly mixed, the mixed solution a is slowly dripped after being uniformly stirred for 10min, the mixed solution b is continuously stirred for 10h, the mixed solution B is continuously stirred for 10h to prepare a mixed solution A, the mixed solution A is added into a compound 2, oxysilane is uniformly mixed and added, the uniform stirring and the reaction are carried out for 12h, the mixed solution A is coated on the surface of a base membrane layer after the reaction is finished, the information bearing layer is prepared after the reaction is finished and the curing is carried out for 2h, the weight ratio of the tetrabutyl titanate, the absolute ethyl alcohol, the carboxylic acid, the mixed solution a to the mixed solution b is controlled to be 1.5: 2: 0.35: 5: 10, and the weight ratio of the mixed solution A to the compound 2 to the oxysilane is 1: 5: 0.3-0.5.

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

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

**P34007**

**CARD**

**WO2021206163**

**TOPPAN PRINTING**

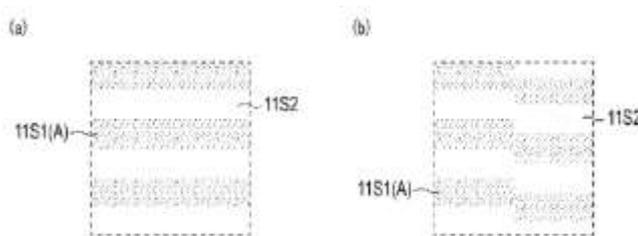
*Priority Date: 10/04/2020*

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

In the color display body according to an embodiment of the present invention, a high-refractive-index layer and a protective layer are formed in order on an embossed layer, the refractive index of the high-refractive-index layer is the highest among the layers, the embossed layer has a first region (A) having a periodic structure shorter than at least the central wavelength of visible light, and, in the first region (A), longitudinal end sides of strip shapes are alternately connected and separated in the direction orthogonal to the longitudinal direction on a display surface, and the periodic direction of the periodic structure is arranged in the longitudinal direction.

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

Dans le corps d'affichage de couleur selon un mode de réalisation de la présente invention, une couche à indice de réfraction élevé et une couche protectrice sont formées dans l'ordre sur une couche gaufrée, l'indice de réfraction de la couche à indice de réfraction élevé est la plus élevée parmi les couches, la couche gaufrée possède une première région (A) ayant une structure périodique plus courte qu'au moins la longueur d'onde centrale d'une lumière visible, et, dans la première région (A), des côtés d'extrémité longitudinaux de formes de bande sont reliés et séparés en alternance dans la direction orthogonale à la direction longitudinale sur une surface d'affichage, et la direction périodique de la structure périodique est agencée dans la direction longitudinale.



**CLAIM 1.** A high refractive index layer and a protective layer are sequentially formed on the embossed layer, and among the above layers, the high refractive index layer has the highest refractive index, and the embossed layer has a periodic structure at least shorter than the center wavelength of visible light. The first region (A) is formed, and the first region (A) has strip-shaped longitudinal ends connected to each other on the display surface and separated from each other in the longitudinal direction. A color display body characterized in that the periodic direction of the periodic structure is arranged in the longitudinal direction.

P34009

BANKNOTE – CARD – RELIEF

WO2021204844

SICPA

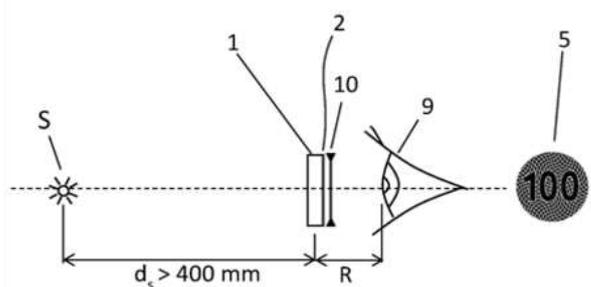
Priority Date: 07/04/2020

### AN OPTICAL ELEMENT AND A METHOD OF VISUALLY AUTHENTICATING AN OBJECT

The invention relates to an anti-copy optical element comprising a caustic layer and a mask layer configured to simultaneously display a visible image reproducing a reference image and form a projected image containing a visible caustic pattern reproducing a reference pattern, upon illumination of the optical element with a light source, the projected image being distinct from the reference image. The invention also relates to a method for designing a relief pattern of a light-redirecting surface of said caustic layer consistently with the transmission properties of the mask layer.

### ÉLÉMENT OPTIQUE ET PROCÉDÉ D'AUTHENTIFICATION VISUELLE D'UN OBJET

La présente invention concerne un élément optique de protection contre la copie comprenant une couche caustique et une couche de masque configurées pour afficher simultanément une image visible reproduisant une image de référence et former une image projetée contenant un motif caustique visible reproduisant un motif de référence, lors de l'éclairage de l'élément optique avec une source de lumière, l'image projetée étant distincte de l'image de référence. L'invention concerne également un procédé de conception d'un motif en relief d'une surface de réorientation de lumière de ladite couche caustique avec les propriétés de transmission de la couche de masque.



**CLAIM 1.** An optical element comprising a caustic layer made of a piece of reflective, or refractive transparent or partially transparent, first optical material, and having a light-redirecting surface with a relief pattern, characterized in that the optical element includes a mask layer disposed, respectively, on an optical surface of the optical element or within the optical element, the mask layer comprising a mask pattern and having a variable light transmission coefficient, the mask layer being adapted to at least partially transmit incoming light upon illumination of the optical element with a point-like light source; and the relief pattern of the light-redirecting surface of the caustic layer is configured to redirect incident light received by the optical element from the point-like light source and form a projected image containing a visible caustic pattern reproducing a reference pattern.

P34028

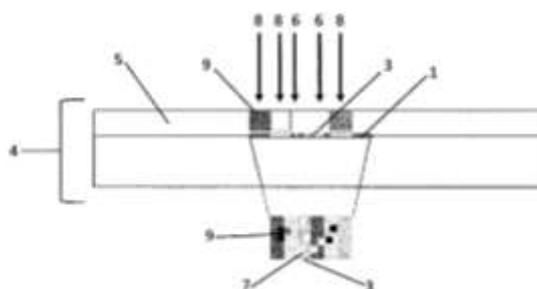
NL1043549

RONALD RENE TEN VELDEN

Priority Date: 17/01/2020

### METHOD FOR GENERATING AN EMBEDDED COLOUR IMAGE WITHIN A SYNTHETIC (POLYMER) DATA CARRYING DOCUMENT USING LASER

The invention relates to a method for generating an embedded colour image under a mechanical transparent protection which is part of the sandwich structure of a synthetic (polymer) data carrying document. Mentioned embedded image is obtained by a latent image of uniformly distributed subpixels of a (RGB or other) primary colour system created in a separate carrier, using specific colour initiating elements and ordered or disordered structures as in diffractive grating, structured coloration and thin-film interference, also embedded in the sandwich structure of the document, and whereas the individual subpixel's (R,G,B or other) reflective density is modulated, in function of the to be created image, by partly or total ablation of the subpixel by a modulated laser beam and whereas the different combination of modulated subpixels result in different target colours. 1043549



P34034

PRINTING

KR20210119088

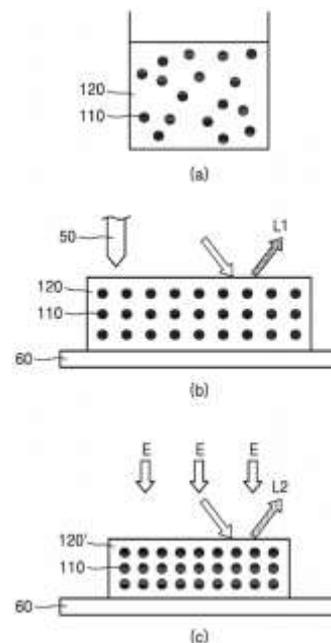
YINGKUSIDA

Priority Date: 24/03/2020

PHOTONIC CRYSTAL COLOR PRINTING METHOD AND PHOTONIC CRYSTAL COLOR PRINTED MATTER

The invention relates to a photonic crystal color printing method and a photonic crystal color printed matter. The invention relates to a photonic crystal color printing method, which comprises the following steps: (a) a step of preparing a printing solution including photonic crystal particles whose reflected light changes according to an arrangement form and a solvent in which the photonic crystal particles are dispersed; (b) a step of forming a printing solution on a substrate; (c) a step of adjusting the color of the printing solution by inputting energy to the printing solution; in the step (c), the volume of the solvent is changed according to the input amount of energy, thereby adjusting the arrangement pitch of the photonic crystal particles.

CLAIM 1. A photonic crystal color printing method, the method comprising: (a) a step of preparing a printing solution including photonic crystal particles that change reflected light according to an arrangement form and a solvent in which the photonic crystal particles are dispersed; (b) a step of forming a printing solution on a substrate; (c) a step of adjusting the color of the printing solution by inputting energy to the printing solution, in the step (c), the volume of the solvent is changed according to the input amount of energy, thereby adjusting the arrangement pitch of the photonic crystal particles.



P34035

CARD

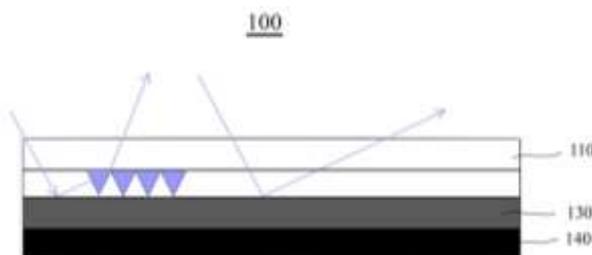
KR20210116766

BIOSMART

Priority Date: 13/03/2020

PLASTIC SHEET FOR REALIZING SURFACE PATTERN OF CARD BY REFRACTION OF LIGHT AND METHOD FOR MANUFACTURING THE SAME

A plastic sheet for forming a pattern on a surface of a card. The present invention relates to an image display device comprising: a transparent film layer (110) which is positioned at the uppermost end, is formed of a transparent material, and has a function of protecting a refraction layer of light positioned below the transparent film layer; a feature forming unit (122) which is strongly adhered to the transparent film layer; a plurality of light sources which are formed below the feature forming unit, A metal deposition film (130) formed by depositing a metal material, and a shielding layer (140) formed under the metal deposition film to further improve the reflectance of light. When the present invention is used in a conventional plastic card or metal card, various patterns can be provided on the surface of the card due to the light reflection and refraction phenomenon.



CLAIM 1. A transparent film layer (110) positioned at the uppermost end, formed of a transparent material, and having a function of protecting a refractive layer of light positioned under the transparent film layer (110); A metal deposition film 130 formed under the pattern forming part 122 and formed by depositing a metal material; and a metal layer 130 formed under the metal deposition film, And a shielding layer (140) formed on the surface of the plastic card or the metal card so as to further improve the reflectance of the light, wherein the plastic sheet can be used adhered to the surface of the plastic card or the metal card, in such a way as to form a pattern on the surface of the plastic card or the metal card by the reflected light of the light.

P34041

**PRINTING – CARD – RELIEF – MICROLENS**

JP2021166378

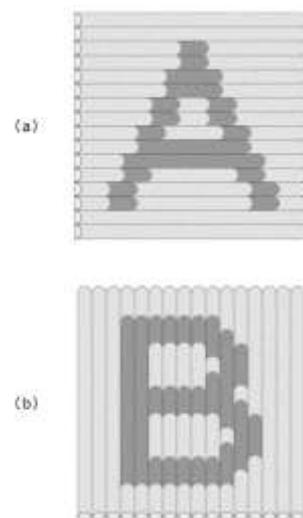
NATIONAL PRINTING BUREAU

Priority Date: 03/03/2021

**METHOD FOR READING LATENT IMAGE OF PRINTED MATERIAL, LATENT IMAGE READING APPARATUS, AND LATENT IMAGE READING SOFTWARE**

TOPIC: To provide a latent image reading method, a latent image reading apparatus, and latent image reading software for visualizing and confirming a latent image from a printed material provided with the latent image. INVENTION: The present invention provides a method for manufacturing a printed article, the method comprising: preprocessing for acquiring image data by shooting or scanning a region containing a latent image provided on a printed material, reading parameters set in accordance with characteristics of the latent image, and extracting the latent image from the image data; A latent image reading method, a latent image reader, and latent image reading software that visualize and display the latent image on a screen by performing extraction processing of edges, which are local features of the latent image, and post-processing to visualize the latent image clearly.

**CLAIM 1.** A method for reading a latent image of a printed material, the printed material having a printed region including a latent image part and a background part, wherein singularities of latent images of the latent image part and the background part can be emphasized by performing edge extraction processing on the printed region, the method comprising: The method according to claim 1, further comprising the steps of: capturing or scanning the print region to acquire image data; reading a parameter set in accordance with characteristics of the latent image; and performing preprocessing on the image data to extract the latent image by: Performing edge extraction processing, which is a local feature of the latent image, in accordance with the parameter; performing edge extraction processing, which is a local feature of the latent image, on the image data on which the preprocessing has been performed; and performing edge extraction processing on the image data on which the edge extraction processing has been performed, Performing post-processing for clearly visualizing the latent image in accordance with the parameters; and displaying the image data on which the post-processing has been performed on a screen.



P34047

**BANKNOTE – LABEL**

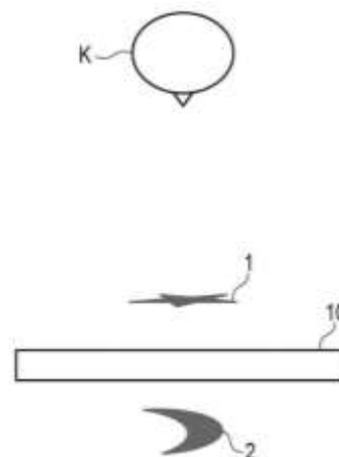
JP2021157079

TOPPAN PRINTING

Priority Date: 27/03/2020

**SECURITY LABEL**

TOPIC: To provide a security label that can be attached to tickets or cards, or to a brochure page of a passport or assessment, a bills, a package, or a plug, and that enables genuine verification. INVENTION: a security label in which a protective layer and a phase modulation layer are laminated, and a phase shift structure is formed in a data recording region of the phase modulation layer. the security label includes a plurality of first element cells and a plurality of second element cells in the data recording region, each of the first element cells and each of the second element cells 2 being nested at a fixed ratio, the security label including: A first reconstructed image reproduced on a front side of and away from the security label by a phase-shifting structure of a first component cell; A second reconstructed image that is reconstructed behind and away from the security label by a phase shifting structure of the second component cell is reconstructed, and a digital code is recorded by an arrangement of the first component cell and the second component cell in the data recording region.



**CLAIM 1.** A security label in which a protective layer and a phase modulation layer are stacked, and a phase shift structure is formed in a data recording region of the phase modulation layer, wherein the data recording region comprises a plurality of first element cells and a plurality of second element cells, each of the first element cells and each of the second element cells are nested at a fixed ratio, and A first reproduced image reproduced on a front side of the security label and spaced apart from the security label by a phase-shifting structure of the first component cell, and a second reproduced image reproduced on a back side of the security label and spaced apart from the security label by a phase-shifting structure of the second component cell; Wherein a digital code is recorded by the arrangement of the first component cell and the second component cell in the data recording region.

P34051

PRINTING – CARD – RELIEF – MICROLENS

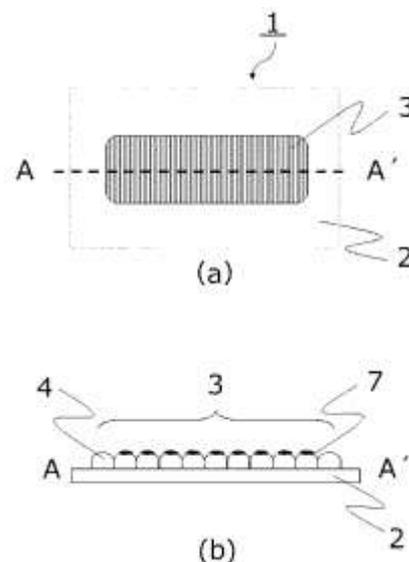
JP2021154598

NATIONAL PRINTING BUREAU

Priority Date: 27/03/2020

LATENT IMAGE PRINTED MATERIAL

TOPIC: To provide a latent image printed material having two different genuine determination functions: genuine determination functions based on an animated visual effect with a moiré pattern that can be authenticated by ten thousand people, and latent image authentication functions that can be visually recognized only when observed with light of a specific wavelength range that can be authenticated by only a limited person for disclosing information. INVENTION: a multilayer structure including, on a base material, a semicylindrical element group in which semicylindrical elements having at least one of optical characteristics of light-dark flip-flop properties and color flip-flop properties are regularly arranged, and latent elements whose color differs from that of the semicylindrical element group under specularly reflected light, A latent image printed material provided with a printed image in which a group of latent image elements regularly arranged with at least one of pitch and angle are layered in that order, is divided into a first latent image element group and a second latent image element group having different absorption characteristics or emission characteristics with respect to light of a specific wavelength band to form a latent image.



**CLAIM 1.** A printed image in which a group of semicylindrical elements and a group of latent elements are laminated in that order on at least a portion of a substrate, wherein the group of semicylindrical elements has optical characteristics with at least one of light-dark flip-flop properties and color flip-flop properties, and Wherein the plurality of raised semicylindrical elements are regularly arranged, and the latent image element group comprises latent image elements that differ in color under specularly reflected light from the semicylindrical element group and are regularly arranged at least one of pitch and angle different from those of the semicylindrical element group, The image display device according to claim 1, wherein the latent image element group is color-matched under visible light, and is divided into a first latent image element group and a second latent image element group having different absorption characteristics or emission characteristics with respect to light of a specific wavelength range to form a latent image, and a moiré pattern is visually recognized when observed under specularly reflected light; The moiré pattern moves and is visually recognized when an observation angle of the printed image is changed, and the moiré pattern disappears and the latent image is visually recognized when observed by irradiating with light of the specific wavelength range.

P34055

PRINTING – CARD

JP2021151700

TOPPAN PRINTING

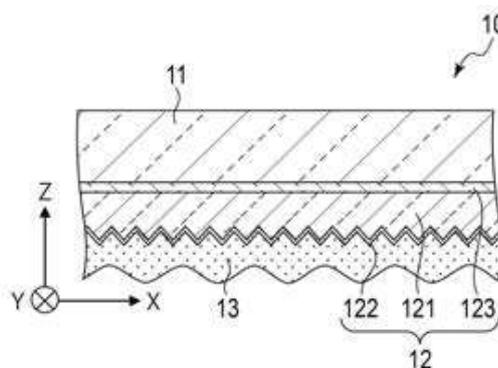
Priority Date: 16/03/2020

TRANSFER FOIL

TOPIC: To achieve high image quality even when a transfer surface is not smooth.

INVENTION: a transfer foil 10 of the present invention includes: a transfer material layer 12 including a relief layer 121 provided with a relief structure for displaying a diffracted image on one main surface, and a reflective layer 122 at least partially covering the main surface; A supporting member 11 that releasably supports the imprint material layer 12, and an adhesive layer 13 that is provided on the imprint material layer 12 and has an absolute value of surface skewness  $S_{sk}$  in a range of 2 to 5.

**CLAIM 1.** A transfer foil comprising: an transfer material layer including a relief layer provided on one main surface with a relief structure configured to display a diffracted image, and a reflective layer at least partially covering the main surface; a support configured to releasably support the transfer material layer; and an adhesive layer provided on the transfer material layer, the adhesive layer having an absolute value of a surface skew  $S_{sk}$  in a range of 2 to 5.



P34057

CARD – RELIEF

JP2021148815

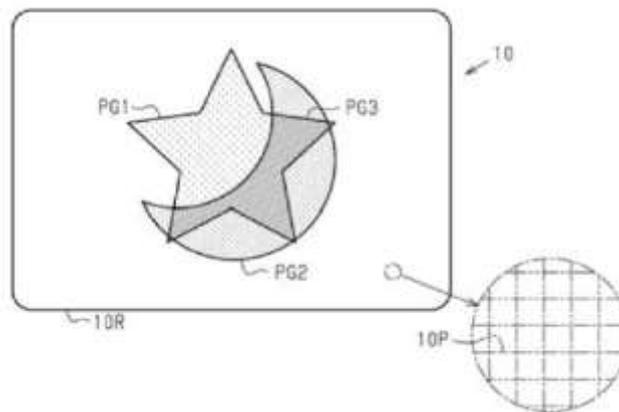
TOPPAN PRINTING

Priority Date: 16/03/2020

DISPLAY

TOPIC: To provide a display body that can enhance visibility of an image that can be displayed by the display body and enhance resistance to counterfeiting.

INVENTION: Each pixel 10 P of a first pixel group PG1 includes a first recessing and protruding structure, each pixel 10 P of a second pixel group PG2 includes a second recessing and protruding structure, and each pixel 10 P of a third pixel group PG3 includes the first recessing and protruding structure and the second recessing and protruding structure. A first image is formed by each pixel 10 P of the first pixel group PG1 and each pixel 10 P of the third pixel group PG3, and a second image is formed by each pixel 10 P of the second pixel group PG2 and each pixel 10 P of the third pixel group PG3. Each pixel 10 P of the first pixel group PG1 has a sea-island structure including a plurality of island regions aperiodic in at least one of shape and arrangement in plan view facing a plane in which the relief layer spreads, and one of the sea region and the island region has a first concave-convex structure, and the other has a blank structure. The third pixel group PG3 records a machine-readable code.



**CLAIM 1.** A display body comprising a relief layer including a recessing and protruding structure, wherein an angle formed by a plane along which the relief layer spreads and a plane including a sight line direction of an observer is an observation angle, the display body is configured to display a first image and a second image at mutually different observation angles, and when viewed from a viewpoint opposite the plane along which the relief layer spreads, Wherein a plurality of pixels are laid across the relief layer, the plurality of pixels include a first pixel group, a second pixel group, and a third pixel group, each pixel of the first pixel group includes a first recessing and protruding structure, each pixel of the second pixel group includes a second recessing and protruding structure, and each pixel of the third pixel group includes: The device according to claim 1, wherein the first recessing and protruding structure and the second recessing and protruding structure are provided, the first image is formed by each pixel of the first pixel group and each pixel of the third pixel group, the second image is formed by each pixel of the second pixel group and each pixel of the third pixel group, and each pixel of the first pixel group includes: In a plan view facing a plane along which the relief layer spreads, the display body includes a sea-island structure including a plurality of island regions aperiodic in at least one of shape and arrangement, one of the sea region and the island region includes the first concave-convex structure, and the other includes a blank structure, and the third pixel group records a machine-readable code.

P34061

PRINTING – BANKNOTE – CARD

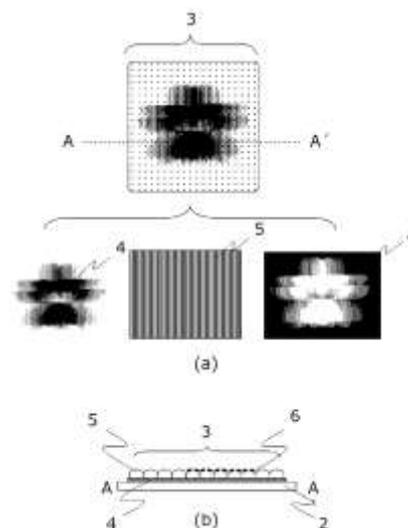
JP2021146530

NATIONAL PRINTING BUREAU

Priority Date: 17/03/2020

### LATENT IMAGE PRINTED MATERIAL

TOPIC: To provide a latent image printed material that can impart rich color to a latent image that appears under specularly reflected light, that can be configured to be one color less than conventional technologies, and that can be easily controlled in quality because there is no need to use a transparent ink. INVENTION: a latent image printed material including a printed image in which a color element group, a semicylindrical element group, and a latent image element group are laminated in that order on at least a portion of a base material, wherein the semicylindrical element group has light-dark flip-flop properties and optical transparency, and includes raised semicylindrical elements arranged regularly, the latent image element group has a predetermined color, and The base image is formed by regularly arranging latent image elements obtained by dividing or compressing the base image, and the color element group is formed by regularly arranging color elements having different colors from the base material and the latent image element and having a negative-positive relationship with the latent image element, In a printing image, a color difference  $\Delta E$  between adjacent regions of different colors is 30 or less, and at least the color element group is disposed to fit together with the latent image element group.



**CLAIM 1.** A printed image in which a group of color elements, a group of semicylindrical elements, and a group of latent elements are laminated in that order on at least a portion of a substrate, the semicylindrical elements having light-dark flip-flop properties and optical transparency, The image display apparatus according to any one of claims 1 to 6, wherein the latent image element group has a predetermined color and is formed by regularly arranging latent image elements obtained by dividing or compressing a base image, and the color element group includes: A color element having a color different from that of the substrate and the latent image element and having a negative-positive relationship with the latent image element, the color element being regularly arranged, and in the printed image, a color difference E between adjacent regions of the different colors is 30 or less, At least the group of color elements is disposed so as to fit together with the group of latent elements, and when observed under specularly reflected light, a latent image having colors of the group of color elements and the group of latent elements is visually recognized.

P34072

PRINTING – CARD – PASSPORT

IN201921053264

PATEL SHILPAN PRAVINCHANDRA

Priority Date: 20/03/2020

### COLOURSHIFT PIGMENTS USING LIQUID CRYSTAL TECHNOLOGY AND METHOD OF MAKING THE SAME

The present invention relates to a colourshift security element, more particularly the present invention relates to colourshift pigments based on liquid crystal technology and method of making the same, so as to provide an improved high security colour shift inks to be applied over documents such as passport, ID card from tampering or alteration.

**CLAIM 1.** A process of obtaining liquid crystal pigments coated with carbon black coating, the process comprising: selecting a substrate or base forming Poly Ethylene Terephthalate (PET) film; applying first liquid crystal coating over the Poly Ethylene Terephthalate (PET) film; drying the first coated layer of liquid crystal over the PET film; applying first UV curing process over the said dried first coated layer of liquid crystal over the PET film, wherein the UV curing process provides complete adherence of the first liquid crystal coating over the PET film; casting UV solution over the first liquid coating of PET film after the first UV curing process, wherein the first liquid crystal coating of PET casted with UV solution undergoes second UV curing process; applying carbon black coating over the UV solution cast liquid crystal PET layer; applying second liquid crystal coating over the PET layer coated with carbon black coating and is allowed to dry; applying third UV curing process after drying the second liquid crystal coating over the PET layer coated with carbon black coating, wherein the third UV curing process over the said PET layer results in formation of a web, wherein the said web is formed into a roll A with facilitation of a shaft; punching the roll A using a die, wherein the roll A is punched in random, specific or discreet shape and sizes, wherein the said punched roll A is scrapped using a knife at an angle, thus scrapped roll A forms small particles of liquid crystals; and collecting the liquid crystal pigments.

P34104

## PRINTING – RELIEF – MICROLENS

CN214310953U

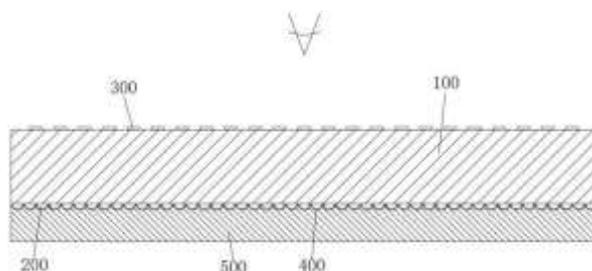
Priority Date: 19/03/2021

SHENZHEN CICADA POLYMER TECHNOLOGY – SHENZHEN

KECHUANG ANTI COUNTERFEITING TECHNOLOGY DEVELOPMENT

### MICRO-LENS ARRAY FILM

A micro-lens array film relates to the anti-counterfeiting technical field. It includes: a substrate; a microlens array layer disposed on one side of the substrate; the micro image-text array layer is arranged on one side, far away from the micro lens array layer, of the substrate, and the period of the micro image-text array is matched with that of the micro lens array; and the reflecting layer is arranged on the surface of the micro-lens array layer and is used for reflecting the image formed by the micro-image-text array layer through the micro-lens array layer so as to realize the view of the micro-image-text on one side of the micro-image-text array. By adopting the technical scheme, the micro-lens array film has the advantages that the micro-lens array film can be packaged and installed on the side where the micro-lens is located, the content of micro-graphics can be checked on the side of the micro-graphics, the micro-graphics are clear, and the thickness is thinner.



**CLAIM 1.** A microlens array film, comprising: a substrate (100); a microlens array layer (200) disposed on one side of the substrate (100); a micro image-text array layer (300) arranged on one side of the substrate (100) far away from the micro lens array layer (200), wherein the micro image-text array period is matched with the micro lens array period; and the number of the first and second groups, the reflection layer (400) is arranged on the surface of the micro-lens array layer (200), and the reflection layer (400) is used for reflecting the image formed by the micro-image-text array layer (300) through the micro-lens array layer (200) so as to realize that the micro-image-text is viewed on one side of the micro-image-text array layer (300).

P34122

## PRINTING – SEAL – BRAND PROTECTION

CN113436525

Priority Date: 24/05/2021

GUANGZHOU HUADU LIANHUA PACKING MATERIAL

### LIGHT ANGLE COLOR-CHANGING ANTI-COUNTERFEITING SEAL PAPER AND PREPARATION PROCESS AND APPLICATION THEREOF

The invention belongs to the technical field of anti-counterfeiting packaging materials, and particularly relates to anti-counterfeiting seal paper with a color changing at an optical angle, and a preparation process and application thereof. The invention relates to a preparation process of light angle color-changing anti-counterfeiting seal paper, which comprises the following steps: s1: brushing ink on the raw paper layer to form a color ink layer as a ground color of a color changing effect; s2: covering a layer of transfer film on the color ink layer to form a photochromic layer, printing the anti-counterfeiting mark on the photochromic layer to form a graph-text layer, and obtaining the anti-counterfeiting seal paper with photochromic angle, or printing the anti-counterfeiting mark on the color ink layer to form the graph-text layer, covering a layer of transfer film on the graph-text layer to form the photochromic layer, and obtaining the anti-counterfeiting seal paper with photochromic angle. The invention achieves the light angle change of the color of the specific color gamut by adjusting the colors of the color ink layer and the image-text layer and compounding with the light-variable color layer, and the prepared facing slip paper has the characteristics of beautiful appearance, anti-counterfeiting and low cost.

**CLAIM 1.** A preparation process of optical angle color-changing anti-counterfeiting seal paper is characterized by comprising the following steps: s1: brushing ink on the raw paper layer to form a color ink layer as a ground color of a color changing effect; s2: covering a transfer film on the color ink layer to form a photochromic layer, and printing an anti-counterfeiting mark on the photochromic layer to form a graph-text layer to obtain the anti-counterfeiting seal paper with photochromic angle; or printing the anti-counterfeiting mark on the color ink layer to form an image-text layer, and covering a transfer film on the image-text layer to form a photochromic layer, thereby obtaining the anti-counterfeiting seal paper with photochromic angle.

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

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

**N8188**

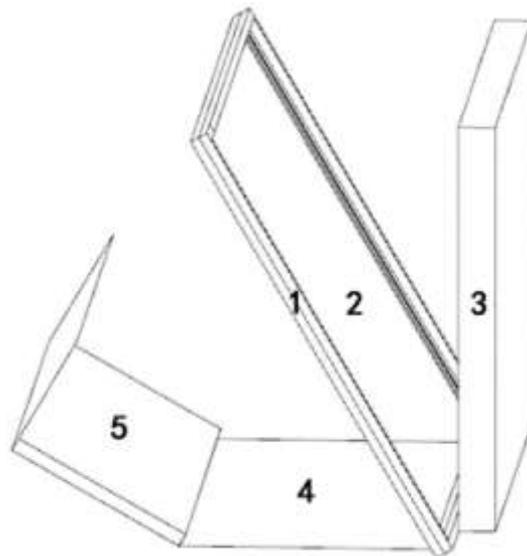
**CN113467214**

*Priority Date: 01/07/2021*

**BELJING DITING HORIZON CULTURE TECHNOLOGY**

**HOLOGRAPHIC IMAGING DEVICE AND IMAGING METHOD THEREOF**

The invention relates to a holographic imaging device and an imaging method thereof, wherein the holographic imaging device comprises: the display screen comprises a rectangular frame, a first display screen, a planar structure and a second display screen; the rectangular frame is arranged at a preset inclination angle with the ground, and a holographic film is fixed on the frame; the first display screen is arranged on the first side of the rectangular frame, is perpendicular to the ground and is used for displaying a foreground picture; the planar structure is arranged on the second side of the rectangular frame and comprises a first plane, a second plane and a third plane, wherein the first plane, the second plane and the third plane are sequentially connected together at a preset angle, and the third plane is connected with the bottom end of the rectangular frame; and the second display screen is arranged on the second plane and is used for displaying a background picture. By the technical scheme, the requirements of the holographic imaging device on the application environment are reduced, and an ideal visual presentation effect is realized.



**CLAIM 1.** A holographic imaging device, characterized in that said device comprises: the display screen comprises a rectangular frame, a first display screen, a planar structure and a second display screen; the rectangular frame is arranged at a preset inclination angle with the ground, and a holographic film is fixed on the frame; the first display screen is arranged on the first side of the rectangular frame, is perpendicular to the ground and is used for displaying a foreground picture; the planar structure is arranged on the second side of the rectangular frame and comprises a first plane, a second plane and a third plane, wherein the first plane, the second plane and the third plane are sequentially connected together at a preset angle, and the third plane is connected with the bottom end of the rectangular frame; and the second display screen is arranged on the second plane and is used for displaying a background picture.

N8189

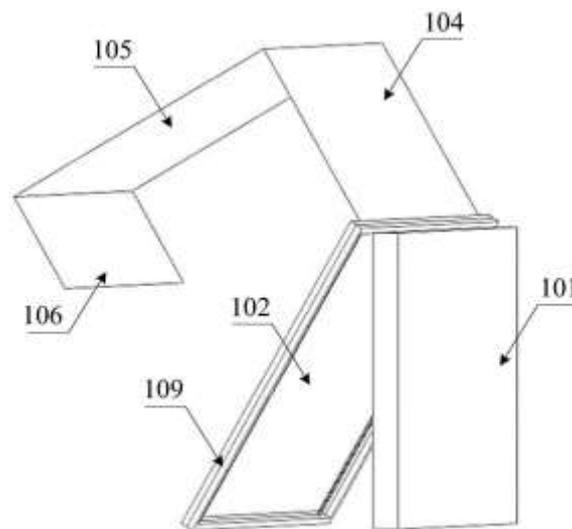
CN113467213

Priority Date: 01/07/2021

BEIJING DITING HORIZON CULTURE TECHNOLOGY

### HOLOGRAPHIC IMAGING STRUCTURE AND STAGE EQUIPMENT

The application relates to the field of holographic imaging, in particular to a holographic imaging structure and stage equipment. The holographic imaging structure comprises a display screen, a holographic medium and an image source; the display screen is vertically arranged on the reference surface to display a foreground picture; the holographic medium is obliquely arranged in the direction of the display screen close to a viewer, the included angle between the holographic medium and the reference surface is a first preset angle, the top end of the holographic medium is close to the display screen, and the bottom end of the holographic medium is far away from the display screen; the image source is located one side of the holographic medium deviating from the display screen, light of the image source is incident to the holographic medium, and a virtual image formed by the holographic medium is located on one side of the display screen far away from the viewer so as to display a background picture. The holographic imaging structure is used for displaying two layers of pictures of a foreground picture and a background picture, does not need to sink the ground, can be applied to various fields, and is higher in safety.



**CLAIM 1.** A holographic imaging structure comprising a display screen (101), a holographic medium (102) and an image source; the display screen (101) is vertically arranged on a reference plane (103) to display a foreground picture; the holographic medium (102) is obliquely arranged in the direction, close to a viewer, of the display screen (101), an included angle between the holographic medium (102) and the reference plane (103) is a first preset angle, the top end of the holographic medium (102) is close to the display screen (101), and the bottom end of the holographic medium (102) is far away from the display screen (101); the image source is located holographic medium (102) deviates from one side of display screen (101), the light of the image source is incident to holographic medium (102), and the virtual image formed by holographic medium (102) is located display screen (101) is far away from one side of the viewer to display a background picture.

N8190

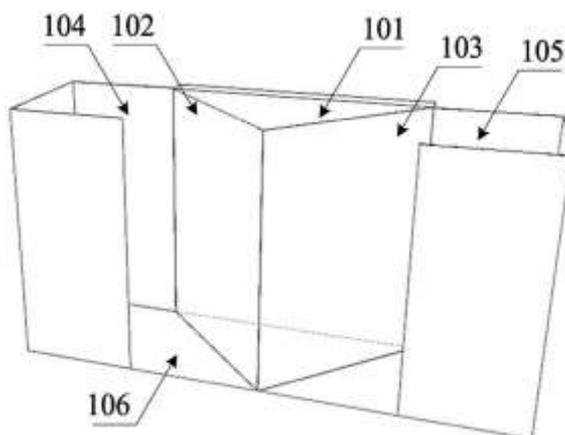
CN113467212

Priority Date: 01/07/2021

BEIJING DITING HORIZON CULTURE TECHNOLOGY

### HOLOGRAPHIC IMAGING STRUCTURE AND STAGE FACILITY

The application relates to the field of holographic imaging, in particular to a holographic imaging structure and a stage facility. The holographic imaging construction includes a display member, a first holographic medium, a first image source, a second holographic medium, and a second image source; the display component displays the foreground picture; a first holographic medium and a second holographic medium which are connected with each other and are consistent with the height direction of the display component are arranged in front of the display component, the first holographic medium and the second holographic medium form a first preset angle, and the first holographic medium and the second holographic medium respectively form a second preset angle and a third preset angle with the display component; the first image source is positioned on one side of the first holographic medium far away from the display component; the second image source is positioned on the side of the second holographic medium far away from the display component; the virtual image formed by the first holographic medium and the second holographic medium is positioned behind the display member to display the background picture. The holographic imaging structure does not need to sink the ground, can be applied to various fields, and is higher in safety.



**CLAIM 1.** A holographic imaging construction comprising a display member (101), a first holographic medium (102), a first image source, a second holographic medium (103) and a second image source; the display component (101) is used for displaying a foreground picture; the first holographic medium (102) and the second holographic medium (103) which are connected are arranged in the direction, close to a viewer, of the display component (101), the height direction of the first holographic medium (102) and the height direction of the second holographic medium (103) are consistent with the height direction of the display component (101), the first holographic medium (102) and the second holographic medium (103) form a first preset angle, the first holographic medium (102) and the display component (101) form a second preset angle, and the second holographic medium (103) and the display component (101) form a third preset angle; the first image source is positioned on one side of the first holographic medium (102) far away from the display component (101) so that light rays are incident on the first holographic medium (102); the second image source is positioned on one side of the second holographic medium (103) far away from the display component (101) so that light rays are incident on the second holographic medium (103); the virtual image formed by the first holographic medium (102) and the second holographic medium (103) is positioned on the side of the display member (101) away from the viewer to display a background picture.

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

**N8141**

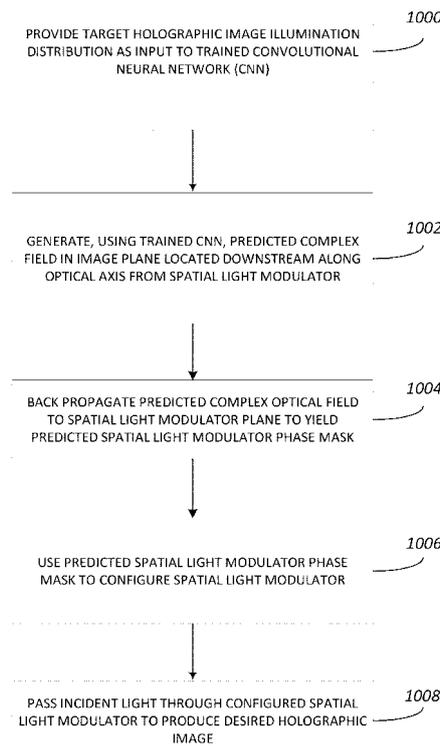
**US20210326690**

*Priority Date: 20/04/2020*

**UNIVERSITY OF NORTH CAROLINA**

**HIGH-SPEED COMPUTER GENERATED HOLOGRAPHY USING CONVOLUTIONAL NEURAL NETWORKS**

The goal of computer generated holography (CGH) is to synthesize custom illumination patterns by shaping the wavefront of a coherent light beam. Existing algorithms for CGH rely on iterative optimization with a fundamental trade-off between hologram fidelity and computation speed, making them inadequate for high-speed holography applications such as optogenetic photostimulation, optical trapping, or virtual reality displays. We propose a new algorithm, DeepCGH, that relies on a convolutional neural network to eliminate iterative exploration and rapidly synthesize high resolution holograms with fixed computational complexity. DeepCGH is an unsupervised model which can be tailored for specific tasks with customizable training data sets and an explicit cost function. Results show that our method computes 3D holograms at record speeds and with better accuracy than existing techniques.



**CLAIM 1.** A method for computer-generated holography, the method comprising: providing a target holographic image illumination distribution as input to a trained convolutional neural network (CNN); generating, using the trained CNN, a predicted complex optical field in an image plane located downstream along an optical axis from a spatial light modulator; back propagating the complex optical field to a spatial light modulator plane to yield a predicted spatial light modulator phase mask; configuring the spatial light modulator using the predicted spatial light modulator phase mask; and passing incident light through the configured spatial light modulator to produce a holographic image.

N8145

PATENT OF THE MONTH

US11150605

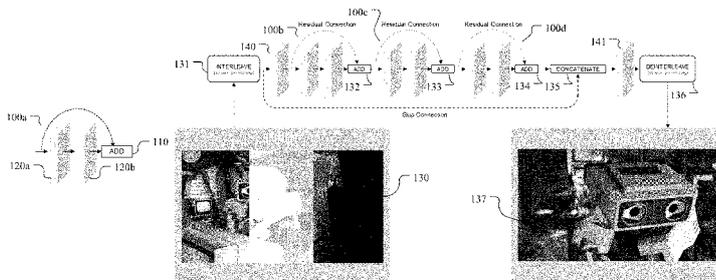
FACEBOOK TECHNOLOGIES

Priority Date: 22/07/2019

SYSTEMS AND METHODS FOR GENERATING HOLOGRAMS USING DEEP LEARNING

In one embodiment, a system may generate a hologram by processing a first image using a machine-learning model. The system may generate a second image based on at least a portion of the hologram using a processing model that is configured to simulate interactions between a light source and the hologram. The system may compare the second image to the first image to calculate a loss based on a loss function. The system may update the machine-learning model based on the loss between the first image and the second image. The updated machine-learning model is configured to process one or more input images to generate one or more corresponding holograms.

CLAIM 1. A method comprising, by a computing system: generating a hologram by processing a first natural image using a machine-learning model, wherein the first natural image that is provided to the machine-learning model is a photograph of a real world; generating a second image that is a reproduced representation of the first natural image by processing at least a portion of the hologram using a processing model that is configured to simulate interactions between a light source and the hologram; comparing (1) the second image generated after the processing of the hologram and (2) the first natural image resulting before the processing of the hologram to calculate a loss based on a loss function; and training the machine-learning model by iteratively updating the machine-learning model based on the loss between the first natural image and the second image, wherein the trained machine-learning model is configured to receive as an input a single natural image on which to add holographic effect and the trained machine-learning model is further configured to generate a final hologram based on the single natural image for display via a holographic display device.



N8150

HOKKAIDO UNIVERSITY - KDDI

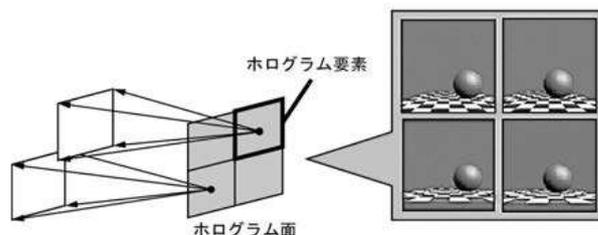
JP2021152580

Priority Date: 24/03/2020

COMPUTER COMPOSITE HOLOGRAM GENERATION APPARATUS, METHOD, AND PROGRAM

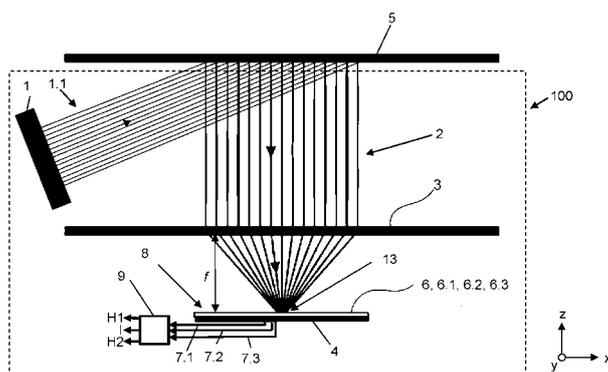
TOPIC: To generate a video 3 D of a scene CGH including each moving object with a low computational load at high speed even when the moving object moves while blocking stationary objects. INVENTION: a scene definition unit 10 places a 3DCG of a specific scene to be holographic in a coordinate space inside a computer. The rendering unit 20 acquires an object point light source for a light wave propagation calculation from a mobile object and a stationary object. The stationary object light wave distribution retainer 30 c retains a stationary object light wave distribution calculated on the basis of light wave propagation from each of the visible object point light sources of the stationary object to the hologram surface for each frame. The stationary object light wave distribution updating unit 30 b updates the stationary object light wave distribution held in the previous frame on the basis of the light waves propagated from the object point light sources of the stationary object visible in the current frame. The light wave dispersion calculation means 40 calculates the object light wave distribution of the current frame on the basis of the updated stationary object light wave distribution and the light waves propagated from each object point light source of the moving object of the current frame.

CLAIM 1. An apparatus for calculating an object light wave distribution of a hologram surface based on light waves propagated from object point light sources of a stationary object and a moving object, and performing interference calculations with a reference light wave to generate a video of a computerized hologram, the apparatus comprising: Means for acquiring respective object point light sources of a stationary object and a moving object; stationary object light wave distribution retaining means for retaining a stationary object light wave distribution calculated based on light wave propagation from the respective visible object point light sources of the stationary object to the hologram surface for each frame; Stationary object light wave distribution updating means for updating the stationary object light wave distribution maintained in the previous frame on the basis of light waves propagated from the object point light sources of the stationary object visualized or invisible in the current frame; A light wave distribution calculating means for calculating an object light wave distribution of a current frame based on the updated stationary object light wave distribution and light waves propagated from each object point light source of a moving object of the current frame.



## READ-OUT DEVICE FOR READING HOLOGRAPHICALLY STORED INFORMATION, METHOD FOR READING HOLOGRAPHICALLY STORED INFORMATION

Read-out device (100) for determining information (I) holographically stored in a hologram (5) and for determining at least one hologram parameter of the hologram, comprising - a narrow-band light source (1) designed to illuminate a hologram (5), in order to generate a reconstruction (8, 10) of the hologram (5), - a first filter element (6, 6.1) and a second filter element (6, 6.2), wherein the first filter element (6, 6.1) is designed to attenuate light with a first attenuation, in order to generate a first local intensity distribution (10'), and the second filter element (6, 6.2) is designed to attenuate light with a second attenuation, in order to generate a second local intensity distribution (10''), and - a sensor (4) with a first region and a second region, wherein the sensor (4) is designed to detect the first and second local intensity distribution (10', 10'') in order to generate a first data signal (7.1) and a second data signal (7.2), - and an image processing device (9), configured to process the first and second data signals (7.1, 7.2), wherein the first filter element (6, 6.1) and the second filter element (6, 6.2) are arranged such that, when the narrow-band light source (1) emits light and as a result the hologram (5) is illuminated and diffracted and reflected light (2) is produced at the hologram and passes through an optical element (3), as a result of which the diffracted and reflected light (2) is Fourier transformed, 10) Is generated on the sensor (4), - the sensor (4) detects the reconstruction (8, 10) with the first local intensity distribution (10') in the first region, and the sensor (4) detects the reconstruction (8, 10) with the second local intensity distribution (10'') in the second region, and - the image processing device (9) determines a first hologram parameter (H1) from the first data signal (7.1) and determines (I) the information holographically stored in the hologram from the second data signal (7.2).



**CLAIM 1.** Read-out device (100) for determining information (I) holographically stored in a hologram (5) and for determining at least one hologram parameter of the hologram, comprising - a narrow-band light source (1) designed to illuminate a hologram (5), in order to generate a reconstruction (8, 10) of the hologram (5), - a first filter element (6, 6.1) and a second filter element (6, 6.2), wherein the first filter element (6, 6.1) is designed to attenuate light with a first attenuation, in order to generate a first local intensity distribution (10'), and the second filter element (6, 6.2) is designed to attenuate light with a second attenuation, in order to generate a second local intensity distribution (10''), and - a sensor (4) with a first region and a second region, wherein the sensor (4) is designed to detect the first and second local intensity distribution (10', 10'') in order to generate a first data signal (7.1) and a second data signal (7.2), - and an image processing device (9), configured to process the first and second data signals (7.1, 7.2), wherein the first filter element (6, 6.1) and the second filter element (6, 6.2) are arranged such that, when the narrow-band light source (1) emits light and as a result the hologram (5) is illuminated and diffracted and reflected light (2) is produced at the hologram and passes through an optical element (3), as a result of which the diffracted and reflected light (2) is Fourier transformed, 10) Is generated on the sensor (4), - the sensor (4) detects the reconstruction (8, 10) with the first local intensity distribution (10') in the first region, and the sensor (4) detects the reconstruction (8, 10) with the second local intensity distribution (10'') in the second region, and - the image processing device (9) determines a first hologram parameter (H1) from the first data signal (7.1) and determines (I) the information holographically stored in the hologram from the second data signal (7.2).

N8167

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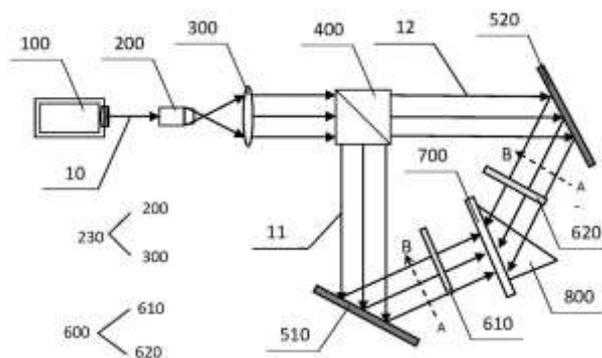
Priority Date: 29/03/2021

ARTIZAN PHOTONIC CRYSTAL SHANDONG

### HOLOGRAPHIC GRATING PREPARATION SYSTEM

The utility model discloses a holographic grating preparation system, which comprises a laser for emitting laser beams; the beam expanding device is arranged on a light path between the laser and the holographic material and is used for expanding the passing light beam; a beam splitting device for splitting the laser beam into a first split beam and a second split beam; a first reflective mirror for reflecting the first split beam to the holographic material; a second reflector for reflecting the second split beam to the holographic material; the moving baffle is arranged on a light path between the beam expanding device and the holographic material, and the cross sections of the beams of the first split beam and the second split beam emitted to the holographic material are changed along with the movement of the moving baffle; and the holographic material is used for being exposed by interference fringes formed by the first split light beam and the second split light beam to form a holographic grating. The utility model discloses a preparation system can make the high-quality holographic grating that diffraction efficiency changes.

**CLAIM 1.** A system for producing a holographic grating, comprising: a laser for emitting a laser beam; the beam expanding device is arranged on a light path between the laser and the holographic material and is used for expanding the passing light beam; a light splitting device for splitting the laser beam into a first split beam and a second split beam; a first reflective mirror for reflecting the first split beam to the holographic material; a second reflector for reflecting the second split beam to the holographic material; at least one movable baffle plate, which is arranged on the light path between the beam expanding device and the holographic material, and the cross-sectional areas of the beams of the first split beam and the second split beam which are emitted to the holographic material are changed along with the movement of the movable baffle plate; the holographic material is used for being exposed by interference fringes formed by the first split light beams and the second split light beams to form a holographic grating.



N8182

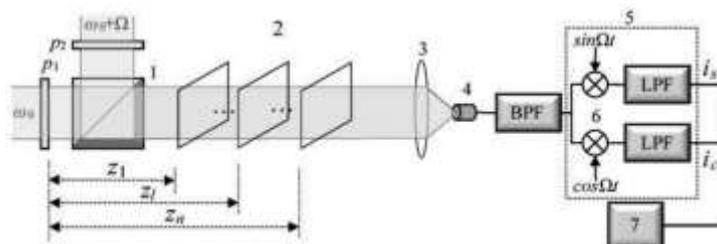
CN113485081

Priority Date: 09/07/2021

BEIHANG UNIVERSITY OF AERONAUTICS & ASTRONAUTICS

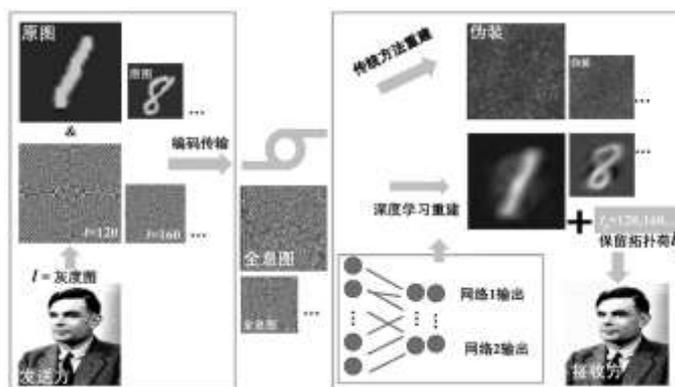
### NON-CASCADE OPTICAL SCANNING HOLOGRAPHIC MULTI-IMAGE PARALLEL ENCRYPTION METHOD

The invention discloses a non-cascaded optical scanning holographic multi-image parallel encryption method, and belongs to the field of optical encryption. Not only can simultaneously encrypt a plurality of plaintext images with different depths, but also can independently and privately decrypt each image. The present invention replaces the process of mechanical scanning by dynamically switching a series of different structural patterns at the pupil. The structural patterns are created by using a modulation measurement matrix, the modulation measurement matrix is obtained by matrix multiplication operation of an orthogonal modulation matrix and a perception matrix, and different images correspond to different sub-structural patterns. Since the distinction of the plaintext images can be completed before sampling by using the orthogonal modulation characteristic, the image to be encrypted does not need to be preprocessed, and the decrypted image does not need to be subjected to out-of-focus noise suppression. Furthermore, the use of modulation measurement matrices expands the key space. These characteristics will greatly promote the security and the practicality based on optical scanning holographic many images encryption system.



**HIGH-FIDELITY HOLOGRAPHIC ORBITAL ANGULAR MOMENTUM COMMUNICATION METHOD BASED ON DEEP LEARNING**

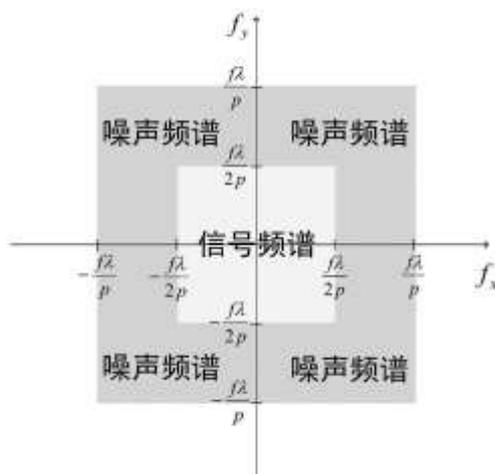
The invention relates to a high-fidelity holographic orbital angular momentum communication method based on deep learning, and belongs to the field of deep learning and information encryption. The invention provides a holographic orbit angular momentum communication method for encoding an orbit angular momentum hologram and deeply learning and decoding. The orbit angular momentum information and the image information are encoded into different holograms, and after propagation, at a receiving end, the encoded holograms reconstruct a high-quality image through the trained neural network hologram. On the other hand, the orbital angular momentum information carried by the hologram is converted into sequence information by a neural network and decoded into a gray image or a sequence code. The communication method provided by the invention can be used for expanding the communication channel and improving the communication safety. The method can be applied to the fields of encrypted digital modulation/demodulation and information encryption, and can expand the transmission capacity of a channel.



**CLAIM 1.** The high-fidelity holographic orbital angular momentum communication method based on deep learning is characterized by comprising the following steps: the method comprises the following steps: step one, improving a conventional GS holographic algorithm: generating a hologram by OAM encoding as a key and an original image; as a training set and a test set; step two, establishing two neural networks, namely a holographic reconstruction network OAM-HRN and a holographic communication network OAM-HCN; the OAM-HRN is used for decrypting and reconstructing the hologram, and the OAM-HCN is used for reading topological charge information; establishing a neural network model through a neural network; calibrating supervision label data according to the training set and the test set generated in the step one and a training task target of the neural network model; step three, training the neural network model established in the step two according to the training data; the training data comprises the training set of the first step and the supervision label data obtained in the second step; continuously adjusting the parameters of the model in the training process until the parameters converge to the global minimum value; obtaining a trained model; testing the model by using the test set, wherein in the model, when the test precision reaches more than 90%, the actual requirement is considered to be met, and the model is obtained; if the condition is not met, repeating the third step, and optimizing and adjusting the model again; randomly selecting a gray image, and changing the gray image into a one-dimensional array according to the gray value of the image, wherein the one-dimensional array corresponds to a group of topological charge information; encoding the vortex optical phase containing the topological charge information and a randomly selected picture into an encrypted hologram; the receiving end can reconstruct a high-quality hologram by using a trained network (OAM-HRN); the receiving end can read out the topological charge information according to the sequence of receiving the hologram by using a network (OAM-HCN), and then converts the topological charge information into a gray image.

**HOLOGRAPHIC ENCODING METHOD BASED ON GRADIENT REDUCTION OF SPECTRAL LOSS FUNCTION**

The invention discloses a holographic coding method based on gradient decline of a spectrum loss function, which divides a frequency spectrum of a pure phase hologram into a signal frequency spectrum region and a noise frequency spectrum region, extracts the signal frequency spectrum region by filtering the frequency spectrum of a complex amplitude hologram, and then uses a gradient decline method to enable the signal frequency spectrum of the pure phase hologram to be approximately equal to the signal frequency spectrum of the complex amplitude hologram, wherein the noise frequency spectrum region of the pure phase hologram can be regarded as an optimized free variable and ignored. Compared with the common bi-phase encoding method and GS algorithm, the signal-to-noise ratio of the method is higher than that of the bi-phase encoding method, and the method is more suitable for holographic display of three-dimensional objects than the GS algorithm.



**CLAIM 1.** A holographic coding method based on gradient descent of a spectrum loss function is characterized in that a frequency spectrum of a pure phase hologram is divided into a signal frequency spectrum region and a noise frequency spectrum region, the signal frequency spectrum region is extracted by filtering the frequency spectrum of a complex amplitude hologram, then the signal frequency spectrum of the pure phase hologram is approximately equal to the signal frequency spectrum of the complex amplitude hologram by a gradient descent method, and the noise frequency spectrum region of the pure phase hologram can be regarded as an optimized free variable and ignored; setting the size of pure phase hologram, complex amplitude hologram and original image as  $m$  pixel, the method includes the following steps: 1) calculating the frequency spectrum  $F$  of a complex amplitude hologram by fast Fourier transform for a two-dimensional or three-dimensional original image light field  $F_0$ ,  $F_0$  is a matrix of  $m \times n$ , and  $F_0$  expanding the vector into an  $m \times n$  dimensional vector; 2) filtering the frequency spectrum of the complex amplitude hologram, namely selecting a rectangular region with the length and the width of the center position of the frequency spectrum being respectively half of the original size, and extracting the rectangular region as a signal frequency spectrum region; representing the signal spectrum as  $S$  wherein  $S$  representing a Hadamard product, wherein  $P$  represents an  $m \times n$ -dimensional vector, and if a certain element of  $P$  is in a signal spectrum region, the value of the certain element is 1, otherwise, the value of the certain element is 0; 3) for the initial pure phase hologram, fast Fourier transform is carried out to calculate a frequency spectrum  $F$ , a rectangular area with a certain position length and width respectively being half of the original size is selected as a signal frequency spectrum area, and the rest area is a noise frequency spectrum area; representing the signal spectrum as  $S$ ; 4) The loss function is calculated for the signal spectrum of a phase-only hologram, since the spectrum is complex, the loss function  $C$  is defined as the form of the real part  $\text{Re}$  plus the imaginary part  $\text{Im}$ ; 5) calculating the gradient of the loss function according to the loss function in the step 4), and updating the pure phase hologram by using the following gradient descent formula: wherein  $\theta$  is a vector of  $m \times n$  dimensions,  $C$ , which is expanded for the matrix formed by the phase values of the current phase-only hologram  $k$  For the current loss function,  $\eta$  is the step size of the iteration,  $k+1$  A vector of  $m \times n$  dimensions is expanded for the matrix formed by the phase values of the updated phase-only hologram,  $k$  representing the  $k$ th iteration,  $\theta$  is a vector with dimensions of  $m \times n$ , and the formula is as follows: wherein  $I$  is a matrix with  $m \times n$  rows and columns,  $F(k)$  is the frequency spectrum  $F$  after the number  $k$  of iterations, the FFT is a fast fourier transform, which is used to convert the optical field into a frequency spectrum,  $\theta$  is formed by  $\theta_k$  Obtaining a  $m \times n$ -dimensional complex vector; 6) and repeating the steps 4) and 5) for iteration until the loss function is converged to obtain the final pure phase hologram.

N8192

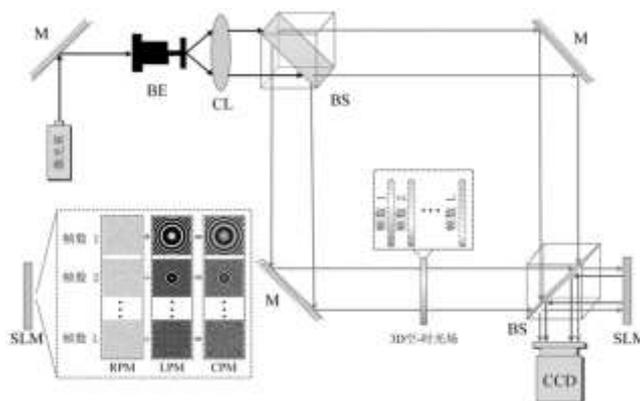
CN113467210

Priority Date: 22/06/2021

ANHUI UNIVERSITY

### MULTI-DIMENSIONAL SPACE-TIME OPTICAL FIELD COMPRESSION HOLOGRAPHIC ENCRYPTION DEVICE AND METHOD

The invention discloses a multi-dimensional space-time light field compression holographic encryption device and method, belonging to the technical field of information security, and comprising a beam expanding optical component, a beam splitter group, a multi-dimensional space-time light field, a spatial light modulator and a detector, wherein the beam expanding optical component is arranged on a path of reflected light generated by irradiating a laser beam on an original object, a first beam splitter is arranged on a light path of the laser beam subjected to beam expanding and collimation by the beam expanding optical component, the laser beam is divided into an object beam and a reference beam by the first beam splitter, the path of the object beam is provided with the multi-dimensional space-time light field, and the distance between the multi-dimensional space-time light field and the light field is  $\Delta z_1$  arranged with a spatial light modulator, a second beam splitter is arranged between the spatial light modulator and the light field, at a distance  $\Delta z_2$  from the spatial light modulator, a detector is arranged at the position of the probe; the time-varying composite mask generated by the spatial light modulator is composed of a time-varying random phase mask and a time-varying lens phase factor. The invention can effectively reduce decryption crosstalk between different frames during reconstruction.



**CLAIM 1.** A multi-dimensional space-time light field compression holographic encryption device is characterized by comprising a beam expanding optical assembly, a beam splitter group, a multi-dimensional space-time light field, a spatial light modulator and a detector, wherein the multi-dimensional space-time light field is a 3D space-time light field, a color space-time light field or a 4D space-time light field, and the beam splitter group comprises a first beam splitter and a second beam splitter; the beam expanding optical assembly is arranged at the path of reflected light generated on an original object, a first beam splitter is arranged on the light path of the laser beam after beam expansion and collimation by a beam expansion optical assembly, the laser beam is divided into an object beam and a reference beam by the first beam splitter, a multi-dimensional space-time light field is arranged on the path of the object beam, and the distance between the multi-dimensional space-time light field and the light field is  $\Delta z_1$  arranged with a spatial light modulator, a second beam splitter is arranged between the spatial light modulator and the light field, at a distance  $\Delta z_2$  from the spatial light modulator, a detector is arranged at the position of the probe; the time-varying composite mask generated by the spatial light modulator is composed of a time-varying random phase mask and a time-varying lens phase factor.

N8195

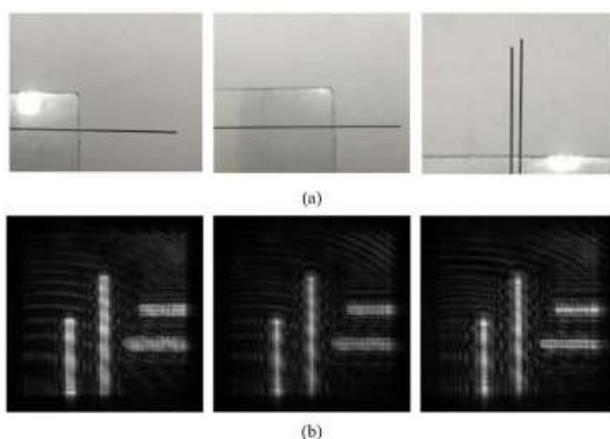
CN113448232

Priority Date: 06/07/2021

HARBIN UNIVERSITY OF SCIENCE & TECHNOLOGY

### MEASUREMENT MATRIX DIMENSION REDUCTION METHOD FOR THREE-DIMENSIONAL LAYERED TARGET COMPRESSION HOLOGRAPHY

A measurement matrix dimension reduction method of three-dimensional layered target compression holography belongs to the field of computational imaging and holographic three-dimensional imaging. When the three-dimensional layered target compression holography is reconstructed, the reconstruction speed and the imaging quality of the three-dimensional layered target compression holography are restricted by the dimension of a measurement matrix and crosstalk noise. According to the invention, on the basis of the layered representation of the three-dimensional layered target hologram, the dimensionality of the measurement matrix is reduced and the crosstalk noise is eliminated by utilizing the segmentation operator and the parallel operator. Compared with the traditional compression holography, the method has faster reconstruction speed and higher reconstruction quality.



**CLAIM 1.** The measurement matrix dimension reduction method of the three-dimensional layered target compression holography is characterized by comprising the following four steps of: step 1, recording a three-dimensional layered target hologram; step 2, segmenting the three-dimensional layered target hologram; step 3, parallel computing of the single-layer target hologram; step 4, reconstructing a three-dimensional layered target image; defining the number of pixels in the transverse direction in compression holography to be  $N_x \times N_y$  The number of pixel layers in the axial direction is  $N_z$ ; The compression holography system at least comprises a light source, a target and an image sensor which are sequentially arranged; step 1: recording, by the compression holography system, a three-dimensional layered target hologram; step 2: using a segmentation operator [ .]FilterSegmenting the three-dimensional layered target hologram to obtain a single-layer target hologram of each layer of target in the three-dimensional layered target; the segmentation operator [ .]FilterAny technique that can achieve hologram segmentation; and step 3: using parallel operators [ .]P-TwISTPerforming parallel reconstruction on a single-layer target hologram of each layer of the three-dimensional layered targets by using a two-step iterative shrinkage threshold (TwinT) algorithm, so that the dimension of a measurement matrix in each parallel pool becomes  $(N_x \times N_y) \times (N_x \times N_y \times 1)$  obtaining the three-dimensional layered objectA reconstructed image of each layer of the target; the parallel operator [ .]P-TwISTAny technique capable of realizing parallel computation; the number of the parallel pools is equal to the number of single-layer targets in the three-dimensional layered target; and 4, step 4: and splicing layer by layer according to the reconstructed image of each layer of target in the three-dimensional layered target to obtain the three-dimensional layered target image.

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

**P34099**

**SECURITY HOLOGRAM**

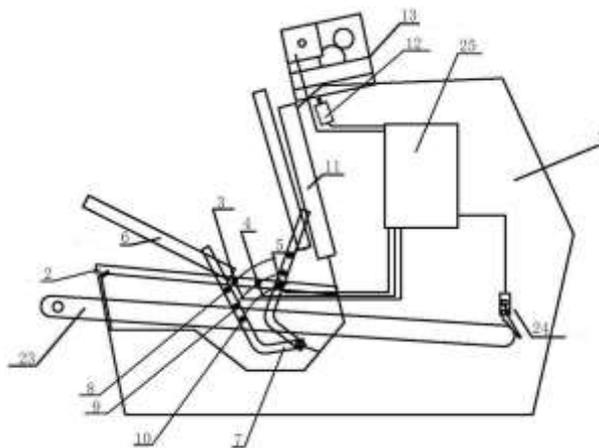
**CN214324589U**

**SHANGHAI SECURITY PRINTING**

*Priority Date: 29/12/2020*

**HOLOGRAPHIC ANTI-COUNTERFEITING MARK HIGH-PRECISION POSITIONING HOT STAMPING DEVICE**

The utility model belongs to the technical field of the location thermoprint technique and specifically relates to a holographic false proof mark high accuracy location thermoprint device. 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 pressing plate, and a cursor detector is arranged below the material dragging equipment. 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.

N8156

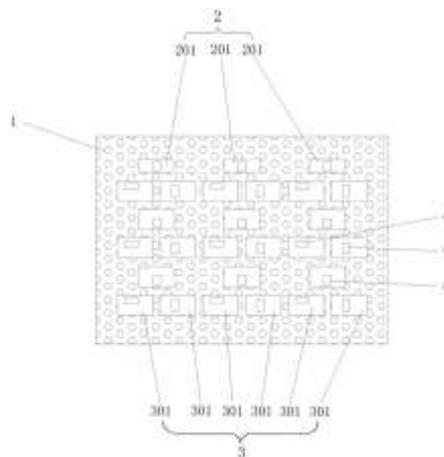
CN214419919U

Priority Date: 30/11/2020

## GUANGXI ZHENLONG TIANRUI COLOR PRINTING PACKAGING

### GILT VERSION THAT CAN SCALD HOLOGRAPHIC AND SCALD SMOOTH STICK GOLD SIMULTANEOUSLY

The utility model discloses a can scald holographic gilt version that scalds smooth stick gold simultaneously, including the honeycomb panel, its characterized in that: the honeycomb plate is characterized by also comprising at least one holographic plate group and at least one hot-pressing plate group, wherein the holographic plate group and the hot-pressing plate group are respectively sequentially arranged on the honeycomb plate from top to bottom; the holographic plate group comprises at least two holographic plates which are arranged side by side, the hot stamping plate group comprises at least two hot stamping plates which are arranged side by side, the holographic plates and the hot stamping plates are respectively provided with hot stamping patterns, and the hot stamping patterns on the holographic plates and the hot stamping patterns on the hot stamping plates are mutually staggered in the up-down direction. By adopting the gold stamping plate, the printing stock can be simultaneously subjected to holographic gold stamping and optical rod gold stamping, mutual interference is avoided during gold stamping, and the gold stamping efficiency and the yield are effectively improved.



**CLAIM 1.** The utility model provides a can scald holographic gilt version that scalds smooth stick gold simultaneously, includes the honeycomb panel, its characterized in that: the honeycomb plate is characterized by also comprising at least one holographic plate group and at least one hot-pressing plate group, wherein the holographic plate group and the hot-pressing plate group are respectively sequentially arranged on the honeycomb plate from top to bottom; the holographic plate group comprises at least two holographic plates which are arranged side by side, the hot stamping plate group comprises at least two hot stamping plates which are arranged side by side, the holographic plates and the hot stamping plates are respectively provided with hot stamping patterns, and the hot stamping patterns on the holographic plates and the hot stamping patterns on the hot stamping plates are mutually staggered in the up-down direction.

N8198

CN113442568

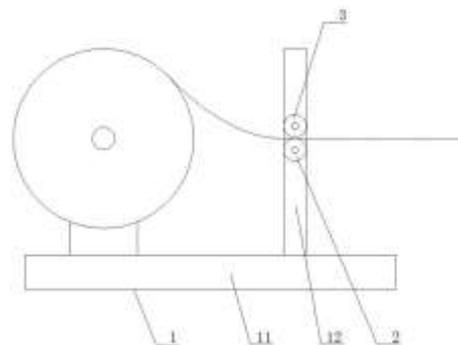
Priority Date: 19/07/2021

## ZHONGSHAN JINHAI PACKAGING TECHNOLOGY

### HOLOGRAPHIC LASER PAPER PRODUCTION CONTROL DEVICE

The invention discloses a holographic laser paper production control device which comprises a base, a fixed roller, a movable roller, a reset mechanism and a sensor. The base comprises a base and support rods arranged on two sides of the base, and two sides of the fixed roller and two sides of the movable roller are rotatably connected on the support rods on the two sides. The movable roller is arranged above the fixed roller, paper passes through between the movable roller and the fixed roller, and a connecting cavity is arranged at the position of a support rod of the movable roller. Reset mechanism and sensor setting are connected the intracavity at connecting, and portable roller both sides are connected with reset mechanism in connecting the intracavity. The moving distance of the movable roller in the vertical direction can be measured through a sensor, so that the thickness of the paper can be obtained, and then information is transmitted to the main control device to adjust the paper discharging speed of the paper.

**CLAIM 1.** A holographic laser paper production control device is characterized by comprising a base, a fixed roller, a movable roller, a reset mechanism and a sensor; the base comprises a base and support rods arranged on two sides of the base, two sides of the fixed roll and the movable roll are rotatably connected to the support rods on two sides, paper passes through the fixed roll and the movable roll, a connecting cavity is arranged in the support rods, the reset mechanism is arranged in the connecting cavity, and two sides of the movable roll are connected with the reset mechanism in the connecting cavity; the sensor is arranged in the connecting cavity, and can measure the moving distance of the movable roller in the vertical direction, so that the thickness of the paper is obtained, and then the information is transmitted to the main control device to adjust the paper discharging speed of the paper.



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

**N8140**

**WO2021198482**

Priority Date: 03/04/2020

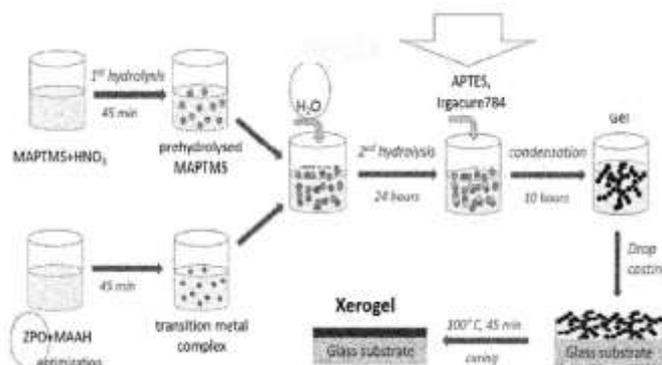
**TECHNOLOGICAL UNIVERSITY DUBLIN**

**COMPOSITION FOR HOLOGRAPHIC APPLICATIONS**

A composition for holographic applications, a process for making the composition and applications thereof. The process comprises gelation of a colloidal sol to yield a gel, wherein a cross-linker (e.g. an amine) and a photoinitiator are combined with the colloidal sol before or during gelation. The colloidal sol comprises a hydrolysed mixture of water; an organosilane; and an organometallic complex, the organometallic complex comprising a metal chelated by one or more ligands. The process may additionally comprise drying the colloidal sol or gel to form a xerogel.

**COMPOSITION POUR APPLICATIONS HOLOGRAPHIQUES**

L'invention concerne une composition pour applications holographiques, un procédé de fabrication de la composition et des applications associées. Le procédé comprend la gélification d'un sol colloïdal pour produire un gel, un agent de réticulation (une amine, par exemple) et un photo-initiateur étant combinés avec le sol colloïdal avant ou pendant la gélification. Le sol colloïdal comprend un mélange hydrolysé d'eau ; un organosilane ; et un complexe organométallique, le complexe organométallique comprenant un métal chélaté par un ou plusieurs ligands. Le procédé peut en outre comprendre le séchage du sol ou du gel colloïdal pour former un xérogel.



**CLAIM 1.** A process for preparing a composition for use in holographic applications, the process comprising: providing a colloidal sol comprising a hydrolysed mixture of water; an organosilane; and an organometallic complex, the organometallic complex comprising a metal chelated by one or more ligands; and inducing gelation of the colloidal sol to yield a gel; wherein a cross-linker and a photo initiator are combined with the colloidal sol before or during gelation.

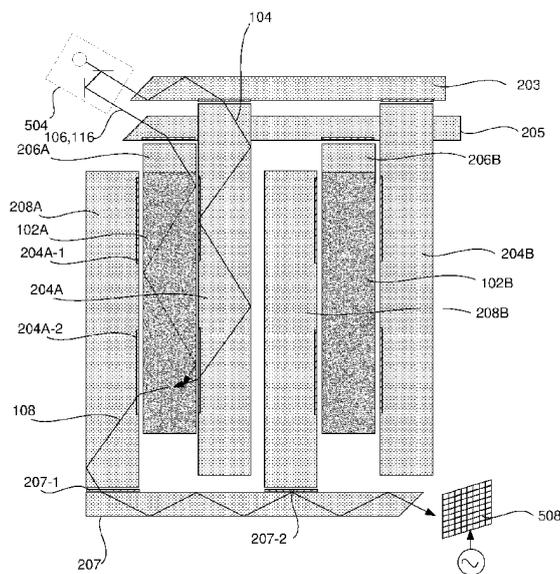
**HOLOGRAPHIC STORAGE**

A holographic data storage system comprises an emitter system, a holographic recording medium, and an input waveguide network formed of one or more multimode optical waveguides. The holographic recording medium has multiple recording regions, each optically coupled to a corresponding one of multiple out-coupling regions of the input waveguide network, the holographic data storage system arranged to persistently write data of an input beam, received at any one of the out-coupling regions, to the corresponding recording region. A controller is coupled to at least one of the emitter system and at least one controllable guiding element of the input waveguide network and controls at least one optical characteristic of the input beam or the at least one guiding element, so as to guide the input beam from an in-coupling region to any selected one of the multiple out-coupling regions. Similar waveguide networks are provided for carrying reference and output beams.

**STOCKAGE HOLOGRAPHIQUE**

Un système de stockage de données holographique comprend un système émetteur, un support d'enregistrement holographique, et un réseau de guides d'ondes d'entrée formé d'un ou de plusieurs guides d'ondes optiques multimodes. Le support d'enregistrement holographique comporte de multiples régions d'enregistrement, chacune étant couplée optiquement à une région correspondante parmi de multiples régions de couplage de sortie du réseau de guides d'ondes d'entrée, le système de stockage de données holographique étant conçu pour écrire de manière persistante des données d'un faisceau d'entrée, reçues au niveau de l'une quelconque des régions de couplage de sortie, vers la région d'enregistrement correspondante. Un dispositif de commande est couplé au système émetteur et/ou à au moins un élément de guidage commandable du réseau de guides d'ondes d'entrée et commande au moins une caractéristique optique du faisceau d'entrée ou de l'au moins un élément de guidage, de manière à guider le faisceau d'entrée d'une région de couplage d'entrée vers l'une quelconque des multiples régions de couplage parmi les multiples régions de couplage de sortie. Des réseaux de guides d'ondes similaires sont prévus pour transporter des faisceaux de référence et de sortie.

**CLAIM 1.** A holographic data storage system comprising: an emitter system; an input waveguide network, formed of one or more multimode optical waveguides, the input waveguide network having an in-coupling region for receiving an input beam from the emitter system and multiple out-coupling regions; at least one holographic recording medium having multiple recording regions, each optically coupled a corresponding one of the multiple out-coupling regions of the input waveguide network, the holographic data storage system arranged to persistently write data of an input beam, received at any one of the out-coupling regions, to the corresponding recording region; and a controller coupled to at least one of the emitter system and at least one controllable guiding element of the input waveguide network, the controller configured to control at least one optical characteristic of the input beam or the at least one guiding element, so as to guide the input beam from the in-coupling region to any selected one of the multiple out-coupling regions, wherein different ones of the multiple recording regions may be written to from the same in-coupling region by changing said at least one optical characteristic or controlling said at least one guiding element to guide the input beam to different ones of the multiple out-coupling regions, whilst the multiple out-coupling regions of the multimode optical waveguide network remain at fixed locations relative to the corresponding recording regions of the holographic recording medium.

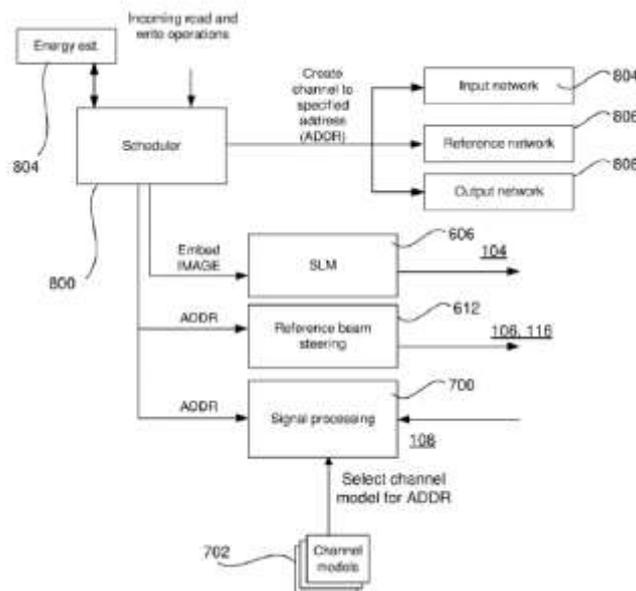


**HOLOGRAPHIC STORAGE**

A method of performing a write operation in a holographic data storage system, in which schedule schedules at least one write operation across multiple non-contiguous write intervals, the write operation pertaining to a set of data to be stored in a region of a holographic recording medium. In each of the non-contiguous write intervals, the region of the holographic recording medium is exposed to an interference pattern caused by interference between a reference beam and an input beam carrying the set of data. The multiple non-contiguous write intervals have a total aggregate duration of sufficient length to cause a persistent state change in the exposed region, such that the set of data is recoverable from that region by the end of a final write interval of the multiple non-contiguous write intervals.

**STOCKAGE HOLOGRAPHIQUE**

Un procédé de réalisation d'une opération d'écriture dans un système de stockage de données holographique, dans lequel une planification planifie au moins une opération d'écriture à travers de multiples intervalles d'écriture non contigus, l'opération d'écriture se rapportant à un ensemble de données à stocker dans une région d'un support d'enregistrement holographique. Dans chacun des intervalles d'écriture non contigus, la région du support d'enregistrement holographique est exposée à un motif d'interférence provoqué par une interférence entre un faisceau de référence et un faisceau d'entrée portant l'ensemble de données. Les multiples intervalles d'écriture non contigus ont une durée agrégée totale de longueur suffisante pour provoquer un changement d'état persistant dans la région exposée, de sorte que l'ensemble de données puisse être récupéré à partir de cette région à l'issue d'un intervalle d'écriture final des multiples intervalles d'écriture non contigus.



**CLAIM 1.** A method of performing a write operation in a holographic data storage system, the method comprising: scheduling, by a scheduler, at least one write operation across multiple non-contiguous write intervals, the write operation pertaining to a set of data to be stored in a region of a holographic recording medium; and in each of the non-contiguous write intervals, exposing the region of the holographic recording medium to an interference pattern caused by interference between a reference beam and an input beam carrying the set of data; wherein the multiple non-contiguous write intervals have a total aggregate duration of sufficient length to cause a persistent state change in the exposed region, such that the set of data is recoverable from that region by the end of a final write interval of the multiple non-contiguous write intervals.

N8157

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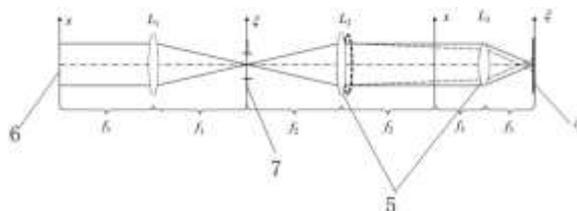
Priority Date: 25/03/2021

SUZHOU PANGU INFORMATION OPTICAL

### TEMPERATURE COMPENSATION DEVICE FOR HOLOGRAPHIC STORAGE

The utility model belongs to the technical field of holographic optical storage, and discloses a temperature compensation device for holographic storage, which comprises a laser light source with adjustable wavelength used as an information incidence surface (1); information incidence surface, first Fourier transform lens L1The spectral surface width adjusting member, the reading light incident angle adjusting member and the holographic storage medium are arranged in this order along the light beam propagation direction, and reading is performedThe light-taking incident angle adjusting assembly comprises lenses L which are sequentially arranged along the light beam propagation direction with the same optical axis2And a lens L3(ii) a By adopting the coaxial holographic structure, the requirement on the coherence of light is reduced, so that the cost of the semiconductor laser with adjustable wavelength can be reduced, and the requirement for realizing the temperature compensation method can be met; the coaxial holographic optical path system can automatically compensate the size change of the reproduced image, realizes the accurate compensation of Bragg mismatch caused by thermal expansion and cold contraction of the recording medium, and greatly improves the practicability of the holographic storage mode.

**CLAIM 1.** A temperature compensation device for holographic storage, comprising a wavelength-tunable laser light source as an illumination light source for an information incident surface (1); characterized in that the information incidence surface (6) and the first Fourier transform lens L1The frequency spectrum surface width adjusting part (7), the reading light incidence angle adjusting component (5) and the holographic storage medium (4) are sequentially arranged along the light beam propagation direction, and the reading light incidence angle adjusting component (5) comprises a lens L which is sequentially arranged along the light beam propagation direction with the optical axis2And a lens L3



N8174

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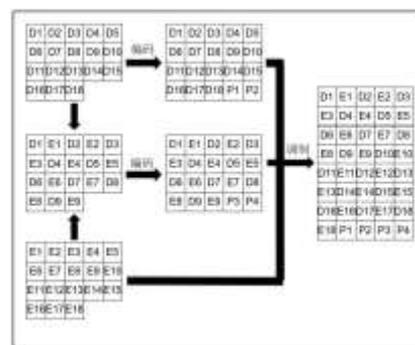
Priority Date: 08/07/2021

HUAZHONG UNIVERSITY OF SCIENCE & TECHNOLOGY

### ENCODING/DECODING METHOD, APPARATUS AND SYSTEM FOR PHASE MODULATION TYPE HOLOGRAPHIC MEMORY SYSTEM

The invention discloses an encoding/decoding method, equipment and a system of a phase modulation type holographic storage system, belonging to the technical field of holographic storage, wherein the encoding method comprises the following steps: when recording data, firstly carrying out 1-N level coding on user data in sequence, and then carrying out phase coding on the user data, all check data and part of embedded data; the level 1 encoding includes: error correction coding is carried out on the user data; the i-level coding includes: selecting partial user data and partial embedded data to form a code word for error correction coding, wherein i belongs to {2,3, ... .., N }; the decoding method comprises the following steps: extracting user data, embedded data and verification data from the read data page; and performing 1-level decoding on the user data by using the check data generated by the 1-level coding, if the decoding is unsuccessful, sequentially starting the next-level decoding to gradually obtain partial correct user data, then performing 1-level decoding again, and repeating until the 1-level decoding is successful. The invention can enhance the protection of the user data and improve the reliability of the data.

**CLAIM 1.** An encoding method of a phase modulation type holographic memory system, comprising: when recording data, after sequentially carrying out 1-level coding to N-level coding on user data to be recorded, carrying out phase coding on the user data, check data generated by the coding at each level and part of embedded data, and organizing the check data and part of embedded data into a data page, and then recording the data page into a holographic storage material in the phase modulation type holographic storage system; n is a positive integer and is more than or equal to 2; the level 1 encoding includes: carrying out error correction coding on the user data as a code word to generate corresponding check data; the i-level coding includes: selecting part of user data and part of embedded data to form a code word, and carrying out error correction coding on the code word to generate corresponding check data; i {2,3, . . , N }; wherein, the user data used by each level of coding are different from each other.



N8170

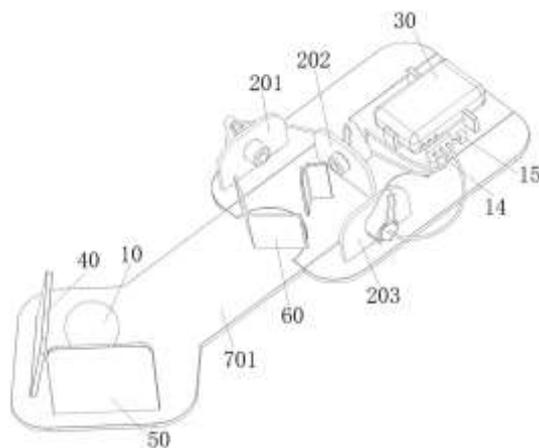
CN214278643U

Priority Date: 29/01/2021

HANGZHOU GUANGLI TECHNOLOGY

### PORTABLE HOLOGRAPHIC RECORDING AND IMAGING ASSEMBLY

The utility model relates to a portable holographic recording and imaging component, belonging to the technical field of holographic projection imaging equipment; the holographic imaging system comprises an object model, a light source module, a power supply, a light barrier, a holographic imaging plate, a light shield and a supporting bottom plate, wherein the power supply is electrically connected with the light source module; the light source module, the power supply, the light barrier and the holographic imaging plate are detachably connected with the supporting sub-plate, and the physical model can be placed on the supporting sub-plate; the light barrier is arranged on one side of the rear part of the physical model along the irradiation direction of the light beam of the light source module, and the light barrier and the light beam irradiation direction of the light source module are obliquely arranged; the utility model provides a portable holographic recording, formation of image subassembly can dismantle the equipment fast, carries convenient to use, and adaptability is good.



**CLAIM 1.** A portable holographic recording, imaging assembly, comprising: the holographic imaging system comprises a physical model (10), a light source module (20), a power supply (30), a light barrier (40), a holographic imaging plate (50), a light shield (60) and a support bottom plate (70), wherein the power supply (30) is electrically connected with the light source module (20), and the support bottom plate (70) is formed by movably connecting at least two support sub-plates (701); the light shield (60) can block the light beam of the light source module (20) and prevent the light beam of the light source module (20) from irradiating the physical model (10) and the holographic imaging plate (50); the light source module (20), the power supply (30), the light barrier (40) and the holographic imaging plate (50) are detachably connected with the supporting sub-plate (701), and the physical model (10) can be placed on the supporting sub-plate (701); when the portable holographic recording and imaging component carries out holographic recording and holographic imaging: the light shield (60) can be removed from an irradiation light path of the light source module (20), and partial light beams emitted by the light source module (20) are irradiated on the physical model (10) to form a diffusion type object light beam (90); another part of the light beam emitted by the light source module (20) is used as a reference light beam (11) to be emitted to the holographic imaging plate (50); the light barrier (40) is arranged on one side of the rear part of the physical model (10) along the irradiation direction of the light beam of the light source module (20), and the light barrier (40) and the irradiation direction of the light beam of the light source module (20) are obliquely arranged.

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

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

**N8139**

**WO2021198944**

Priority Date: 31/03/2020

**SABOOWALA, ABDUL BASIT**

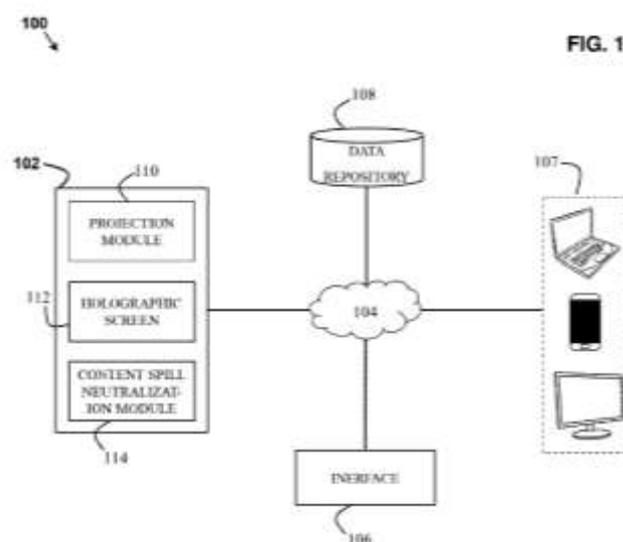
**A SYSTEM AND A METHOD TO GENERATE AND SIMULATE 3D HOLOGRAPHIC CONTENTS**

A system (100) to generate 3D holographic content (1121) is provided. The system (100) comprises a projection module (110), configured to project one or more content related to an object, a holographic screen (112), configured to receive the content projected from the projection module (110), and generate a 3D holographic content (1121) from the projected content, and a content spill formed by an unabsorbed light spilled from the holographic screen (112), and a content spill neutralization module (114) comprising a reflective surface (1141), configured to receive and redirect the content spill, a content spill area (1142), adapted to receive the redirected content spill. Further, the content spill neutralization module (114) is configured to remove the content spill from a line of sight of one or more viewers.

**SYSTÈME ET PROCÉDÉ PERMETTANT DE GÉNÉRER ET DE SIMULER DES CONTENUS HOLOGRAPHIQUES EN 3D**

La présente invention concerne un système (100) permettant de générer un contenu holographique en 3D (1121). Le système (100) comprend un module de projection (110), configuré pour projeter un ou plusieurs contenus associés à un objet, un écran holographique (112), configuré pour recevoir le contenu projeté à partir du module de projection (110) et pour générer un contenu holographique en 3D (1121) à partir du contenu projeté, et un déversement de contenu formé par une lumière non absorbée déversée à partir de l'écran holographique (112), et un module de neutralisation de déversement de contenu (114) comprenant une surface réfléchissante (1141), configurée pour recevoir et rediriger le déversement de contenu, une zone de déversement de contenu (1142) étant conçue pour recevoir le déversement de contenu redirigé. En outre, le module de neutralisation de déversement de contenu (114) est configuré pour supprimer le déversement de contenu d'une ligne de visée d'un ou plusieurs spectateurs.

**CLAIM 1.** A system (100) to generate 3D holographic contents (1121), the system (100) comprising: a projection module (110), configured to project one or more content related to an object; a holographic screen (112), configured to: receive the content projected from the projection module (110), and generate a 3D holographic content (1121) from the projected content, and a content spill neutralization module (114) comprising: a reflective surface (1141), configured to receive and redirect the content spill; a content spill area (1142), adapted to receive the redirected content spill; wherein the content spill neutralization module (114) is configured to remove the content spill from a line of sight of one or more viewers.



N8142

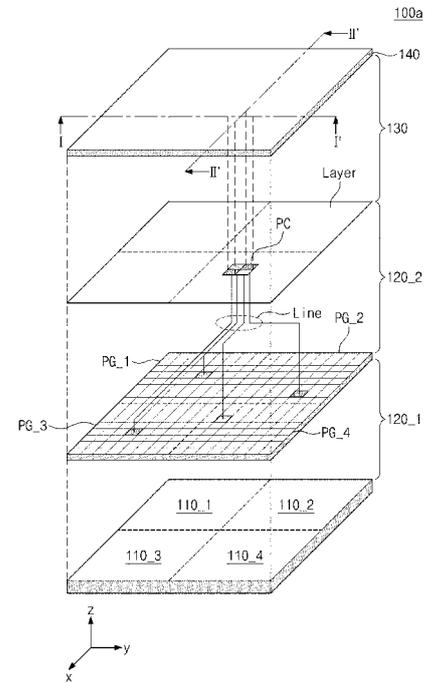
US20210325826  
Priority Date: 17/04/2020

ELECTRONICS & TELECOMMUNICATIONS RESEARCH INSTITUTE

APPARATUS FOR DISPLAYING HOLOGRAM

Disclosed is an apparatus for displaying a hologram including a pixel circuit array including first to nth pixel circuits, a first insulating layer provided on the pixel circuit array, first to nth pixel electrodes provided on the first insulating layer and electrically connected to the first to nth pixel circuits, respectively, a second insulating layer provided on the first insulating layer, first to nth display electrodes provided on the second insulating layer and electrically connected to the first to nth pixel electrodes, respectively, a display panel formed on the first to nth display electrodes, and a common electrode formed on the display panel. The first to nth display electrodes are clustery formed, and an area of the first to nth display electrodes is smaller than an area of the pixel circuit array.

**CLAIM 1.** An apparatus for displaying a hologram comprising: a pixel circuit array including first to nth pixel circuits; a first insulating layer provided on the pixel circuit array; first to nth pixel electrodes provided on the first insulating layer and configured to be electrically connected to the first to nth pixel circuits, respectively; a second insulating layer provided on the first insulating layer; first to nth display electrodes provided on the second insulating layer and configured to be electrically connected to the first to nth pixel electrodes, respectively; a display panel formed on the first to nth display electrodes; and a common electrode formed on the display panel, wherein the first to nth display electrodes are clustery formed, and wherein an area of the first to nth display electrodes is smaller than an area of the pixel circuit array.



N8143

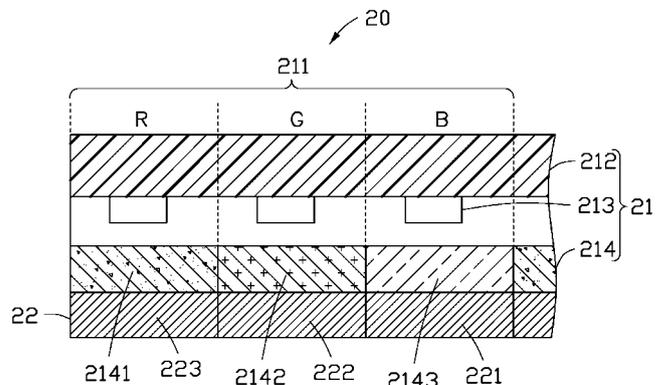
US20210318551  
Priority Date: 10/04/2020

HON HAI PRECISION INDUSTRY

DISPLAY PANEL AND HOLOGRAPHIC DISPLAY DEVICE

A holographic display panel with precise control in the wavelengths of projected light, and therefore sharpness of image, includes a light source and a filter layer. The light source emits at least a first color light and a second color light. The filter layer is located on an optical path of the first color light and an optical path of the second color light. The filter layer includes first and second filter units. Each of the first filter units filters and restricts wavelengths of the first color light, each of the second filter units filters and restricts wavelengths of the second color light.

**CLAIM 1.** A display panel comprising: a light source configured to emit a first color light and a second color light; and a filter layer located on an optical path of the first color light and an optical path of the second color light, wherein the filter layer comprises a plurality of first filter units and a plurality of second filter units, each of the plurality of first filter units is configured to filter the first color light, each of the plurality of second filter units is configured to filter the second color light, the first color light has a first wavelength range, the second color light has a second wavelength range, the first color light after filtering by the plurality of first filter units has a first target wavelength range that is less than the first wavelength range, the second color light after filtering by the plurality of second filter units has a second target wavelength range that is less than the second wavelength range.



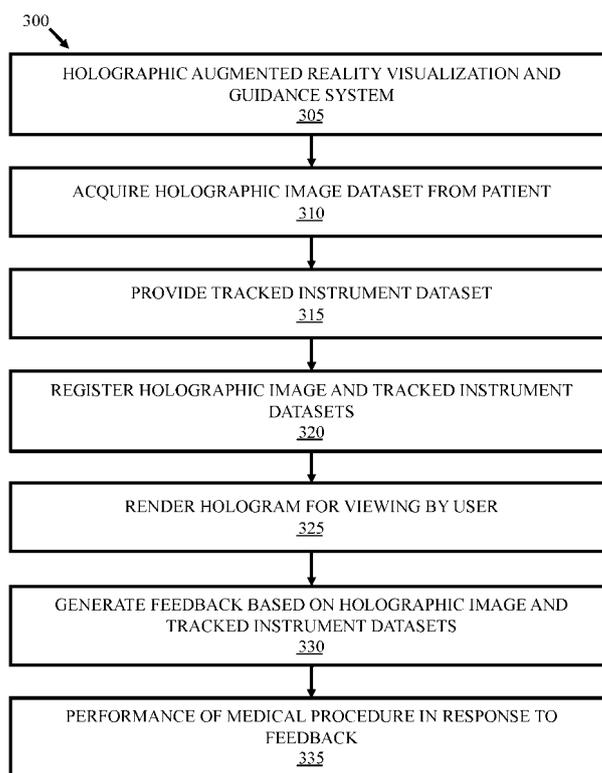
**HOLOGRAPHIC TREATMENT ZONE MODELING AND FEEDBACK LOOP FOR SURGICAL PROCEDURES**

Performance of a medical procedure on an anatomical site can include acquiring a holographic image dataset from a patient. An instrument can be tracked using a sensor to provide a tracked instrument dataset and the holographic image dataset and the tracked instrument dataset can be registered with the patient. A hologram can be rendered based on the holographic image dataset from the patient for viewing by the user and to generate a feedback based on the holographic image dataset from the patient and the tracked instrument dataset. Performance of a portion of the medical procedure on the patient can occur while the user views the patient and the hologram with an augmented reality system, where the user can employ the augmented reality system for visualization, guidance, and/or navigation of the instrument during the medical procedure in response to the feedback.

**MODÉLISATION HOLOGRAPHIQUE DE ZONE DE TRAITEMENT ET BOUCLE DE FEEDBACK POUR INTERVENTIONS CHIRURGICALES**

Les performances d'une intervention médicale sur un site anatomique peuvent comprendre l'acquisition d'un ensemble de données d'image holographique (122) à partir d'un patient. Un instrument (104) peut être suivi à l'aide d'un capteur (115, 117, 119, 121) pour fournir un ensemble de données de suivi d'instrument (132) et l'ensemble de données d'image holographique (122) et l'ensemble de données de suivi d'instrument (132) peuvent être enregistrés avec le patient. Un hologramme (134, 136, 138, 140, 142) peut être rendu sur la base de l'ensemble de données d'image holographique (122) provenant du patient pour une visualisation par l'utilisateur et pour générer un feedback sur la base de l'ensemble de données d'image holographique (122) provenant du patient et de l'ensemble de données de suivi d'instrument (132). Les performances d'une partie de l'intervention médicale sur le patient peuvent se produire tandis que l'utilisateur visualise le patient et l'hologramme (134, 136, 138, 140, 142) à l'aide d'un système de réalité augmentée (102), l'utilisateur pouvant utiliser le système de réalité augmentée (102) pour la visualisation, le guidage et/ou la navigation de l'instrument (104) pendant l'intervention médicale en réponse au feedback.

**CLAIM 1.** A method for holographic augmented reality visualization and guidance in performing a medical procedure on an anatomical site of a patient by a user, comprising: providing a system including: an augmented reality system, a tracked instrument having a sensor, an image acquisition system configured to acquire a holographic image dataset from the patient, and a computer system having a processor and a memory, the computer system in communication with the augmented reality system, the tracked instrument, and the image acquisition system; acquiring, by the image acquisition system, the holographic image dataset from the patient; tracking, by the computer system, the tracked instrument using the sensor to provide a tracked instrument dataset; registering, by the computer system, the holographic image dataset and the tracked instrument dataset with the patient; rendering, by the augmented reality system, a hologram based on the holographic image dataset from the patient for viewing by the user; generating, by the augmented reality system, a feedback based on the holographic image dataset from the patient and the tracked instrument dataset; and performing, by the user, a portion of the medical procedure on the patient while viewing the patient and the hologram with the augmented reality system, whereby the user employs the augmented reality system for at least one of visualization, guidance, and navigation of the tracked instrument during the medical procedure in response to the feedback.



N8146

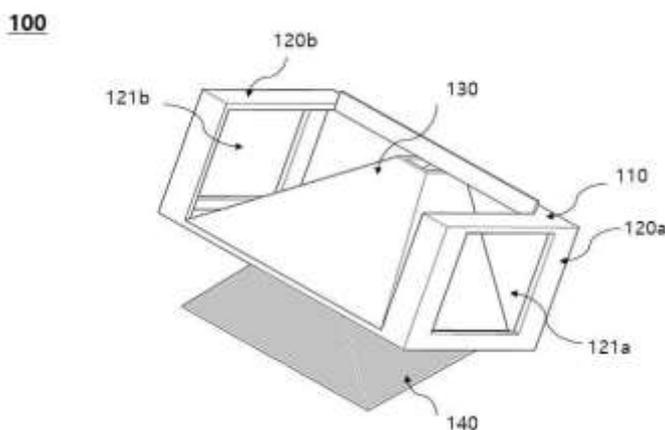
KR20210122615

Priority Date: 01/04/2020

INDUSTRY ACADEMIC COOPERATION FOUNDATION HANYANG UNIVERSITY

### HOLOGRAM VIDEO DISPLAY DEVICE AND HOLOGRAM VIDEO DISPLAY SYSTEM

The hologram image display device includes a reflection unit having a polygonal pyramid shape, a polygonal pyramid shape, or a columnar shape, and configured to generate a hologram image by reflecting an image incident from an image output device, and an accommodation unit configured to accommodate the reflection unit. The hologram image display apparatus includes a main body having an open side to view an image of a three-dimensional (3 D) hologram displayed on both left and right sides thereof, and a separate support unit to adjust an inclination of the support unit. In addition, since the image output device and the terminal of the user are connected to each other, it is possible to freely control the image of the displayed 3 D hologram.



**CLAIM 1.** A hologram image display device comprising: a main body including a reflection unit having a polygonal pyramid, a polygonal truncated pyramid, or a columnar shape and configured to generate a hologram image by reflecting an image incident from an image output device; and an accommodation unit configured to accommodate the reflection unit.

N8147

KR20210121950

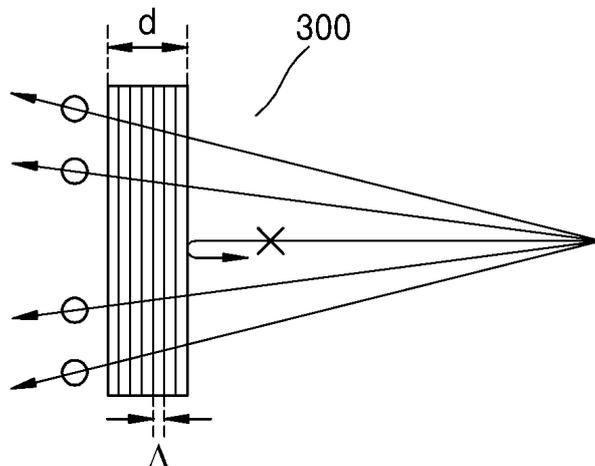
Priority Date: 31/03/2020

SEOUL NATIONAL UNIVERSITY R&DB FOUNDATION

### METHOD AND DEVICE FOR DENOISING A HOLOGRAPHIC DISPLAY

A method and apparatus for denoising a holographic display are provided. The noise removing apparatus includes a first filter implemented with a volume grating for removing DC noise included in light modulated by an optical spatial modulator, or a second filter implemented with a volume grating or a thin-film filter for removing high-order term noise included in the light.

**CLAIM 1.** A noise removing device for a holographic display, comprising: a first filter implemented by a volume grating for removing DC noise included in light modulated by an optical spatial modulator; or a second filter implemented by a volume grating or a thin-film filter for removing high-order term noise included in the light.



N8148

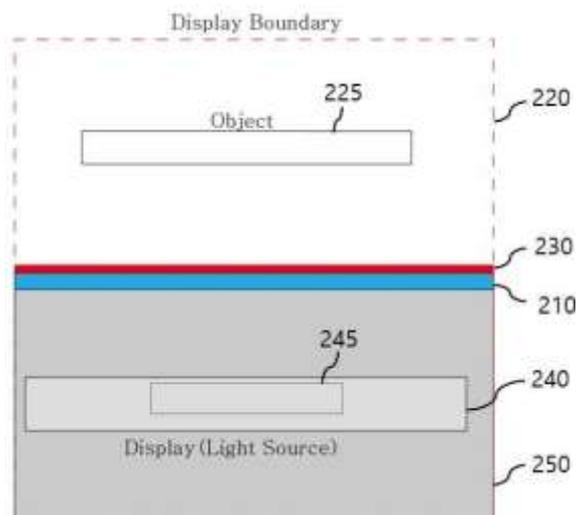
KR20210120383

Priority Date: 26/03/2020

LG UPLUS

**PSEUDO HOLOGRAM DISPLAY ASSEMBLY, PSEUDO HOLOGRAM DISPLAY APPARATUS HAVING THE SAME, AND METHOD FOR MANUFACTURING THE SAME**

A pseudo hologram display assembly, a pseudo hologram display apparatus including the pseudo hologram display assembly, and a method of manufacturing the pseudo hologram display apparatus are provided. the pseudo hologram display assembly includes a light emitting display panel installed on the light emitting display panel, A Fresnel lens for enlarging a content image output through the light emitting display panel; a retroreflector for shielding a partial region of the light emitting display panel; and a transparent medium for forming the enlarged content image into a floating image in a space to provide a hologram effect. According to the present disclosure, it is possible to transmit three-dimensional holographic large screen information by refracting and expanding an image transmitted from a display by a lens in the form of an aspherical reflector and then reflecting and transmitting the image by a reflector module, The content reproduced through the transparent medium can be viewed stereoscopically, and the image of the subject can be enlarged to a predetermined size or more by using a Fresnel lens, so that a planar image reproduced on a narrow screen can be viewed as a three-dimensional stereoscopic image that is immersive into a dialog surface. In addition, it is possible to more effectively express only visible light to be expressed through the light and thin display expansion module by combining the semi-transparent retroreflective plate and the light and thin display expansion module, except for unnecessary information of the subject.



**CLAIM 1.** A pseudo hologram display assembly, comprising: a Fresnel lens installed on a light emitting display panel and configured to enlarge a content image output through the light emitting display panel; and a transparent medium configured to form the enlarged content image into a floating image in a space to provide a hologram effect.

N8149

KR20210118662

Priority Date: 23/03/2020

KANG, DONG-GYUN

**RING DISPLAY NETWORK SYSTEM USING HOLOGRAMS**

The present invention is intended to obtain a view display apparatus using holograms and a network system thereof, which can provide a view implemented as a 3 D stereoscopic image by applying a hologram technique through online remote control at a shop site, A mobile terminal comprising: a canvas unit including a plurality of divided canvas screens in which a trapezoidal planar screen area is divided and arranged in at least four directions; a motor driving unit configured to move the canvas unit upward and downward or rotate the canvas unit; An image output unit configured to display a specific image on each of the divided canvas screen areas of the canvas unit to implement a hologram target object; and a controller configured to control the motor driving unit, And a controller which selectively reads an image to be displayed on the image output unit from a memory which is stored in advance and outputs optimal image information for implementing a hologram.

**CLAIM 1.** A hologram display apparatus includes: a canvas unit 245 including a plurality of divided canvas screens in which a trapezoidal planar screen area is divided and arranged in at least four directions; a motor driving unit 240 configured to move the canvas unit 245 upward and downward or rotate the canvas unit 245; an image output unit 230 configured to display a specific image on each of the divided canvas screen areas of the canvas unit 245 to implement a hologram target object; And a control unit 220 configured to control an operation of the motor driving unit 240 and selectively read an image to be displayed on the image output unit 230 from a memory 221 stored in advance to output optimal image information for implementing a hologram.

N8155

CN214425479U

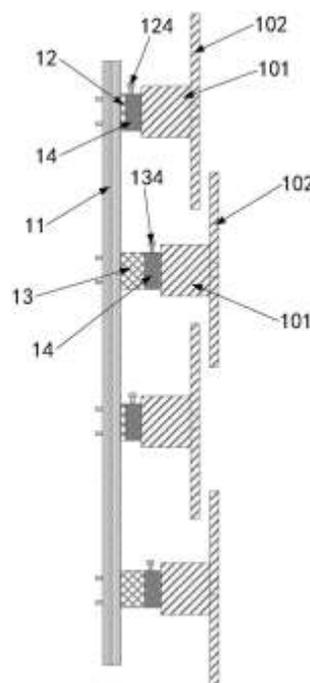
Priority Date: 28/12/2020

GUANGZHOU DASQI DIGITAL TECHNOLOGY

### 3D HOLOGRAPHIC DISPLAY DEVICE BASED ON CONCATENATION FORMULA

The utility model discloses a 3D holographic display device based on concatenation formula includes: a plurality of LED holographic screens; a plurality of support rods arranged at intervals; the first installation seats are arranged in the supporting rod at intervals; the second installation seats are arranged in the supporting rod at intervals; the plurality of third installation seats are detachably connected with the plurality of first installation seats and the plurality of second installation seats, and the third installation seats are fixedly connected with the control host; the length and the width of the first mounting seat are equal to those of the second mounting seat, and the thickness of the first mounting seat is smaller than that of the second mounting seat. In this way, the utility model discloses a holographic display device of 3D based on concatenation formula can make the flabellum between the holographic screen of adjacent LED not be in same horizontal plane for the space that whole holographic display device of 3D used temporarily is smaller, and holographic display device's the holographic screen of LED can be dismantled with the bracing piece and be connected, easy to assemble and dismantlement, and the flexibility is high, has promoted user's experience greatly.

**CLAIM 1.** The utility model provides a holographic display device of 3D based on concatenation formula, includes the holographic screen of a plurality of LED, and this holographic screen of LED includes the main control system and rotates the setting and is in a plurality of flabellums in the main control system, be provided with a plurality of LED lamps along its length direction interval in the flabellum, its characterized in that still includes: a plurality of support rods arranged at intervals; the first installation seats are arranged in the supporting rod at intervals along the length direction of the supporting rod; the second installation seats are arranged in the supporting rod at intervals along the length direction of the supporting rod; the plurality of third installation seats are detachably connected with the plurality of first installation seats and the plurality of second installation seats, and the third installation seats are fixedly connected with the control host; the second installation seats are arranged between every two first installation seats in the supporting rods, the first installation seats are arranged between every two second installation seats in the supporting rods, the first installation seats and the second installation seats are rectangular, the length and the width of each first installation seat are equal to those of each second installation seat, and the thickness of each first installation seat is smaller than that of each second installation seat.



N8158

CN214410578U

Priority Date: 19/01/2021

SUZHOU WEIKA HUANJING INTELLIGENT TECHNOLOGY

### HOLOGRAPHIC INTERACTIVE DISPLAY DEVICE AND SYSTEM

The utility model provides a holographic interactive display device and system, the device includes: the holographic window is arranged inside the showcase component, and the moving component is arranged at the bottom of the showcase component; the holographic window is used for displaying article information of a specified article and responding to the operation of a user and/or an associated terminal on the article information; the moving assembly is used for moving the showcase assembly. The utility model discloses can effectively improve the bandwagon effect and reduce the cost of labor.

**CLAIM 1.** A holographic interactive display device, comprising: the holographic window is arranged inside the showcase component, and the moving component is arranged at the bottom of the showcase component; wherein the content of the first and second substances, the holographic window is used for displaying the article information of a specified article and responding to the operation of a user and/or an associated terminal on the article information; the moving assembly is used for moving the showcase assembly.

N8159

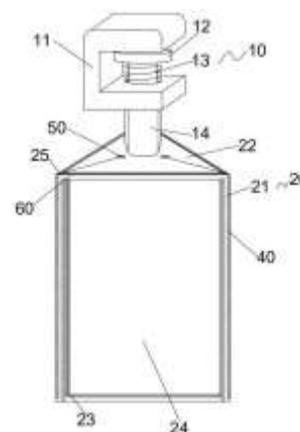
CN214410530U

Priority Date: 28/02/2021

TANGSHAN ELECTRIC POWER SURVEY & DESIGN INSTITUTE

### HOLOGRAPHIC TABLET OF TRANSMISSION LINE

The utility model relates to a holographic tablet of transmission line, including connector and display card. The upper part of the connector is fixed on the power transmission line by clamping. The display board comprises three information boards, the three information boards are surrounded and arranged to form a triangular prism space structure, a connecting board is fixedly arranged at the top of the triangular prism space structure, and the connecting board is fixed to the lower portion of the connecting head. The display groove has been set up to information board one side, is provided with a keli glass board in the display groove, and the slot has been set up to the information board top surface for place the information card that has transmission line. Through connector and transmission line body centre gripping, then be three information board on triangular prism space structure's the show tablet and place the sign of three kinds of different information respectively. Compared with the prior art, the holographic board of the power transmission line enables production and construction personnel to completely avoid knowing the parameters of the power transmission line through the holographic board on site, and to know the whole information and the individual information of the power transmission line through the holographic board and master the comprehensive parameters of the power transmission line.



**CLAIM 1.** The utility model provides a transmission line holographic tablet which characterized in that: comprises a connector (10) and a display board (20); the upper part of the connector (10) is fixed on the power transmission line through clamping; the display board (20) comprises three information boards (21), a triangular prism space structure is formed by the three information boards (21), a connecting board (22) is fixedly arranged at the top of the triangular prism space structure, and the connecting board (22) is fixed below the connecting head (10); information panel (21) have a well cavity, information panel (21) are located show groove (23) have been set up to a side of triangular prism space structure's lateral wall, show groove (23) with well cavity is linked together, be provided with a keli glass board (24) in show groove (23), information panel (21) are located slot (25) have been set up to triangular prism space structure's top surface, slot (25) with well cavity is linked together and is used for placing the information card that has transmission line.

N8160

CN214409570U

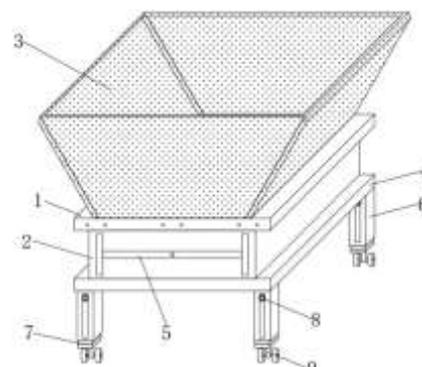
Priority Date: 25/02/2021

WUHAN SHENGLIAN TECHNOLOGY

### HOLOGRAPHIC PROJECTION ARRANGEMENT IS USED IN WEDDING CEREMONY BANQUET HALL

The utility model discloses a holographic projection device for wedding ceremony banquet hall, which comprises a backing plate, wherein the top of the backing plate is uniformly provided with a projection plate, the bottom of the backing plate is connected with a placing box in a clamping manner, the bottom of the placing box is connected with a bottom plate in a clamping manner, four corners of the bottom plate are connected with a slide cylinder in a clamping manner, the inner side of the slide cylinder is connected with a slide rod in a sliding manner, and the bottom of the slide rod is provided with universal wheels; through setting up backing plate box bottom plate to make the staff can install backing plate and bottom plate respectively and place box upper and lower both sides, install the projection board at the backing plate top, install the slide cartridge in bottom four corners of the bottom plate again, thereby can assemble and accomplish holographic projection arrangement, thereby when need not to use, can disassemble and deposit, thereby be convenient for accommodate, and through the slide bar with slide cartridge sliding connection, thereby height-adjustable, and through the universal wheel that the slide bar bottom set up, thereby be convenient for device global shifting.

**CLAIM 1.** The utility model provides a holographic projection arrangement is used to wedding ceremony banquet hall, includes backing plate (1), its characterized in that: backing plate (1) top evenly is provided with projection board (3), backing plate (1) bottom block is connected with places box (2), it is connected with bottom plate (4) to place box (2) bottom block, the equal block in bottom plate (4) bottom four corners is connected with slide cartridge (6), slide cartridge (6) inboard sliding connection has slide bar (7), slide bar (7) bottom all is provided with universal wheel (9), the even block in backing plate (1) inboard is connected with block box (25), the equal sliding connection in block box (25) inboard has rack (27), rack (27) all are connected with gear (26) meshing, gear (26) all with projection board (3) fixed connection.



N8161

CN214363089U

Priority Date: 31/12/2020

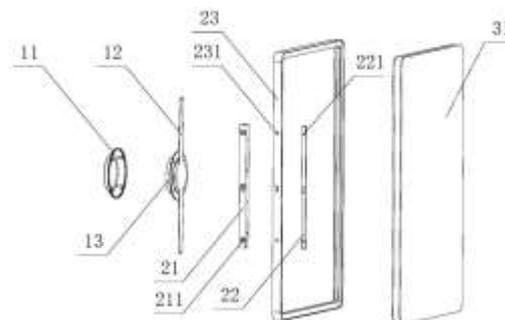
SHENZHEN XINDONG ELECTRONIC TECHNOLOGY

### HOLOGRAPHIC DISPLAY SWING GATE AND SWING GATE

The utility model provides a pendulum gate and pendulum floodgate of holographic display relates to pendulum floodgate and shows technical field, has solved current pendulum gate and has not utilized the time of waiting for the clearance to the pendulum floodgate, and traditional information display mode can not effectively be applied to the technical problem of pendulum gate.

The swing gate comprises a light-emitting component, a connecting component and a fixing plate; the LED lamp beads can form preset patterns and/or characters when being electrified and rotated; the light-emitting assembly is fixedly connected with the fixing plate and can display the patterns and/or the characters through the fixing plate; the connecting assembly is used for fixedly connecting the swing gate with a case of the swing gate, and the case can drive the swing gate to swing to open or close.

The utility model discloses the pendulum gate has newly increased the information display function, and information display's mode is interesting strong moreover, can fully attract the attention of waiting for the release time at the pendulum gate, carries out advertisement putting and publicity and can play fabulous effect.



**CLAIM 1.** A holographic display swing gate is characterized by comprising a light-emitting component, a connecting component and a fixing plate; the LED lamp beads can form preset patterns and/or characters when being electrified and rotated; the light-emitting assembly is connected with the fixing plate and can display the patterns and/or the characters through the fixing plate; the connecting assembly is used for fixedly connecting the swing gate with a case of the swing gate, and the case can drive the swing gate to swing to open or close.

N8162

CN214335473U

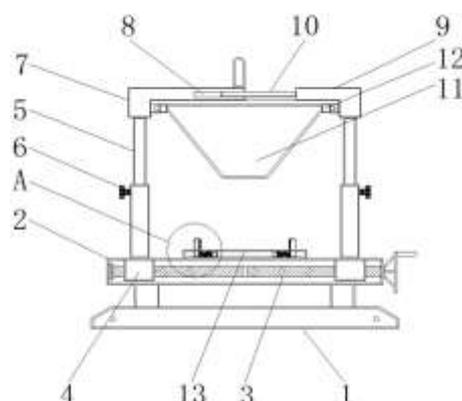
Priority Date: 28/12/2020

SHENZHEN FORETELL INTELLIGENT VISION CONTROL

### 360-DEGREE HOLOGRAPHIC IMAGING DEVICE

The utility model discloses a 360 degree holographic imaging device, include the base and bear the seat, settle the base upper surface has the backup pad, and the inside lead screw that is provided with of backup pad, the lead screw surface is connected with the slider, and settles on the slider has the telescopic link, telescopic link outer wall connection has the tightening bolt, and is connected with first roof on the telescopic link, the draw-in groove has been seted up to first roof right side outer wall, and the right-hand second roof that is provided with of first roof, second roof left side outer wall is fixed with first fixture block. This degree holographic imaging device, first roof and second roof can be opposite to each other through the drive of lead screw to no longer fix the projection arrangement of its outer wall centre gripping, so that dismantle the projection arrangement of changing unidimensional with it, and make first roof and second roof move in opposite directions through the second fixture block centre gripping with new projection arrangement fixed through the rotatory lead screw in the opposite direction, and then accomplish the change of different projection arrangements, make holographic imaging effect can switch over as required at will.

**CLAIM 1.** The utility model provides a 360 degree holographic imaging device, includes base (1) and bears seat (13), its characterized in that: the upper surface of the base (1) is provided with a supporting plate (2), a lead screw (3) is arranged in the supporting plate (2), the outer surface of the lead screw (3) is connected with a sliding block (4), the upper end of the sliding block (4) is provided with a telescopic rod (5), the outer wall of the telescopic rod (5) is connected with a tightening bolt (6), the upper end of the telescopic rod (5) is connected with a first top plate (7), the outer wall of the right side of the first top plate (7) is provided with a clamping groove (8), the right side of the first top plate (7) is provided with a second top plate (9), the outer wall of the left side of the second top plate (9) is fixed with a first clamping block (10), the lower part of the outer wall of the second top plate (9) is connected with a projection device (11), the outer wall of the projection device (11) is fixed with a second clamping block (12), the bearing seat (13) is arranged in the middle of the upper surface of the supporting plate (2), and a spring (14) is arranged in the bearing seat (13), the tail end of the spring (14) is connected with a clamping plate (15), and a sponge pad (16) is adhered to the outer wall of the clamping plate (15).



N8163

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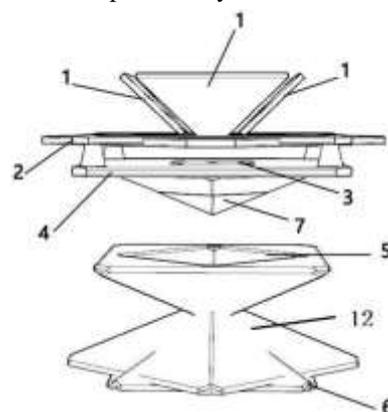
Priority Date: 08/03/2021

NANJING VOCATIONAL UNIVERSITY OF INDUSTRY TECHNOLOGY

### FOLDABLE SUSPENSION HOLOGRAPHIC PROJECTION DEVICE

The utility model discloses a collapsible holographic projection arrangement that suspends relates to holographic projection arrangement technical field, including the ya keli board, support module and base module, the ya keli board is four identical isosceles trapezoid that have cylindrical bearing and application bearing structure is connected with the leg part and can turns over the effect of rolling over, turn over the holographic projection screen that specific angle made up into the pyramid form when rolling over, the support module includes the support that is connected with the ya keli board and is equipped with the convenience and lifts up the ya keli board recess, place the platform of projection material and with the magnet bottom of magnetic suspension platform contact, the base module is including the one side of accomodating the groove one side that can accomodate holographic projection arrangement part and being used as the magnetic suspension platform. The utility model discloses collapsible holographic projection screen is more nimble than the fixed holographic projection screen that has now, also accomodates more easily, the great increase holographic projection arrangement's of the addition practicality and the science and technology nature of magnetic suspension technique.

**CLAIM 1.** A foldable suspension holographic projection device is characterized by comprising a base (12) and a support module, wherein a square-cone-shaped containing groove (5) is formed in the top of the base (12), a magnetic suspension platform (6) is arranged at the bottom of the base (12), the support module comprises a pyramid-shaped magnet (7), a magnetic sheet (8) and a material placing platform (4) are arranged at the top of the pyramid-shaped magnet (7), a square groove is formed in the center of the bottom of the material placing platform (4), an iron sheet (3) is arranged on the top surface of the square groove, the magnetic sheet (8) is embedded into the square groove and adsorbs the iron sheet (3), conical support legs (11) are arranged at four corners of the top surface of the material placing platform (4), a support (2) is arranged on each conical support leg (11), a foldable holographic projection screen is arranged at the top of each support (2), and the pyramid-shaped magnet (7) is completely inserted into the containing groove (5) during storage, during projection, after the base (12) is turned over, the magnetic suspension platform (6) is positioned at the top of the base (12) to enable the pyramid-shaped magnet (7) to form a magnetic suspension state.



N8164

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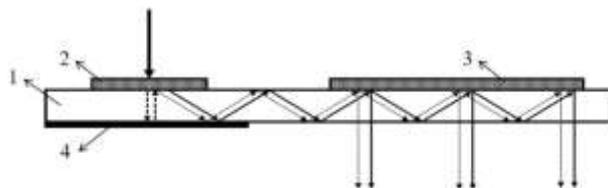
Priority Date: 19/04/2021

NICROTEK - SOOCHOW UNIVERSITY - SVG TECHNOLOGY

### HOLOGRAPHIC WAVEGUIDE LENS AND AUGMENTED REALITY DISPLAY DEVICE

The application relates to a holographic waveguide lens, which comprises a waveguide, and a coupling-in area and a coupling-out area which are arranged on the surface of the waveguide, wherein the coupling-in area is configured to enable incident image light rays to be coupled into the waveguide and to be conductively coupled to the coupling-out area along the total reflection of the waveguide, the coupling-out area is configured to couple out the light rays in the waveguide, the holographic waveguide lens further comprises a reflecting layer which is arranged on the surface of the waveguide and used for reflecting the light rays, and the reflecting layer and the coupling-in area are oppositely arranged on two sides of the waveguide. The holographic waveguide lens is simple in structure and easy to prepare, when light enters the waveguide through the coupling-in area, the formed 0-order diffraction light can be reflected back into the waveguide by the reflecting layer and is continuously transmitted to the coupling-out area in the waveguide, light transmitted out of the waveguide is reduced, and light utilization efficiency is improved.

**CLAIM 1.** A holographic waveguide lens comprising a waveguide and disposed on a surface of the waveguide an incoupling region and an outcoupling region, the incoupling region being configured such that incident image light is coupled into the waveguide and guided along the waveguide to the outcoupling region, the outcoupling region being configured to outcouple light in the waveguide from the waveguide, the holographic waveguide lens further comprising a reflective layer disposed on the surface of the waveguide to reflect light, the reflective layer and the incoupling region being disposed on opposite sides of the waveguide.



N8166

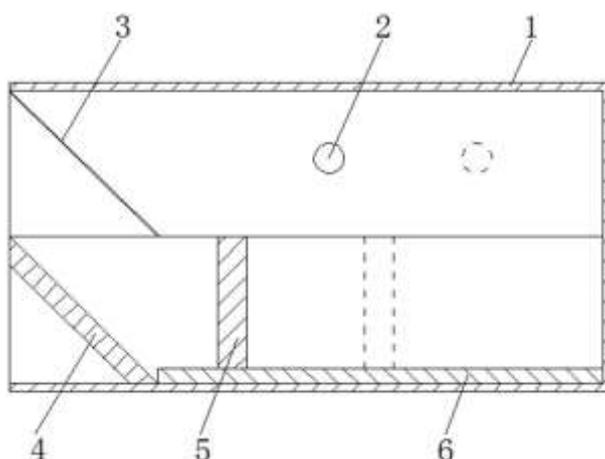
CN214311138U

Priority Date: 29/01/2021

SUO MINGXIN

### HOLOGRAPHIC IMAGING DEVICE BASED ON COMPUTER

The utility model discloses a holographic imaging device based on computer, including the shading shell, the holographic membrane of left side fixedly connected with reflection at shading shell inner chamber top, the track is removed in the right side fixedly connected with numerical control of shading shell inner chamber bottom, the left side at numerical control removal track top is provided with high bright display screen, the left side fixedly connected with reflector surface of shading shell inner chamber bottom, and the top of shading shell inner chamber forms the formation of image space. The utility model discloses a shading shell, the formation of image space, reflect the holographic membrane, the speculum face, bright display screen of reflection and numerical control remove orbital cooperation and use, possess the high advantage of formation of image accuracy, it is relatively poor to have solved traditional degree holographic reflection space degree of depth effect, there is the medium simultaneously in the formation of image space, the accuracy of holographic image back and forth space variation is relatively poor, can't satisfy holographic imaging demand, simultaneously, the condition of slope can appear in the in-process of installation, and then can influence the problem of formation of image effect.



**CLAIM 1.** A computer-based holographic imaging device comprising a light-shielding housing (1), characterized in that: the left side of the top of the inner cavity of the shading shell (1) is fixedly connected with a reflection holographic film (3), the right side of the bottom of the inner cavity of the shading shell (1) is fixedly connected with a numerical control moving track (6), the left side of the top of the numerical control moving track (6) is provided with a highlight display screen (5), the left side of the bottom of the inner cavity of the shading shell (1) is fixedly connected with a reflection mirror surface (4), the top of the inner cavity of the shading shell (1) forms an imaging space (2), the bottom of the shading shell (1) is provided with a fixing plate (7), four corners of the top of the fixing plate (7) are fixedly connected with vertical plates (17), the shading shell (1) is arranged between one sides opposite to the front and the back of the vertical plates (17), the top of the front and back opposite sides of the vertical plates (17) is provided with fastening bolts (18) in a penetrating manner, one side of the fastening bolts (18) penetrates through the vertical plates (17) and is in close contact with the surface of the shading shell (1), the front surface of the fixing plate (7) is fixedly connected with a level gauge (10), the center of the bottom of the fixing plate (7) is movably connected with a vertical rod (11), the bottom of the vertical rod (11) is fixedly connected with a bottom plate (9), the right side of the top of the bottom plate (9) is fixedly connected with a spring (8), the top of the spring (8) is fixedly connected with the bottom of the fixing plate (7), a cavity (15) is formed in the left inside of the bottom plate (9), the right side of the inner cavity of the cavity (15) is movably connected with a threaded rod (12), a threaded sleeve (14) is sleeved on the surface of the threaded rod (12), a connecting block (19) is fixedly connected with the top of the threaded sleeve (14), a moving hole (13) is formed in the left side of the top of the bottom plate (9), and the top of the connecting block (19) penetrates through the moving hole (13) and is fixedly connected with a moving rod (16), one side of the movable rod (16) far away from the connecting block (19) is movably connected to the left side of the bottom of the fixing plate (7).

N8168

CN214279394U

Priority Date: 29/10/2020

SHANGHAI KERUI EXHIBITION DISPLAY ENGINEERING  
TECHNOLOGY

**HOLOGRAPHIC INTERACTION SYSTEM INTERACTING WITH ENTITY**

The utility model discloses a with mutual holographic interactive system of entity, include: the system comprises a display stand, a first graphic server, a second graphic server, a user terminal, a lighting equipment assembly, a projection equipment assembly and a playing equipment assembly; the user terminal is respectively in signal connection with the first graphic server, the second graphic server and the lighting equipment assembly and is used for interactively controlling the first graphic server, the second graphic server and the lighting equipment assembly to synchronously operate; a semi-closed wall body is arranged on the exhibition stand, and a holographic film is obliquely arranged between the top and the bottom of the semi-closed wall body and is used for 3D projection to present a main picture related to the real-scene model; the lighting equipment component provides illumination for the exhibition stand to create a lighting environment; the playing device component is used for playing the main picture and reflecting the main picture to the holographic film so that the main picture presents 3D holographic projection; the projection equipment assembly performs back projection and ground projection, and presents the background and ground shadow of the main picture. The utility model discloses be applied to the interior space show with holographic projection, let objective environment become the appearance interface of a "stealthy", make any things that exist in virtual environment take place in real life in the vision psychology.

N8169

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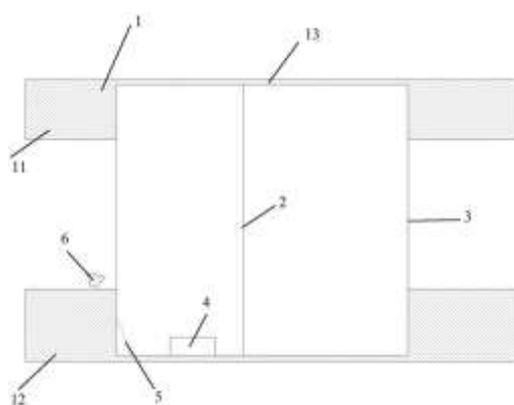
Priority Date: 20/01/2021

SUO MINGXIN

**ANTI-LIGHT HIGH-ALTITUDE HOLOGRAPHIC IMAGING DEVICE**

The utility model discloses a light-resistant up-to-the-air holographic imaging device, wherein a central imaging module is arranged in the center of a frame, and a peripheral light deviation module surrounds the central imaging module and is connected with the frame; the central imaging module comprises a first transparent plate, one side of the first transparent plate is provided with a highlight polarizing film, the other side of the first transparent plate is provided with a holographic projection film, the highlight polarizing film faces the front side of the peripheral light deviation module, and the holographic projection film faces the back side of the peripheral light deviation module; the peripheral light deviation module is a plurality of second transparent plates, and the second transparent plates positioned on the front surface and the back surface are provided with light-reducing materials. The outer edge of the central imaging module is hidden through the frame, a high-light polarizing film is arranged on one side of the transparent plate, a holographic projection film is arranged on the other side of the central imaging module to realize imaging, the light-reducing material is arranged on the front side of the central imaging module to reduce the brightness of an imaging space and improve the reflection light of the peripheral transparent plate, and the light-reducing material is arranged on the back side of the central imaging module to control the background brightness of a picture.

**CLAIM 1.** A light-resistant up-to-the-air holographic imaging device, comprising: the device comprises a frame (1), a central imaging module (2) and a peripheral light ray offset module (3); the central imaging module (2) is arranged in the center of the frame, and the peripheral light deviation module (3) surrounds the central imaging module and is connected with the frame (1); the central imaging module (2) comprises a first transparent plate (21), one side of the first transparent plate (21) is provided with a high-light polarizing film (22), the other side is provided with a holographic projection film (23), the high-light polarizing film (22) faces the front side of the peripheral light shift module (3), and the holographic projection film (23) faces the back side of the peripheral light shift module (3); the peripheral light deviation module (3) is a plurality of second transparent plates (32), and the second transparent plates (32) positioned on the front surface and the back surface are provided with light-reducing materials (31); central authorities imaging module (2) with be provided with projection module (4) between the back of peripheral light skew module (3), projection module (4) with frame (1) is connected, be provided with specular reflection module (5) on projection module's (4) the direction of projection, projection light warp specular reflection module (5) reflect to central authorities imaging module (2) on.



N8171

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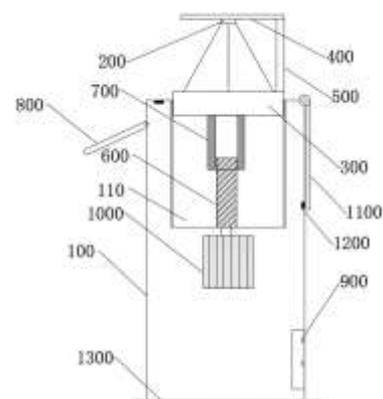
Priority Date: 19/02/2021

SHANGHAI CHENGYI PACKAGE TECHNOLOGY

### HOLOGRAPHIC PROJECTION DEVICE

The utility model discloses a holographic projection device, which comprises a projection base and a holographic projection module arranged on the projection base, wherein the projection base is also provided with a lifting mechanism which drives the holographic projection module to move up and down; the holographic projection device for holographic display in the utility model has higher use safety, and the three-dimensional projection space formed by the lifting mechanism ensures that the holographic projection module performs holographic projection display; the lifting mechanism can control the holographic projection module to ascend or descend when in use, and the damage of the holographic projection module is avoided, so that the use and maintenance safety of the projection equipment is improved, and the high practical value is achieved.

**CLAIM 1.** A holographic projection device, comprising a projection base (100) and a holographic projection module (200) arranged on the projection base (100), characterized in that: the projection base (100) is also provided with a lifting mechanism which drives the holographic projection module (200) to move up and down; the lifting mechanism comprises a lifting frame, the lifting frame comprises a mounting plate (300) and a top plate (400) which are arranged at an interval from top to bottom, a connecting plate (500) is arranged between the mounting plate (300) and the top plate (400), a projection space is formed between the top plate (400) and the mounting plate (300), and the holographic projection module (200) is arranged between the mounting plate (300) and the top plate (400); projection base (100) upper end is equipped with holding tank (110) that holds the crane, holding tank (110) diapire is equipped with along vertical arrangement's driving screw (600), the upper end of driving screw (600) is connected with the lower extreme of fixing swivel nut (700) screw-thread adaptation, driving screw (600) at mounting panel (300) lower extreme and locating drive module (1000) transmission in projection base (100), can drive the crane during driving screw (600) circumferential direction and stretch out or return in holding tank (110).



N8173

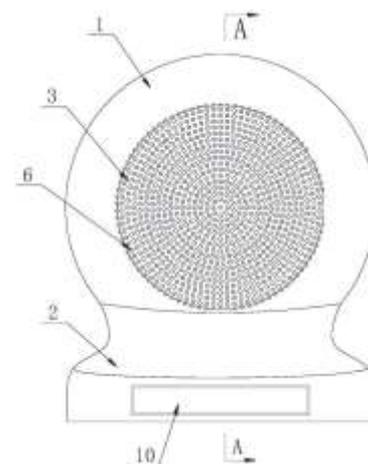
CN214267232U

Priority Date: 30/12/2020

FUNAN COUNTY TIANYI CRAFTS

### HOLOGRAPHIC IMAGE GLASS CRYSTAL BALL

A holographic image glass crystal ball belongs to the technical field of handicraft application and comprises a ball body, a base and a holographic image ball, wherein the ball body is a hollow glass ball, a radial through hole is formed in the surface of the ball body, the radial through hole is fixedly installed on the base in a side-down mode, the holographic image ball is installed in an inner cavity of the ball body, a high-speed micro motor and an IC control circuit board are arranged in the base, the bottom end of the holographic image ball is vertically connected with the shaft end of the high-speed micro motor, LED lamp beads are evenly and densely distributed on the surface of the holographic image ball, the IC control circuit board is respectively electrically connected with the high-speed micro motor and the LED lamp beads, the high-speed micro motor drives the holographic image ball to rotate at a high speed, the IC control circuit board controls the orderly on and off of the LED lamp beads through a program circuit, a floating character pattern is formed in the ball body 1, the character pattern and the color can be freely selected and changed, and are full of scientific and artistic feelings, the functional diversity of the glass crystal ball is enriched, and the ornamental value and the market competitiveness are better realized.



**CLAIM 1.** A holographic image glass crystal ball is characterized in that: including spheroid, base and holographic image ball, the spheroid is inside hollow glass ball, and the spheroid surface is equipped with radial through-hole, and radial through-hole side is fixed mounting on the base downwards, the holographic image ball is installed in the spheroid inner chamber, is equipped with high-speed micromotor and IC control circuit board in the base, and holographic image ball bottom is connected with high-speed micromotor axle head is vertical, and holographic image ball surface is equipped with the LED lamp pearl of even densely covered, and IC control circuit board respectively with high-speed micromotor, LED lamp pearl electric connection.

N8177

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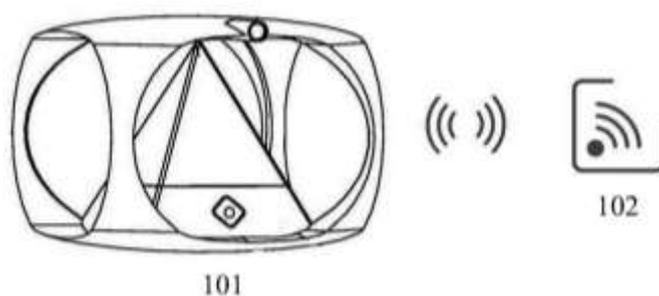
Priority Date: 25/05/2021

BEIJING BAIDU NETCOM SCIENCE & TECHNOLOGY

### HOLOGRAPHIC PROJECTION SYSTEM, HOLOGRAPHIC PROJECTION PICTURE PROCESSING METHOD AND RELATED DEVICE

The disclosure provides a holographic projection system, a holographic projection picture processing method, a holographic projection picture processing device, electronic equipment, a computer readable storage medium and a computer program product, and relates to the technical field of holographic projection and near field communication. The method comprises the following steps: the near field communication information memory is used for storing the picture content configuration information which can be read through a near field communication mechanism; the holographic projection body is provided with a near field communication scanner and is used for reading the picture content configuration information in the near field communication information storage through the near field communication scanner and presenting holographic projection corresponding to the picture content configuration information. The method stores the picture content configuration information into the memory independently, so that the holographic projection body can read the picture content configuration information through a near field identification mechanism, corresponding holographic projection is presented according to the picture content configuration information, and flexible change of holographic projection pictures is realized by replacing the memory storing different picture content configuration information.

**CLAIM 1.** A holographic projection system, comprising: the near field communication information memory is used for storing the picture content configuration information which can be read through a near field communication mechanism; the holographic projection body is provided with a near field communication scanner and is used for reading the picture content configuration information in the near field communication information storage through the near field communication scanner and presenting holographic projection corresponding to the picture content configuration information.



N8179

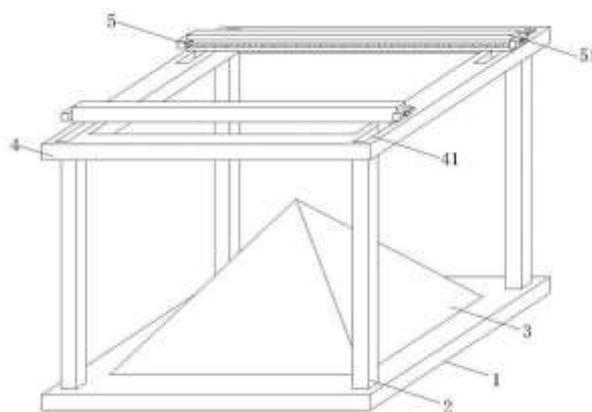
CN113503433

Priority Date: 30/06/2021

WANG XIAOCUI - LI LINGJIE

### HOLOGRAPHIC PROJECTOR

The invention relates to the technical field of holographic projection, in particular to a holographic projector which comprises a bottom plate, four groups of supports, hollow pyramids, a square-shaped frame and a clamping mechanism, wherein the number of the supports is four, the four groups of supports are respectively and fixedly connected to the outer surface of the upper end of the bottom plate, which is close to four corners, the bottom plate is connected with the square-shaped frame through the four groups of supports, the hollow pyramids are arranged on the outer surface of the upper end of the bottom plate, which is close to the middle, and the hollow pyramids are positioned below the square-shaped frame. According to the invention, through the arrangement of the clamping mechanism, the two groups of U-shaped clamping plates can be used for clamping and fixing the playing equipment with different specifications and models in the playing process, and the compression spring is used for automatically adjusting the distance between the two groups of U-shaped clamping plates, simultaneously alleviating the influence of external shaking on the playing equipment, improving the stability of the playing equipment and the watching effect of the projector, and reducing the damage probability of the playing equipment caused by accidental touch and drop.



N8183

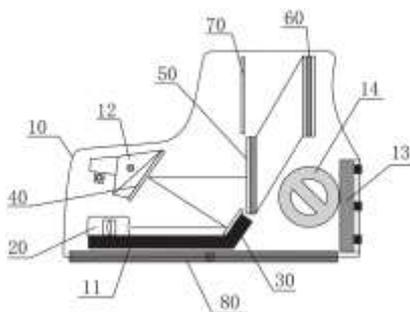
CN113483601

Priority Date: 30/06/2021

XIAMEN HAIPAI INVESTMENT & MANAGEMENT

### HOLOGRAPHIC DIFFRACTION SIGHTING TELESCOPE

The invention provides a holographic diffraction sighting telescope which comprises a telescope body, wherein a laser device used for emitting diffused light, a first reflecting mirror used for carrying out primary reflection on the diffused light, a second reflecting mirror used for carrying out secondary reflection on the diffused light, an H diffraction grating filter used for filtering the diffused light and deriving parallel light, and an F holographic image window sheet used for dividing the parallel light into holographic sighting images in the horizontal direction are arranged in the telescope body, and the diffused light emitted by the laser device sequentially passes through the first reflecting mirror, the second reflecting mirror and the H diffraction grating filter and then reaches the F holographic image window sheet to form holographic sighting images for observation of human eyes. The method can effectively improve the definition of the holographic aiming image, solve the problem of laser center wavelength drift, further reduce the focal length, aberration, parallax, large fuzzy noise of the aiming split picture image, low brightness, twin image generation and the like, and improve the aiming precision.



**CLAIM 1.** A holographic diffractive sighting telescope, comprising: including the mirror body, the internal laser instrument that is used for launching diffuse light that is equipped with of mirror, be used for carrying out the first speculum of primary reflection to diffuse light, be used for carrying out the second mirror of secondary reflection to diffuse light, be used for carrying out the filtering and deriving out the H diffraction grating filter plate of parallel light and be used for differentiating out the F holographic image window piece that the holographic image of aiming on the horizontal direction was aimed to parallel light, diffuse light that the laser instrument launches arrives F holographic image window piece formation holographic image of aiming at behind first speculum, second mirror, H diffraction grating filter plate in proper order and supplies people's eye to observe.

N8187

CN113467612

Priority Date: 17/06/2021

SHENZHEN REALIS MULTIMEDIA TECHNOLOGY

### INTERACTION METHOD AND DEVICE APPLIED TO HOLOGRAPHIC SAND TABLE BASED ON UE4

The application discloses an interaction method and device based on a UE4 holographic sand table, which are used for detecting user gestures when detecting that a holographic picture of the holographic sand table contains images of movable objects; when the user gesture is detected, judging whether the moving direction of the hand of the user shown by the user gesture is matched with the specified direction; if yes, detecting the moving time of the hand of the user for continuously moving along the specified direction; judging whether the moving time is greater than threshold time; and if so, controlling the image of the movable object to move according to a moving mode corresponding to the specified direction. The process in the specification realizes interaction based on the moving direction of the hand of the user and the time of continuous movement of the hand of the user, and can effectively avoid invalid actions of the user and cause interference to the interaction process.

**CLAIM 1.** An interactive method applied to a UE 4-based holographic sand table, wherein the method comprises the following steps: when detecting that the holographic picture of the holographic sand table contains the image of the movable object, executing detection on the user gesture; when a user gesture is detected, judging whether the moving direction of a user hand shown by the user gesture is matched with a specified direction; if yes, detecting the moving time of the hand of the user for continuously moving along the specified direction; judging whether the moving time is greater than threshold time; and if so, controlling the image of the movable object to move according to a moving mode corresponding to the appointed direction.

N8193

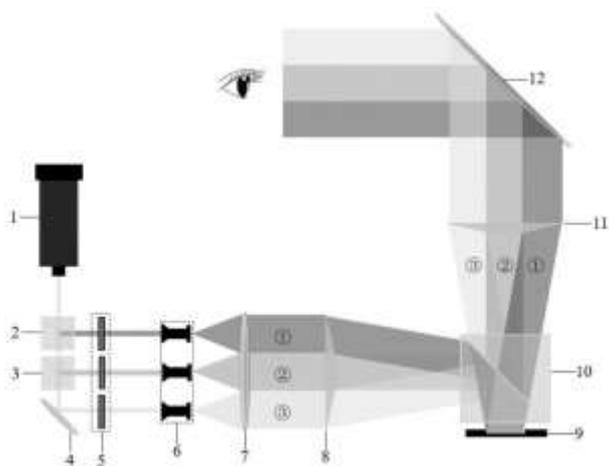
CN113448234

Priority Date: 19/07/2021

BEIHANG UNIVERSITY OF AERONAUTICS & ASTRONAUTICS

### HOLOGRAPHIC 3D DISPLAY SYSTEM BASED ON VIRTUAL ARRAY SPLICING OF SPATIAL LIGHT MODULATOR

The invention provides a holographic 3D display system based on virtual array splicing of a spatial light modulator, which comprises a laser, a beam splitter 1, a beam splitter 2, a reflector 1, a shutter array, a spatial filter array, a solid lens, a light beam deflection element 1, the spatial light modulator, the beam splitter 3, the light beam deflection element 2 and the reflector 2. Wherein a laser is used to generate the coherent light beam. The beam splitter 1, the beam splitter 2 and the mirror 1 are used for splitting the light beam generated by the laser into three paths of parallel light and illuminating the shutter array. The shutter array is used for controlling the three beams of light to sequentially pass through according to a set time sequence. The spatial filter array and the solid lens are used for expanding the three beams of light passing through the shutter array into three parallel beams with the same size and uniform intensity. And controlling the seamless splicing of the diffracted light of the spatial light modulator at three moments, and when the switching speed is fast enough, a viewer sees the diffracted light spliced by the virtual array of the spatial light modulator according to the persistence of vision effect of human eyes.



**CLAIM 1.** A holographic 3D display system based on virtual array splicing of a spatial light modulator is characterized by comprising a laser, a beam splitter 1, a beam splitter 2, a reflector 1, a shutter array, a spatial filter array, a solid lens, a light beam deflection element 1, the spatial light modulator, the beam splitter 3, the light beam deflection element 2 and the reflector 2; wherein the laser is used to generate a coherent light beam; the beam splitter 1, the beam splitter 2 and the reflector 1 are used for splitting a light beam generated by the laser into three paths of parallel light and irradiating the shutter array; the shutter array is used for controlling the three beams of light to sequentially pass through according to a set time sequence; the spatial filter array and the solid lens are used for expanding the three beams of light passing through the shutter array into three parallel beams with the same size and uniform intensity, namely a light beam I, a light beam II and a light beam III; the light beam deflection element 1 is positioned in the emergent direction of the three parallel light beams and is used for deflecting the light beam I, the light beam II and the light beam III along three specific directions respectively, and the type of the light beam deflection element 1 is the same as that of the light beam deflection element 2; at T1At the moment, the shutter array is controlled to enable the light beam (i) to pass through the beam splitter 3 and then irradiate the spatial light modulator, the diffracted light passes through the beam splitter 3, the light beam deflection element 2 and the reflecting mirror 2, and a viewer sees T1Diffracted light of the temporal spatial light modulator; at T2At the moment, the shutter array is controlled to make the light beam irradiate the spatial light modulator, the diffracted light passes through the beam splitter 3, the beam deflection element 2 and the reflector 2, and the viewer sees T2Diffracted light of the temporal spatial light modulator; at T3At the moment, the shutter array is controlled to enable the light beam (c) to irradiate the spatial light modulator, the diffracted light passes through the beam splitter 3, the light beam deflection element 2 and the reflecting mirror 2, and a viewer sees T3Diffracted light of the temporal spatial light modulator; and controlling the seamless splicing of the diffracted light of the spatial light modulator at three moments, and when the switching speed is fast enough, a viewer sees the diffracted light spliced by the virtual array of the spatial light modulator according to the persistence of vision effect of human eyes.

N8196

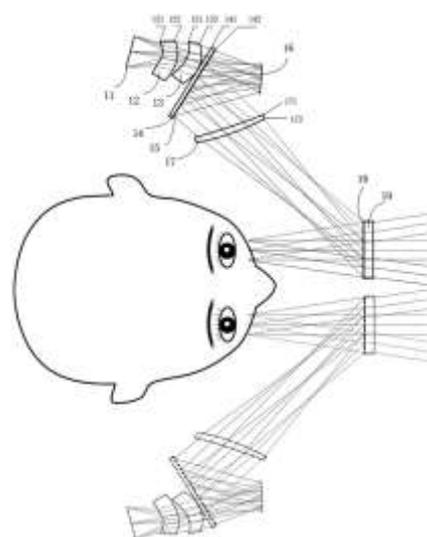
CN113448098

Priority Date: 16/06/2021

ZHEJIANG UNIVERSITY

### LIGHT FULL-COLOR FREE CURVED SURFACE-VOLUME HOLOGRAPHIC VISUAL OPTICAL IMAGING DEVICE AND NEAR-TO-EYE DISPLAY SYSTEM THEREOF

The invention relates to a light full-color free-form surface-volume holographic visual optical imaging device and a near-to-eye display system thereof, wherein the system is formed by combining two visual optical imaging devices which are in mirror symmetry, each visual optical imaging device comprises 3 optical lenses, 1 glass flat plate, 1 reflector, 2 volume holographic optical elements and 1 image display, and image optical signals sent by the image display pass through the optical system and are finally reflected by the volume holographic optical elements to enter human eyes. The holographic optical element breaks through the traditional catadioptric law and can realize large-angle unconventional catadioptric, so that the volume and the weight of the whole system are greatly reduced, and the color difference can be corrected by matching the two pieces of holographic optical elements to realize full-color display. Meanwhile, light rays in the transmission direction can be normally transmitted to enter human eyes, so that ultrathin and light binocular near-to-eye display is realized.



**CLAIM 1.** A light full-color free-form surface-volume holographic visual optical imaging device is characterized by comprising 3 optical lenses, 1 glass flat plate, 1 reflector, 2 volume holographic optical elements and 1 image display; the image signal light emitted by the image display (11) sequentially passes through a first optical lens (12), a second optical lens (13), a glass flat plate (14) and a first integral holographic optical element (15), wherein when the light enters the first integral holographic optical element through the glass flat plate (14), the incidence angle does not meet the incidence relation of the first integral holographic optical element; the light is reflected to the first volume holographic optical element (15) through the reflector (16), the incidence angle of the light at the moment meets the incidence relation designed by the first volume holographic optical element, the light is reflected to the third optical lens (17) through the first volume holographic optical element (15), and is transmitted to the second volume holographic optical element (18) through the third optical lens (17), the incidence relation designed by the second volume holographic optical element is met when the light is incident to the second volume holographic optical element, and the light is finally reflected to the human eye through the second volume holographic optical element (18); ambient light is transmitted through the spectacle lens (19) and the second volume hologram optical element (18) and then enters the human eye, and when the ambient light enters the second volume hologram optical element, the incident angle does not satisfy the incidence relation of the second volume hologram optical element.

N8200

CN113433788

Priority Date: 09/07/2021

GUANGXI ZHONGGUANGYING PHOTOELECTRIC

### FRONT PROJECTION TRANSPARENT HOLOGRAPHIC PROJECTION SCREEN

A positive-projection transparent holographic projection screen is characterized by comprising a first transparent substrate layer, a light dispersion layer, a high-transmittance refraction layer, a fluorescence brightening layer, a high-transmittance reflection layer and a second transparent substrate layer which are sequentially arranged, wherein the light dispersion layer is used for dispersing incident light and emergent light; the high-transmittance refraction layer is used for refracting light; the fluorescent crystal and the light guide agent are arranged in the fluorescent brightening layer, and the fluorescent crystal is used for generating fluorescence by excitation so as to increase the screen brightness; the high-transmittance and reflection layer is used for reflecting the light rays passing through the fluorescence brightening layer back to the fluorescence brightening layer to excite the fluorescence crystal; the second transparent substrate layer is transparent. The front projection transparent holographic projection screen of the invention presents a high transparency state when no projection light or strong light irradiates, and presents a high reflection capability when projection light enters, and the transparency is reduced to display a clear projection picture, so that the front projection transparent holographic projection screen can meet different scene requirements, improve the application range and has strong practicability.

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

**N8151**

**EP3889992**

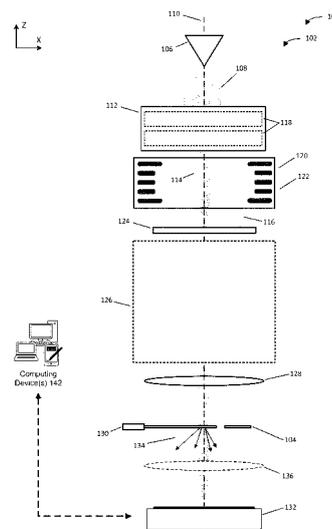
**FEI**

Priority Date: 30/03/2020

**ELECTRON DIFFRACTION HOLOGRAPHY**

Methods for using electron diffraction holography to investigate a sample, according to the present disclosure include the initial steps of emitting a plurality of electrons toward the sample, forming the plurality of electrons into a first electron beam and a second electron beam, and modifying the focal properties of at least one of the two beams such that the two beams have different focal planes. Once the two beams have different focal planes, the methods include focusing the first electron beam such that it has a focal plane at or near the sample, and focusing the second electron beam so that it is incident on the sample, and has a focal plane in the diffraction plane. An interference pattern of the first electron beam and the diffracted second electron beam is then detected in the diffraction plane, and then used to generate a diffraction holograph.

**CLAIM 1 .** A method for using electron holography to investigate a sample, the method comprising emitting a plurality of electrons toward the sample; forming the plurality of electrons into a first electron beam and a second electron beam; modifying the focal properties of at least one of the first electron beam and the second electron beam such that the two electron beams have different focal planes; focusing the first electron beam such that it has a focal plane at or near the sample; focusing the second electron beam so that it is incident on the sample, and has a focal plane in the diffraction plane; detecting an interference pattern of the first electron beam and the diffracted second electron beam in the diffraction plane; determining an exit wave function of the exit wave resultant from the second electron beam being incident on the sample; and determining the structure of the sample based on the exit wave function.



**N8172**

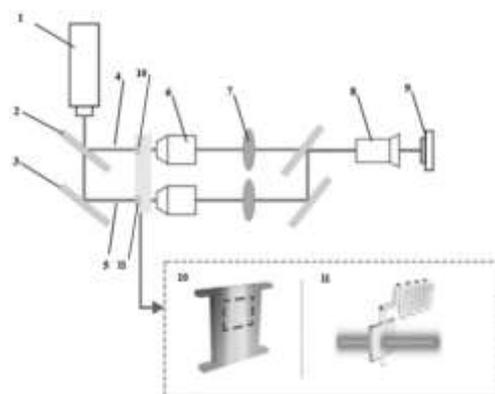
**CN214277898U**

**CHINA UNIVERSITY OF GEOSCIENCES WUHAN**

Priority Date: 21/10/2020

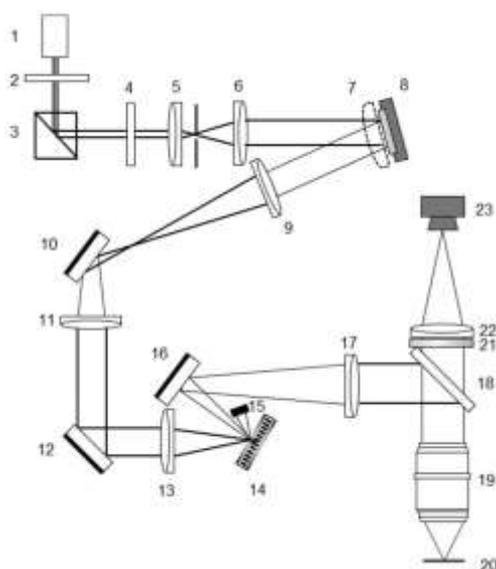
**THERMAL FLUID DYNAMICS MEASURING DEVICE BASED ON DIGITAL HOLOGRAPHIC MICROSCOPY**

The utility model provides a hot fluid dynamics measuring device based on digital holographic microtechnology, the device includes: the device comprises an interference device, an imaging system, a fluid control system, a phase shifter and a chip to be tested. Wherein the interference device comprises: a continuous laser spectroscopy, a high-reflection mirror, an objective lens, a biconvex lens and an eyepiece; the imaging system includes: the device comprises an area array CCD, a collection card and a computer; the fluid control system is realized by a double-channel injection pump; the phase shifter consists of a snake-shaped micro mixer and a phase shifting chamber, and the micro mixer is used for adjusting the concentration of fluid in the phase shifting chamber to change the refractive index so as to realize the adjustment of phase shifting; the phase shifter and the chip to be tested are made by inverse molding PDMS on a silicon chip. The utility model discloses a micro-fluidic phase shift element integrate, and preparation simple process, theory of operation is reliable, has simplified the phase shift operation, has reduced operating cost, and this measurement system possesses no mark, integrated nature, stability simultaneously, can accomplish advantages such as transient state measurement.



**UNIFORM HOLOGRAPHIC TWO-PHOTON MICROSCOPE SYSTEM BASED ON SPACE-TIME FOCUSING**

The invention discloses a space-time focusing-based uniform holographic two-photon microscope system. The laser outputs line polarized femtosecond laser, the power and the polarization direction of the laser are adjusted by a half-wave plate and a polarization beam splitter to achieve the maximum modulation efficiency, the laser passes through an orthogonal column lens and then is obliquely incident on a reflective liquid crystal spatial light modulator, an orthogonal column lens group is arranged close to the liquid crystal spatial light modulator in parallel, the light beam after phase modulation enters a space-time focusing module through a group of relay 4F lenses formed by a second achromatic lens and a third achromatic lens, and the laser after dispersion compensation output by the space-time focusing module is reflected by a dichroic mirror and then focused on an experimental sample by an objective lens. The method basically eliminates the phase singularity in the holographic phase diagram loaded to the liquid crystal spatial light modulator, finally obtains the uniform holographic beam with high axial resolution and no speckle noise, and has the advantages of wide application range, strong compatibility, high excitation efficiency and the like.



**CLAIM 1.** A homogeneous holographic two-photon microscope system based on space-time focusing is characterized in that: the device comprises a femtosecond laser (1), a half-wave plate (2), a polarization beam splitter (3), a focusing mirror (4), a pinhole (5), a first achromatic lens (6), an orthogonal cylindrical lens (7), a liquid crystal spatial light modulator (8), a second achromatic lens (9), a first reflector (10), a third achromatic lens (11), a second reflector (12), a fourth achromatic lens (13), a reflective blazed grating (14), a third reflector (16), a fifth achromatic lens (17), a dichroic mirror (18), an objective lens (19), a light filter (21), a tube lens (22) and a camera (23); the femtosecond laser device (1) emits femtosecond laser beams, the femtosecond laser beams enter a polarization beam splitter (3) to be reflected after passing through a half-wave plate (2), reflected beams of the polarization beam splitter (3) sequentially pass through a focusing mirror (4), a pinhole (5) and a first achromatic lens (6) and then enter a reflective liquid crystal spatial light modulator (8) through an orthogonal cylindrical lens (7) to be subjected to phase modulation, the orthogonal cylindrical lens (7) is arranged in front of the liquid crystal spatial light modulator (8), the reflected modulated beams of the liquid crystal spatial light modulator (8) are transmitted through the orthogonal cylindrical lens (7) and then sequentially pass through a second achromatic lens (9) and a first reflector (10) to be reflected, the reflected beams of the first reflector (10) are reflected through a third achromatic lens (11) and a second reflector (12), and the reflected beams of the second reflector (12) pass through a fourth achromatic lens (13), The reflective blazed grating (14) is reflected, a reflected beam of the reflective blazed grating (14) is reflected by a third reflecting mirror (16), transmitted by a fifth achromatic lens (17) and then incident to a dichroic mirror (18) for reflection, a holographic beam generated by the reflected beam of the dichroic mirror (18) after passing through an objective lens (19) is irradiated to an experimental sample (20), fluorescence excited by the holographic beam of the experimental sample (20) is reversely reflected by the objective lens (19) and returns to the dichroic mirror (18) for transmission, and a transmitted beam of the dichroic mirror (18) sequentially passes through a filter (21) and a tube lens (22) and then is incident to a camera (23).

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

## N8138

**WO2021205292**

**ARTINESS**

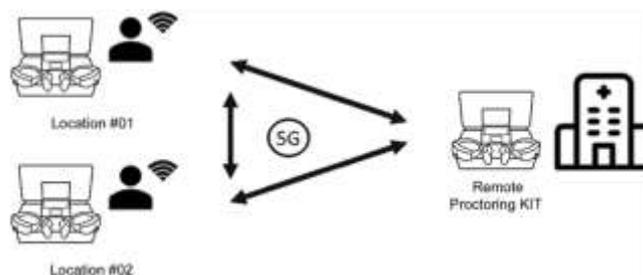
Priority Date: 06/04/2020

### REAL-TIME MEDICAL DEVICE TRACKING METHOD FROM ECHOCARDIOGRAPHIC IMAGES FOR REMOTE HOLOGRAPHIC PROCTORING

The present invention concerns a method for visualizing, by a remote holographic device (112), a medical image stream acquired at an intervention site, the method comprising the execution of the following steps: A. Acquiring a medical image stream of a patient body organ by a medical acquisition apparatus (101), wherein a medical device is inserted in the patient body organ during an intervention; B. Streaming (102) the medical image stream to a virtual machine on a server (105); C. Identifying, by an expert algorithm (107) on the sole basis of the image stream, running on said virtual machine, the digital position and orientation of the medical device and at least two digital anatomical landmarks on at least a subset of images in the image stream; D. Generating a graphical element representing the digital position and orientation of the medical device, and overlaying the graphical element to said a subset of images, obtaining an overlaid image stream; E. Reformatting (108) the overlaid image stream into a video signal; and F. Sending the video signal to the remote holographic device (112) for visualization.

### PROCÉDÉ DE SUIVI DE DISPOSITIF MÉDICAL EN TEMPS RÉEL À PARTIR D'IMAGES ÉCHOCARDIOGRAPHIQUES POUR LA SURVEILLANCE HOLOGRAPHIQUE À DISTANCE

La présente invention concerne un procédé de visualisation, par un dispositif holographique distant (112), d'un flux d'images médicales acquis au niveau d'un site d'intervention, le procédé comprenant l'exécution des étapes suivantes, consistant à : A. acquérir un flux d'images médicales d'un organe corporel de patient par un appareil médical d'acquisition (101), un dispositif médical étant inséré dans l'organe corporel du patient pendant une intervention ; B. diffuser en continu (102) le flux d'images médicales à une machine virtuelle sur un serveur (105) ; C) identifier, par un algorithme expert (107) sur la seule base flux d'images, s'exécutant sur ladite machine virtuelle, la position et l'orientation numériques du dispositif médical et d'au moins deux points de repère anatomiques numériques sur au moins un sous-ensemble d'images dans le flux d'images ; D. générer un élément graphique représentant la position et l'orientation numériques du dispositif médical et superposer l'élément graphique audit sous-ensemble d'images, ce qui permet d'obtenir un flux d'images superposé ; E. reformater (108) le flux d'images superposé en un signal vidéo ; et F. envoyer le signal vidéo au dispositif holographique distant (112) pour une visualisation.



**CLAIM 1.** Method for visualizing, by a remote holographic device (112), a medical image stream acquired at an intervention site, the method comprising the execution of the following steps: A. Acquiring a medical image stream of a patient body organ by a medical acquisition apparatus (101), wherein a medical device is inserted in the patient body organ during an intervention; B. Streaming (102) the medical image stream to a virtual machine on a server (105); C. Identifying, by an expert algorithm (107) on the sole basis of the image stream, running on said virtual machine, the digital position and orientation of the medical device and at least two digital anatomical landmarks on at least a subset of images in the image stream; D. Generating a graphical element representing the digital position and orientation of the medical device, and overlaying the graphical element to said a subset of images, obtaining an overlaid image stream; E. Reformatting (108) the overlaid image stream into a video signal; and F. Sending the video signal to the remote holographic device (112) for visualization.

N8165

CN214311313U

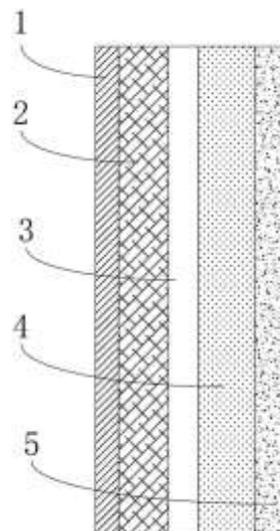
Priority Date: 15/01/2021

SINO SINGAPORE INTERNATIONAL JOINT RESEARCH INSTITUTE

### MULTIPURPOSE ENERGY-SAVING HOLOGRAPHIC FILM, HOLOGRAPHIC GLASS AND HOLOGRAPHIC PROJECTION DEVICE

The utility model provides a holographic membrane of multipurpose energy-conserving, including substrate layer, adaptive modulation layer and holographic display layer, the substrate layer for holographic display layer and adaptive modulation layer set up in the outside, holographic display layer with the range upon range of setting of adaptive modulation layer, holographic display layer or adaptive modulation layer hugs closely the substrate layer, holographic display layer has energy-conserving and holographic function of showing, and its visible light transmissivity is greater than 80%, adaptive modulation layer's transparency can change. The embodiment of the utility model provides an energy-conserving holographic membrane of multipurpose and holographic glass and holographic projection arrangement have better outdoor projection effect.

**CLAIM 1.** The multipurpose energy-saving holographic film is characterized by comprising a substrate layer, a self-adaptive modulation layer and a holographic display layer, wherein the substrate layer is arranged on the outer side relative to the holographic display layer and the self-adaptive modulation layer, the holographic display layer and the self-adaptive modulation layer are arranged in a laminated mode, the holographic display layer or the self-adaptive modulation layer is tightly attached to the substrate layer, the visible light transmittance of the holographic display layer is larger than 80%, and the transparency of the self-adaptive modulation layer can be changed.



N8175

CN113514802

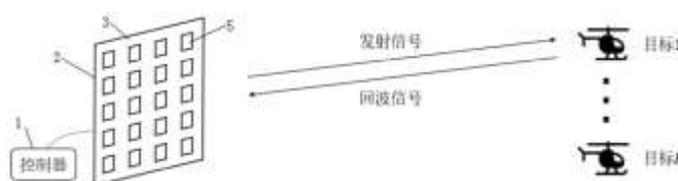
Priority Date: 15/07/2021

HANGZHOU FEIFEI TECHNOLOGY

### MILLIMETER WAVE RADAR AND DETECTION METHOD BASED ON RECONFIGURABLE HOLOGRAPHIC SUPER SURFACE

The invention relates to a millimeter wave radar and a detection method based on a reconfigurable holographic super surface, wherein the millimeter wave radar comprises the following components: a controller and a reconfigurable holographic super surface; the RHS comprises a parallel plate waveguide, N feed sources and M metamaterial radiation units with liquid crystals, wherein the N feed source arrays and the M metamaterial radiation units are arranged on the parallel plate waveguide, and the controller is connected with the liquid crystals and the feed sources respectively;

the controller is used for controlling the bias voltage of the liquid crystal to adjust the amplitude of the electromagnetic wave of the metamaterial radiation unit; receiving echo signals returned after the transmitted signals meet all targets by using a metamaterial radiation unit; the controller is used to optimize and determine the radar detection results. The millimeter wave radar is constructed based on the aid of the RHS, so that the detection performance of the radar is maximized. In addition, the RHS can achieve a dynamic multi-beam control effect by adopting an electric control mode, is particularly suitable for multi-target radar detection, and effectively reduces the cost of the millimeter wave radar.



**CLAIM 1.** A millimeter-wave radar based on a reconfigurable holographic hypersurface, comprising: a controller and a reconfigurable holographic super surface RHS; the RHS comprises a parallel plate waveguide, N feed sources and M metamaterial radiation units with liquid crystals, wherein the N feed sources are arranged on the parallel plate waveguide, the M metamaterial radiation units are arranged on the parallel plate waveguide, M and N are positive integers larger than 1, and M is larger than N; the controller is respectively connected with the liquid crystals and the feed sources; the feed source is used for sending electromagnetic waves; the parallel plate waveguide is used for transmitting the electromagnetic wave in the form of surface wave to the metamaterial radiation unit; the controller is used for controlling the bias voltage of the liquid crystal so as to adjust the amplitude of the electromagnetic wave of each metamaterial radiation unit; the controller is further used for optimizing and determining a radar detection result; the metamaterial radiation unit is used for sending emission signals to each target; the transmitting signal is electromagnetic wave with changed amplitude; the metamaterial radiation unit is also used for receiving echo signals returned after the emission signals meet all targets and sending the echo signals to the parallel plate waveguide, so that the parallel plate waveguide sends the returned echo signals to the controller through the feed source.

**N8176**

**CN113506335**

Priority Date: 01/06/2021

**TSINGHUA UNIVERSITY**

### **REAL-TIME HUMAN BODY HOLOGRAPHIC RECONSTRUCTION METHOD AND DEVICE BASED ON MULTIPLE RGBD CAMERAS**

The application provides a real-time human body holographic reconstruction method and device based on multiple RGBD cameras and computer equipment. The specific implementation scheme is as follows: pre-training a three-dimensional reconstruction neural network based on pixel alignment characteristics, collecting a multi-view scene color depth image, extracting a multi-view color depth image foreground, extracting a feature image of the multi-view color depth image, uniformly sampling a reconstruction space, calculating a projection symbol distance function value, screening effective sampling points, calculating multi-view image characteristics of the sampling points, fusing the multi-view characteristics, reasoning a symbol distance function by using a symbol distance regression network, extracting a three-dimensional reasoning model surface from the sampling points, and using the vertex color of a color regression network model to complete holographic reconstruction. The method and the device can improve the holographic reconstruction speed, improve the network generalization performance and further improve the quality and accuracy of holographic reconstruction.

**CLAIM 1.** A real-time human body holographic reconstruction method based on multiple RGBD cameras is characterized by comprising the following steps: rendering multi-viewpoint training data according to a human body scanning data set, and pre-training a three-dimensional reconstruction neural network based on pixel alignment characteristics according to the multi-viewpoint training data, wherein the three-dimensional reconstruction neural network comprises an RGBD image characteristic extraction neural network, a symbol distance function regression neural network and a color regression network; acquiring a collected multi-view scene color depth image, and extracting a multi-view color depth image foreground in the multi-view scene color depth image; performing feature extraction on the multi-viewpoint color depth image according to the RGBD image feature extraction neural network to obtain a feature image of the multi-viewpoint color depth image; uniformly sampling the reconstruction space, calculating a projection symbol distance function value, and screening effective sampling points according to the projection symbol distance function value; calculating multi-viewpoint image characteristics of sampling points, and performing multi-viewpoint characteristic fusion; inputting the multi-viewpoint characteristic image obtained after fusion into the symbolic distance function regression neural network to obtain the symbolic distance function values of all effective sampling points; and extracting a complete three-dimensional model surface from the sampling points, and performing model vertex color reasoning on the complete three-dimensional model surface according to the color regression network to complete holographic reconstruction.

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**N8180**

**CN113498107**

Priority Date: 19/03/2020

**DATANG MOBILE COMMUNICATIONS EQUIPMENT**

### **HOLOGRAPHIC IMAGE TRANSMISSION METHOD, DEVICE AND SYSTEM**

The application discloses a holographic image transmission method, a holographic image transmission device and a holographic image transmission system, which are used for realizing the transmission of holographic images through a mobile communication network. The application provides a holographic image transmission method, which comprises the following steps: receiving a holographic image transmission request message sent by a first terminal, and determining a target base station according to the request message, wherein the coverage area of the target base station comprises a target object for acquiring holographic image data; informing the target base station to determine the position information of the target object, so that the target base station realizes the acquisition of holographic image data according to the position information of the target object; and receiving the holographic image data sent by the target base station, and realizing holographic image projection according to the position information of the first terminal.

**CLAIM 1.** A method for transmitting a hologram, the method comprising: receiving a holographic image transmission request message sent by a first terminal, and determining a target base station according to the request message, wherein the coverage area of the target base station comprises a target object for acquiring holographic image data; informing the target base station to determine the position information of the target object, so that the target base station realizes the acquisition of holographic image data according to the position information of the target object; and receiving the holographic image data sent by the target base station, and realizing holographic image projection according to the position information of the first terminal.

N8181

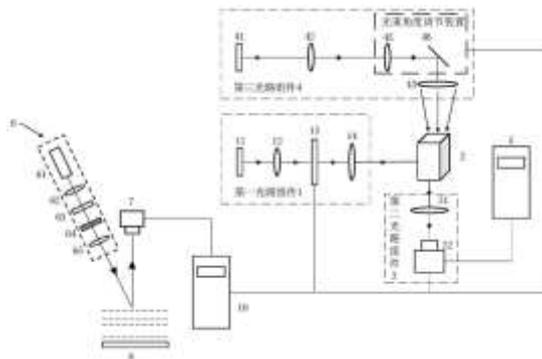
CN113485082

Priority Date: 09/08/2021

FENGRUI LINGCHUANG ZHUHAI TECHNOLOGY

### THREE-DIMENSIONAL DETECTION SYSTEM, METHOD, CONTROLLER AND MEDIUM BASED ON VOLUME HOLOGRAPHY

The invention is used in the field of industrial detection, relates to the field of semiconductors, and discloses a three-dimensional detection system, a method, a controller and a medium based on volume holography, wherein the three-dimensional detection system based on volume holography comprises a speckle image generation system, a volume holography optical correlator and a target detection system, and the speckle image generation system is used for acquiring a three-dimensional target speckle image of a three-dimensional target detection object; the volume holographic optical correlator is used for storing a plurality of speckle template images with different depths, and carrying out volume holographic correlation operation on the three-dimensional target speckle image according to the speckle template images so as to output a volume holographic correlation image of the three-dimensional target detection object; the target detection system is used for carrying out three-dimensional detection on the volume holographic correlation image of the three-dimensional target speckle image; according to the invention, the volume holographic technology is utilized to complete the related operation of the three-dimensional target image with huge information content, and the complex operation process can be instantly completed in an optical mode, so that the operation cost is reduced, and the three-dimensional detection efficiency of the semiconductor is further improved.



The invention is used in the field of industrial detection, relates to the field of semiconductors, and discloses a three-dimensional detection system, a method, a controller and a medium based on volume holography, wherein the three-dimensional detection system based on volume holography comprises a speckle image generation system, a volume holography optical correlator and a target detection system, and the speckle image generation system is used for acquiring a three-dimensional target speckle image of a three-dimensional target detection object; the volume holographic optical correlator is used for storing a plurality of speckle template images with different depths, and carrying out volume holographic correlation operation on the three-dimensional target speckle image according to the speckle template images so as to output a volume holographic correlation image of the three-dimensional target detection object; the target detection system is used for carrying out three-dimensional detection on the volume holographic correlation image of the three-dimensional target speckle image; according to the invention, the volume holographic technology is utilized to complete the related operation of the three-dimensional target image with huge information content, and the complex operation process can be instantly completed in an optical mode, so that the operation cost is reduced, and the three-dimensional detection efficiency of the semiconductor is further improved.

**CLAIM 1.** A volume hologram based three-dimensional detection system, comprising: the speckle image generating system is used for acquiring a three-dimensional target speckle image of a three-dimensional target detection object; the volume holographic optical correlator is used for storing a plurality of speckle template images with different depths and carrying out volume holographic correlation operation on the three-dimensional target speckle image according to the speckle template images so as to output a volume holographic correlation image of the three-dimensional target detection object; and the target detection system is used for carrying out three-dimensional detection on the volume holographic correlation image of the three-dimensional target speckle image.

N8184

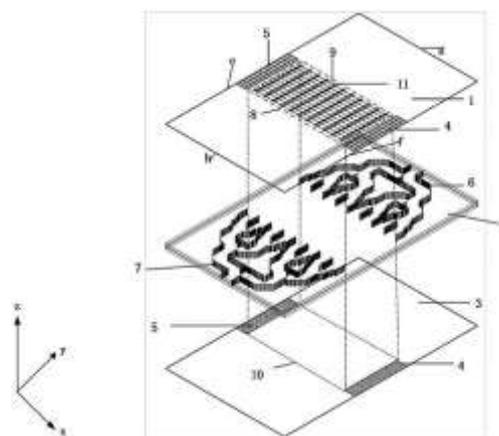
CN113471716

Priority Date: 06/09/2021

COMBA NETWORK SYSTEMS - SOUTH CHINA UNIVERSITY OF TECHNOLOGY

### HOLOGRAPHIC ANTENNA, CONTROL METHOD, COMPUTER DEVICE, AND STORAGE MEDIUM

The application relates to a holographic antenna, a control method, a computer device and a storage medium. The holographic antenna comprises a first dielectric plate, a first metal plate and a second metal plate, wherein the first metal plate and the second metal plate are respectively attached to a first surface and a second surface of the first dielectric plate; the first electromagnetic band gap array and the second electromagnetic band gap array which are symmetrical on each plate form a first artificial magnetic surface and a second artificial magnetic surface respectively; a cavity structure is formed between the first metal plate and the second metal plate by the first power divider and the second power divider integrated on the first medium plate, and the first artificial magnetic surface and the second artificial magnetic surface; the first metal plate is provided with a slot array positioned on one surface of the cavity structure. The first artificial magnetic surface and the second artificial magnetic surface are used for converting TE waves generated by the first power divider and the second power divider between the first metal plate and the second metal plate into quasi-TEM waves in the cavity structure. The slot array is used to control the radiation of quasi-TEM waves within the cavity structure. The holographic antenna can reduce the complexity of the antenna structure.



The first artificial magnetic surface and the second artificial magnetic surface are used for converting TE waves generated by the first power divider and the second power divider between the first metal plate and the second metal plate into quasi-TEM waves in the cavity structure. The slot array is used to control the radiation of quasi-TEM waves within the cavity structure. The holographic antenna can reduce the complexity of the antenna structure.

**N8185**

**CN113470173**

*Priority Date: 22/07/2021*

**SHENZHEN UNITED IMAGING HEALTHCARE DATA SERVICE**

### **HOLOGRAPHIC DIGITAL HUMAN BODY MODELING METHOD AND DEVICE**

The invention discloses a holographic digital human body modeling method, which comprises the following steps: acquiring body surface information of a human body, and establishing a three-dimensional model outer surface of the human body according to the body surface information; acquiring system three-dimensional image information of a human body: establishing a corresponding system three-dimensional model according to the system three-dimensional image information: and combining the three-dimensional model of the system and the outer surface of the three-dimensional model at the corresponding positions to obtain the holographic digital human body model. The invention generates the holographic digital human body model which accords with each individual human body, performs 3D visualization on each examination and inspection data of the human body, is convenient to obtain the change information of each part of each organ according to a time axis, and is convenient to rapidly determine the disease focus in the diagnosis process. In addition, in the medical teaching process, the human body models which are normal or have various different diseases can be directly generated, and the visual mode is adopted for teaching, so that the problem of scarce standard resources in medical teaching is effectively solved.

**CLAIM 1.** A holographic digital human body modeling method is characterized by comprising the following steps: acquiring body surface information of a human body, and establishing a three-dimensional model outer surface of the human body according to the body surface information; acquiring system three-dimensional image information of the human body: wherein the system three-dimensional image information comprises at least one of the following: three-dimensional image information of a vascular system, three-dimensional image information of a nervous system, three-dimensional image information of an internal organ system, three-dimensional image information of a skeletal system and three-dimensional image information of a muscular system; establishing a corresponding system three-dimensional model according to the system three-dimensional image information: wherein the system three-dimensional model comprises at least one of: a three-dimensional model of a vascular system, a three-dimensional model of a nervous system, a three-dimensional model of an internal organ system, a three-dimensional model of a skeletal system and a three-dimensional model of a muscular system; and combining the three-dimensional model of the system and the outer surface of the three-dimensional model at corresponding positions to obtain the holographic digital human body model.

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**N8194**

**CN113448233**

*Priority Date: 13/07/2021*

**ANHUI UNIVERSITY**

### **UNDER-SAMPLING HOLOGRAM COMPRESSION HOLOGRAPHIC MULTI-SCALE SELF-FOCUSING RECONSTRUCTION METHOD AND SYSTEM**

The invention discloses an under-sampling hologram compression holographic multi-scale self-focusing reconstruction method and a system, belonging to the technical field of digital holography, comprising the steps of respectively carrying out down-sampling operation on holograms generated by irradiating different positions of an object in an optical structure by a light source to obtain down-sampling holograms at different positions; reconstructing the down-sampling holograms at different positions based on a CS algorithm to obtain amplitude images at different positions; estimating the position of a focal plane according to amplitude images at different positions by adopting an evaluation method of a characteristic value self-focusing algorithm; and reconstructing the down-sampled hologram at the position of the focusing plane based on the TwinT algorithm. The invention provides an EIG-AF-CS self-focusing algorithm for realizing self-focusing under the condition of undersampling, combines the EIG-AF-CS self-focusing algorithm with compression reconstruction without twin images, and effectively overcomes the problems of twin image interference and lack of self-focusing capability in the traditional compression holographic reconstruction while ensuring the reconstruction quality.

**CLAIM 1.** An under-sampled hologram compression holographic multi-scale self-focusing reconstruction method is characterized by comprising the following steps: carrying out down-sampling operation on the hologram generated by the object through the illumination of the light source to obtain a down-sampling hologram; and reconstructing the down-sampling hologram based on a TwinST algorithm to obtain a reconstruction result.

N8197

CN113447244

Priority Date: 22/05/2021

XIDIAN UNIVERSITY

### ADJUSTABLE SINGLE-MODE VORTEX LIGHT BEAM ORBIT ANGULAR MOMENTUM DETECTION METHOD BASED ON HOLOGRAPHIC GRATING

The invention belongs to the technical field of optics, and discloses a holographic-grating-based adjustable single-mode vortex beam orbit angular momentum detection method, wherein a continuous phase function  $\phi(x)$  of a one-dimensional holographic grating is obtained according to the theory based on the optimal beam splitting theory proposed by Romero and Dickey; the continuous phase function  $\phi(x)$  of the one-dimensional holographic grating is popularized to two dimensions  $\phi(x, y)$ ; the feasibility of one-dimensional holographic grating and two-dimensional holographic grating is realized by software programming; and (4) verifying the theoretical simulation result based on the SLM in combination with the experiment to determine the feasibility of the method. The invention adopts a numerical simulation and experimental demonstration mode, embodies the holographic grating with adjustable intensity and position distribution based on the SLM in a mathematical form, and provides a simple demonstration experiment to achieve the detection of the orbital angular momentum of the single-mode vortex beam.

**CLAIM 1.** The method for detecting the orbital angular momentum of the adjustable single-mode vortex light beam based on the holographic grating is characterized by comprising the following steps of: based on the optimal beam splitting theory proposed by Romero and Dickey, obtaining a continuous phase function  $\phi(x)$  of the one-dimensional holographic grating according to the theory; the continuous phase function  $\phi(x)$  of the one-dimensional holographic grating is popularized to two dimensions  $\phi(x, y)$ ; the feasibility of one-dimensional holographic grating and two-dimensional holographic grating is realized by software programming; and (4) verifying the theoretical simulation result based on the SLM in combination with the experiment to determine the feasibility of the method.

N8199

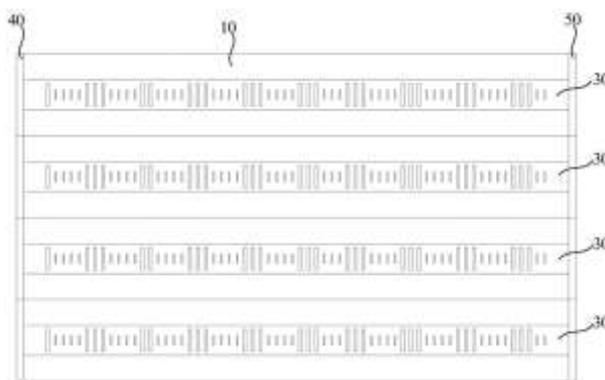
CN113437492

Priority Date: 22/06/2021

COMBA NETWORK SYSTEMS

### COMMUNICATION DEVICE, MILLIMETER WAVE HOLOGRAPHIC ANTENNA AND MANUFACTURING METHOD THEREOF

The invention relates to a communication device, a millimeter wave holographic antenna and a manufacturing method thereof. One end of the medium substrate is provided with an excitation port, and the other end of the medium substrate is provided with a load port. A plurality of setting areas which are sequentially spaced are defined on the microstrip line along the extending direction of the microstrip line. Wherein, a plurality of first gap openings are correspondingly arranged in a part of the arrangement area. The length direction of the first slot opening is vertical to the extension direction of the microstrip line. When an excitation signal is applied to the excitation port, the first slot openings on the microstrip line can generate excitation, so that the first slot openings are equivalent to a plurality of first unit antennas, the excitation at the first slot openings can be mutually superposed, namely, the radiation patterns of the first unit antennas are superposed, a specified high-gain pattern can be formed, the wide bandwidth and the low profile can be realized, and the production process is simpler.



**CLAIM 1.** A millimeter-wave holographic antenna, comprising: the microstrip line comprises a dielectric substrate, a grounding layer and a microstrip line, wherein one end of the dielectric substrate is provided with an excitation port, the other end of the dielectric substrate is provided with a load port, the grounding layer is arranged on one side surface of the dielectric substrate, the microstrip line is arranged on the other side surface of the dielectric substrate, two ends of the microstrip line are respectively and electrically connected with the excitation port and the load port correspondingly, a plurality of sequentially spaced arrangement areas are defined on the microstrip line along the extension direction of the microstrip line, a plurality of first slot openings are arranged in one-to-one correspondence in one part of the arrangement areas, and the length direction of the first slot openings is perpendicular to the extension direction of the microstrip line.

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**HOLOGRAMS - 18 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="#">P34023</a>	US	20210323338	21/10/2021	ITW - ILLINOIS TOOL WORKS	US	17/04/2020	US202000011693	US20210323338 WO2021211601	EMBOSSED FILM ASSEMBLY HAVING PASTEL HOLOGRAPHIC SECURITY FEATURES	
<a href="#">P34038</a>	KR	20210114743	24/09/2021	BIOSMART	KR	11/03/2020	KR202000030269	KR20210114743	METHOD FOR MANUFACTURING DEPOSITION HOLOGRAM CARD	
<a href="#">P34044</a>	JP	2021163166	11/10/2021	DAI NIPPON PRINTING	JP	31/03/2020	JP202000063728	JP2021163166	PROGRAM, AUTHENTICITY DETERMINATION METHOD, AND AUTHENTICITY DETERMINATION APPARATUS	
<a href="#">P34050</a>	JP	2021154636	07/10/2021	DAI NIPPON PRINTING	JP	27/03/2020	JP202000058162	JP2021154636	METHOD FOR PRODUCING PRINTED PRODUCT AND HEAT TRANSFER PRINTING APPARATUS	
<a href="#">P34060</a>	JP	2021146550	27/09/2021	DAI NIPPON PRINTING	JP	17/03/2020	JP202000047029	JP2021146550	INFORMATION RECORDING MATERIAL AND PRINTED MATERIAL PROVIDED WITH INFORMATION RECORDING MATERIAL	
<a href="#">P34073</a>	EP	3896529	20/10/2021	KAUNAS UNIVERSITY OF TECHNOLOGY	EP	13/04/2020	EP202000169233	US20210318621 EP3896529 EP3896529	FABRICATION METHOD OF HOLOGRAPHIC SECURITY LABEL	
<a href="#">P34076</a>	EP	3888929	06/10/2021	NWM RESEARCH SP K - NWM RESEARCH SPOLKA Z OGRANICZONA ODPOWIEDZIALNOSCIA SPOLKA KOMANDYTOWA	EP	31/03/2020	EP2020000461524	EP3888929 WO2021197692	A METHOD OF MANUFACTURING A DISCRETIZED OPTICAL SECURITY MICROSTRUCTURE ON A SUBSTRATE AND A SHIM FOR USE IN THE METHOD	
<a href="#">P34086</a>	CN	214401213	15/10/2021	SHANGHAI SHUNHO NEW MAT TECHNOLOGY	CN	09/11/2020	CN2020002566630	CN214401213U	TRANSFER PAPER FOR POSITIONING TRANSVERSE CUTTING	
<a href="#">P34087</a>	CN	214396044	15/10/2021	FOSHAN SAIHE FILM TECHNOLOGY	CN	20/10/2020	CN2020002346873	CN214396044U	TRANSFER BASE FILM BASED ON PET MATERIAL	
<a href="#">P34092</a>	CN	214336160	01/10/2021	SHANDONG TAIBAO INFORMATION TECHNOLOGY GROUP	CN	31/03/2021	CN2021000662214	CN214336160U	HOLOGRAPHIC RAINBOW LASER SECRET TYPE ANTI-COUNTERFEITING MARK	
<a href="#">P34093</a>	CN	214336159	01/10/2021	SHANDONG TAIBAO INFORMATION TECHNOLOGY GROUP	CN	31/03/2021	CN2021000662213	CN214336159U	LASER CONCEALED ANTI-FAKE MARK	
<a href="#">P34094</a>	CN	214336158	01/10/2021	SHANDONG TAIBAO INFORMATION TECHNOLOGY GROUP	CN	31/03/2021	CN2021000655578	CN214336158U	ANTI-FAKE CARD WITH OPENED VERIFICATION INFORMATION	
<a href="#">P34097</a>	CN	214336149	01/10/2021	HUBEI GEDIAN DEVELOPMENT REGION CHENGUANG INDUSTRIAL	CN	09/03/2021	CN2021000501121	CN214336149U	HOLOGRAPHIC ANTI-COUNTERFEIT LABEL WITH HIDDEN CODED INFORMATION	
<a href="#">P34098</a>	CN	214335765	01/10/2021	HUBEI GEDIAN DEVELOPMENT REGION CHENGUANG INDUSTRIAL	CN	09/03/2021	CN2021000505353	CN214335765U	LASER TWO-DIMENSIONAL CODE PREVENTS TAKING OFF SAFETY SIGN	
<a href="#">P34099</a>	CN	214324589	01/10/2021	SHANGHAI SECURITY PRINTING	CN	29/12/2020	CN2020003245967	CN214324589U	HOLOGRAPHIC ANTI-COUNTERFEITING MARK HIGH-PRECISION POSITIONING HOT STAMPING DEVICE	
<a href="#">P34109</a>	CN	113512364	19/10/2021	CHUZHOU JQDK NEW MAT	CN	26/04/2021	CN2021000454485	CN113512364	EB (ELECTRON BEAM) CURING OPTICAL COLOR-CHANGING HOLOGRAPHIC ANTI-COUNTERFEITING COMPOSITE FILM GLUE	
<a href="#">P34113</a>	CN	113480948	08/10/2021	ZHEJIANG CHUNYU PACKAGING MATERIAL	CN	02/07/2021	CN2021000752570	CN113480948	ANTI-COUNTERFEITING STRUCTURE, HOLOGRAPHIC THERMOPRINT ANTI-COUNTERFEITING FILM AND PREPARATION METHOD THEREOF	
<a href="#">P34120</a>	CN	113442627	28/09/2021	ANHUI SHUNTONG PACKAGING MATERIAL	CN	05/07/2021	CN2021000758072	CN113442627	LASER HOLOGRAPHIC ANTI-COUNTERFEITING FILM AND PREPARATION METHOD THEREOF	

**VARIOUS OPTICAL EFFECTS - 14 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="#">P34007</a>	WO	2021206163	14/10/2021	TOPPAN PRINTING	JP	10/04/2020	JP202000070966	WO2021206163	COLOR DISPLAY BODY, AUTHENTICATION MEDIUM, AND AUTHENTICITY DETERMINATION METHOD OF COLOR DISPLAY BODY	
<a href="#">P34009</a>	WO	2021204844	14/10/2021	SICPA	EP	07/04/2020	EP2020000168421	WO2021204844	AN OPTICAL ELEMENT AND A METHOD OF VISUALLY AUTHENTICATING AN OBJECT	

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**VARIOUS OPTICAL EFFECTS - 14 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="#">P34028</a>	NL	1043549	08/09/2021	RONALD RENE TEN VELDEN	NL	17/01/2020	NL2020001043549	NL1043549	METHOD FOR GENERATING AN EMBEDDED COLOUR IMAGE WITHIN A SYNTHETIC (POLYMER) DATA CARRYING DOCUMENT USING LASER	
<a href="#">P34034</a>	KR	20210119088	05/10/2021	YINGKUSIDA	KR	24/03/2020	KR2020000035518	CN113442618 KR20210119088	PHOTONIC CRYSTAL COLOR PRINTING METHOD AND PHOTONIC CRYSTAL COLOR PRINTED MATTER	
<a href="#">P34035</a>	KR	20210116766	28/09/2021	BIOSMART	KR	13/03/2020	KR2020000031365	KR20210116766	PLASTIC SHEET FOR REALIZING SURFACE PATTERN OF CARD BY REFRACTION OF LIGHT AND METHOD FOR MANUFACTURING THE SAME	
<a href="#">P34041</a>	JP	2021166378	14/10/2021	NATIONAL PRINTING BUREAU	JP	03/03/2021	JP2021000033153	JP2021166378	METHOD FOR READING LATENT IMAGE OF PRINTED MATERIAL, LATENT IMAGE READING APPARATUS, AND LATENT IMAGE READING SOFTWARE	Micro lens
<a href="#">P34047</a>	JP	2021157079	07/10/2021	TOPPAN PRINTING	JP	27/03/2020	JP2020000057984	JP2021157079	SECURITY LABEL	
<a href="#">P34051</a>	JP	2021154598	07/10/2021	NATIONAL PRINTING BUREAU	JP	27/03/2020	JP2020000057001	JP2021154598	LATENT IMAGE PRINTED MATERIAL	Micro lens
<a href="#">P34055</a>	JP	2021151700	30/09/2021	TOPPAN PRINTING	JP	16/03/2020	JP2020000044917	JP2021151700	TRANSFER FOIL	
<a href="#">P34057</a>	JP	2021148815	27/09/2021	TOPPAN PRINTING	JP	16/03/2020	JP2020000045111	JP2021148815	DISPLAY	
<a href="#">P34061</a>	JP	2021146530	27/09/2021	NATIONAL PRINTING BUREAU	JP	17/03/2020	JP2020000046150	JP2021146530	LATENT IMAGE PRINTED MATERIAL	
<a href="#">P34072</a>	IN	201921053264	24/09/2021	PATEL SHILPAN PRAVINCHANDRA	IN	20/03/2020	IN2019021053264	IN201921053264	COLOURSHIFT PIGMENTS USING LIQUID CRYSTAL TECHNOLOGY AND METHOD OF MAKING THE SAME	Passport
<a href="#">P34104</a>	CN	214310953	28/09/2021	SHENZHEN CICADA POLYMER TECHNOLOGY - SHENZHEN KECHUANG ANTI COUNTERFEITING TECHNOLOGY DEVELOPMENT	CN	19/03/2021	CN2021000570967	CN214310953U	MICRO-LENS ARRAY FILM	Micro lens
<a href="#">P34122</a>	CN	113436525	24/09/2021	GUANGZHOU HUADU LIANHUA PACKING MATERIAL	CN	24/05/2021	CN2021000568386	CN113436525	LIGHT ANGLE COLOR-CHANGING ANTI-COUNTERFEITING SEAL PAPER AND PREPARATION PROCESS AND APPLICATION THEREOF	

**NON SECURITY HOLOGRAMS - 63 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="#">N8138</a>	WO	2021205292	14/10/2021	ARTINESS	IT	06/04/2020	IT2020000007252	WO2021205292	REAL-TIME MEDICAL DEVICE TRACKING METHOD FROM ECHOCARDIOGRAPHIC IMAGES FOR REMOTE HOLOGRAPHIC PROCTORING	
<a href="#">N8139</a>	WO	2021198944	07/10/2021	SABOOWALA, ABDUL BASIT	IN	31/03/2020	IN2020021004356	WO2021198944	A SYSTEM AND A METHOD TO GENERATE AND SIMULATE 3D HOLOGRAPHIC CONTENTS	
<a href="#">N8140</a>	WO	2021198482	07/10/2021	TECHNOLOGICAL UNIVERSITY DUBLIN	GB	03/04/2020	GB2020000004985	WO2021198482 GB202004985	COMPOSITION FOR HOLOGRAPHIC APPLICATIONS	
<a href="#">N8141</a>	US	20210326690	21/10/2021	UNIVERSITY OF NORTH CAROLINA	US	20/04/2020	US2020000012865	US20210326690 GB202105628	HIGH-SPEED COMPUTER GENERATED HOLOGRAPHY USING CONVOLUTIONAL NEURAL NETWORKS	
<a href="#">N8142</a>	US	20210325826	21/10/2021	ELECTRONICS & TELECOMMUNICATIONS RESEARCH INSTITUTE	KR	17/04/2020	KR2020000046689	US20210325826	APPARATUS FOR DISPLAYING HOLOGRAM	
<a href="#">N8143</a>	US	20210318551	14/10/2021	HON HAI PRECISION INDUSTRY	CN	10/04/2020	CN2020000278061	US20210318551 CN113517264	DISPLAY PANEL AND HOLOGRAPHIC DISPLAY DEVICE	
<a href="#">N8144</a>	US	20210298836	30/09/2021	MEDIVIEW XR	US	26/03/2020	US2020000000408	US20210298836 WO2021195474	HOLOGRAPHIC TREATMENT ZONE MODELING AND FEEDBACK LOOP FOR SURGICAL PROCEDURES	

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NON SECURITY HOLOGRAMS - 63 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="#">N8145</a>	US	11150605	19/10/2021	FACEBOOK TECHNOLOGIES	US	22/07/2019	US2019000517850	US11150605	SYSTEMS AND METHODS FOR GENERATING HOLOGRAMS USING DEEP LEARNING	
<a href="#">N8146</a>	KR	20210122615	12/10/2021	INDUSTRY ACADEMIC COOPERATION FOUNDATION HANYANG UNIVERSITY	KR	01/04/2020	KR2020000040002	KR20210122615	HOLOGRAM VIDEO DISPLAY DEVICE AND HOLOGRAM VIDEO DISPLAY SYSTEM	
<a href="#">N8147</a>	KR	20210121950	08/10/2021	SEOUL NATIONAL UNIVERSITY R&DB FOUNDATION	KR	31/03/2020	KR2020000039433	KR20210121950	METHOD AND DEVICE FOR DENOISING A HOLOGRAPHIC DISPLAY	
<a href="#">N8148</a>	KR	20210120383	07/10/2021	LG UPLUS	KR	26/03/2020	KR2020000037027	KR20210120383	PSEUDO HOLOGRAM DISPLAY ASSEMBLY, PSEUDO HOLOGRAM DISPLAY APPARATUS HAVING THE SAME, AND METHOD FOR MANUFACTURING THE SAME	
<a href="#">N8149</a>	KR	20210118662	01/10/2021	KANG, DONG-GYUN	KR	23/03/2020	KR2020000035212	KR20210118662	RING DISPLAY NETWORK SYSTEM USING HOLOGRAMS	
<a href="#">N8150</a>	JP	2021152580	30/09/2021	HOKKAIDO UNIVERSITY - KDDI	JP	24/03/2020	JP2020000052720	JP2021152580	COMPUTER COMPOSITE HOLOGRAM GENERATION APPARATUS, METHOD, AND PROGRAM	
<a href="#">N8151</a>	EP	3889992	06/10/2021	FEI	US	30/03/2020	US2020000835129	US20210302333 EP3889992 JP2021163755 CN113466269 KR20210122111	ELECTRON DIFFRACTION HOLOGRAPHY	
<a href="#">N8152</a>	EP	3886092	29/09/2021	MICROSOFT TECHNOLOGY LICENSING	EP	26/03/2020	EP2020000165935	EP3886092 WO2021194668	HOLOGRAPHIC STORAGE	
<a href="#">N8153</a>	EP	3886091	29/09/2021	MICROSOFT TECHNOLOGY LICENSING	EP	26/03/2020	EP2020000165926	EP3886091 WO2021194669	HOLOGRAPHIC STORAGE	
<a href="#">N8154</a>	DE	102020210935	30/09/2021	TESA SCRIBOS	DE	31/08/2020	DE202010210935	DE102020210935	READ-OUT DEVICE FOR READING HOLOGRAPHICALLY STORED INFORMATION, METHOD FOR READING HOLOGRAPHICALLY STORED INFORMATION	
<a href="#">N8155</a>	CN	214425479	19/10/2021	GUANGZHOU DASQI DIGITAL TECHNOLOGY	CN	28/12/2020	CN2020003208752	CN214425479U	3D HOLOGRAPHIC DISPLAY DEVICE BASED ON CONCATENATION FORMULA	
<a href="#">N8156</a>	CN	214419919	19/10/2021	GUANGXI ZHENLONG TIANRUI COLOR PRINTING PACKAGING	CN	30/11/2020	CN2020002817985	CN214419919U	GILT VERSION THAT CAN SCALD HOLOGRAPHIC AND SCALD SMOOTH STICK GOLD SIMULTANEOUSLY	
<a href="#">N8157</a>	CN	214410790	15/10/2021	SUZHOU PANGU INFORMATION OPTICAL	CN	25/03/2021	CN2021000605909	CN214410790U	TEMPERATURE COMPENSATION DEVICE FOR HOLOGRAPHIC STORAGE	
<a href="#">N8158</a>	CN	214410578	15/10/2021	SUZHOU WEIKA HUANJING INTELLIGENT TECHNOLOGY	CN	19/01/2021	CN2021000133894	CN214410578U	HOLOGRAPHIC INTERACTIVE DISPLAY DEVICE AND SYSTEM	
<a href="#">N8159</a>	CN	214410530	15/10/2021	TANGSHAN ELECTRIC POWER SURVEY & DESIGN INSTITUTE	CN	28/02/2021	CN2021000430035	CN214410530U	HOLOGRAPHIC TABLET OF TRANSMISSION LINE	
<a href="#">N8160</a>	CN	214409570	15/10/2021	WUHAN SHENGLIAN TECHNOLOGY	CN	25/02/2021	CN2021000415847	CN214409570U	HOLOGRAPHIC PROJECTION ARRANGEMENT IS USED IN WEDDING CEREMONY BANQUET HALL	
<a href="#">N8161</a>	CN	214363089	08/10/2021	SHENZHEN XINDONG ELECTRONIC TECHNOLOGY	CN	31/12/2020	CN2020003352220	CN214363089U	HOLOGRAPHIC DISPLAY SWING GATE AND SWING GATE	
<a href="#">N8162</a>	CN	214335473	01/10/2021	SHENZHEN FORETELL INTELLIGENT VISION CONTROL	CN	28/12/2020	CN2020003234554	CN214335473U	360-DEGREE HOLOGRAPHIC IMAGING DEVICE	
<a href="#">N8163</a>	CN	214335457	01/10/2021	NANJING VOCATIONAL UNIVERSITY OF INDUSTRY TECHNOLOGY	CN	08/03/2021	CN2021000489688	CN214335457U	FOLDABLE SUSPENSION HOLOGRAPHIC PROJECTION DEVICE	
<a href="#">N8164</a>	CN	214335372	01/10/2021	NICROTEK - SOOCHOW UNIVERSITY - SVG TECHNOLOGY	CN	19/04/2021	CN2021000798178	CN214335372U	HOLOGRAPHIC WAVEGUIDE LENS AND AUGMENTED REALITY DISPLAY DEVICE	
<a href="#">N8165</a>	CN	214311313	28/09/2021	SINO SINGAPORE INTERNATIONAL JOINT RESEARCH INSTITUTE	CN	15/01/2021	CN2021000109428	CN214311313U	MULTIPURPOSE ENERGY-SAVING HOLOGRAPHIC FILM, HOLOGRAPHIC GLASS AND HOLOGRAPHIC PROJECTION DEVICE	
<a href="#">N8166</a>	CN	214311138	28/09/2021	SUO MINGXIN	CN	29/01/2021	CN2021000270954	CN214311138U	HOLOGRAPHIC IMAGING DEVICE BASED ON COMPUTER	
<a href="#">N8167</a>	CN	214310957	28/09/2021	ARTIZAN PHOTONIC CRYSTAL SHANDONG	CN	29/03/2021	CN2021000633186	CN214310957U	HOLOGRAPHIC GRATING PREPARATION SYSTEM	

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<a href="#">N8168</a>	CN	214279394	24/09/2021	SHANGHAI KERUI EXHIBITION DISPLAY ENGINEERING TECHNOLOGY	CN	29/10/2020	CN2020002448902	CN214279394U	HOLOGRAPHIC INTERACTION SYSTEM INTERACTING WITH ENTITY	
<a href="#">N8169</a>	CN	214278644	24/09/2021	SUO MINGXIN	CN	20/01/2021	CN2021000154476	CN214278644U	ANTI-LIGHT HIGH-ALTITUDE HOLOGRAPHIC IMAGING DEVICE	
<a href="#">N8170</a>	CN	214278643	24/09/2021	HANGZHOU GUANGLI TECHNOLOGY	CN	29/01/2021	CN2021000253630	CN214278643U	PORTABLE HOLOGRAPHIC RECORDING AND IMAGING ASSEMBLY	
<a href="#">N8171</a>	CN	214278622	24/09/2021	SHANGHAI CHENGYI PACKAGE TECHNOLOGY	CN	19/02/2021	CN2021000376535	CN214278622U	HOLOGRAPHIC PROJECTION DEVICE	
<a href="#">N8172</a>	CN	214277898	24/09/2021	CHINA UNIVERSITY OF GEOSCIENCES WUHAN	CN	21/10/2020	CN2020002365356	CN214277898U	THERMAL FLUID DYNAMICS MEASURING DEVICE BASED ON DIGITAL HOLOGRAPHIC MICROSCOPY	
<a href="#">N8173</a>	CN	214267232	24/09/2021	FUNAN COUNTY TIANYI CRAFTS	CN	30/12/2020	CN2020003333084	CN214267232U	HOLOGRAPHIC IMAGE GLASS CRYSTAL BALL	
<a href="#">N8174</a>	CN	113517896	19/10/2021	HUAZHONG UNIVERSITY OF SCIENCE & TECHNOLOGY	CN	08/07/2021	CN2021000771818	CN113517896	ENCODING/DECODING METHOD, APPARATUS AND SYSTEM FOR PHASE MODULATION TYPE HOLOGRAPHIC MEMORY SYSTEM	
<a href="#">N8175</a>	CN	113514802	19/10/2021	HANGZHOU FEIFEI TECHNOLOGY	CN	15/07/2021	CN2021000800748	CN113514802	MILLIMETER WAVE RADAR AND DETECTION METHOD BASED ON RECONFIGURABLE HOLOGRAPHIC SUPER SURFACE	
<a href="#">N8176</a>	CN	113506335	15/10/2021	TSINGHUA UNIVERSITY	CN	01/06/2021	CN2021000610788	CN113506335	REAL-TIME HUMAN BODY HOLOGRAPHIC RECONSTRUCTION METHOD AND DEVICE BASED ON MULTIPLE RGBD CAMERAS	
<a href="#">N8177</a>	CN	113505616	15/10/2021	BEIJING BAIDU NETCOM SCIENCE & TECHNOLOGY	CN	25/05/2021	CN2021000572126	CN113505616	HOLOGRAPHIC PROJECTION SYSTEM, HOLOGRAPHIC PROJECTION PICTURE PROCESSING METHOD AND RELATED DEVICE	
<a href="#">N8178</a>	CN	113504717	15/10/2021	ZHEJIANG UNIVERSITY	CN	09/07/2021	CN2021000776834	CN113504717	UNIFORM HOLOGRAPHIC TWO-PHOTON MICROSCOPE SYSTEM BASED ON SPACE-TIME FOCUSING	
<a href="#">N8179</a>	CN	113503433	15/10/2021	WANG XIAOCUI - LI LINGJIE	CN	30/06/2021	CN2021000738360	CN113503433	HOLOGRAPHIC PROJECTOR	
<a href="#">N8180</a>	CN	113498107	12/10/2021	DATANG MOBILE COMMUNICATIONS EQUIPMENT	CN	19/03/2020	CN2020000195293	CN113498107	HOLOGRAPHIC IMAGE TRANSMISSION METHOD, DEVICE AND SYSTEM	
<a href="#">N8181</a>	CN	113485082	08/10/2021	FENGRUI LINGCHUANG ZHUHAI TECHNOLOGY	CN	09/08/2021	CN2021000910486	CN113485082	THREE-DIMENSIONAL DETECTION SYSTEM, METHOD, CONTROLLER AND MEDIUM BASED ON VOLUME HOLOGRAPHY	
<a href="#">N8182</a>	CN	113485081	08/10/2021	BEIHANG UNIVERSITY OF AERONAUTICS & ASTRONAUTICS	CN	09/07/2021	CN2021000777222	CN113485081	NON-CASCADE OPTICAL SCANNING HOLOGRAPHIC MULTI-IMAGE PARALLEL ENCRYPTION METHOD	
<a href="#">N8183</a>	CN	113483601	08/10/2021	XIAMEN HAIPAI INVESTMENT & MANAGEMENT	CN	30/06/2021	CN2021000741914	CN113483601	HOLOGRAPHIC DIFFRACTION SIGHTING TELESCOPE	
<a href="#">N8184</a>	CN	113471716	01/10/2021	COMBA NETWORK SYSTEMS - SOUTH CHINA UNIVERSITY OF TECHNOLOGY	CN	06/09/2021	CN2021001035447	CN113471716	HOLOGRAPHIC ANTENNA, CONTROL METHOD, COMPUTER DEVICE, AND STORAGE MEDIUM	
<a href="#">N8185</a>	CN	113470173	01/10/2021	SHENZHEN UNITED IMAGING HEALTHCARE DATA SERVICE	CN	22/07/2021	CN2021000830968	CN113470173	HOLOGRAPHIC DIGITAL HUMAN BODY MODELING METHOD AND DEVICE	
<a href="#">N8186</a>	CN	113468554	01/10/2021	BEIJING UNIVERSITY OF TECHNOLOGY	CN	02/06/2021	CN2021000613902	CN113468554	HIGH-FIDELITY HOLOGRAPHIC ORBITAL ANGULAR MOMENTUM COMMUNICATION METHOD BASED ON DEEP LEARNING	
<a href="#">N8187</a>	CN	113467612	01/10/2021	SHENZHEN REALIS MULTIMEDIA TECHNOLOGY	CN	17/06/2021	CN2021000674975	CN113467612	INTERACTION METHOD AND DEVICE APPLIED TO HOLOGRAPHIC SAND TABLE BASED ON UE4	
<a href="#">N8188</a>	CN	113467214	01/10/2021	BEIJING DITING HORIZON CULTURE TECHNOLOGY	CN	01/07/2021	CN2021000745927	CN113467214	HOLOGRAPHIC IMAGING DEVICE AND IMAGING METHOD THEREOF	
<a href="#">N8189</a>	CN	113467213	01/10/2021	BEIJING DITING HORIZON CULTURE TECHNOLOGY	CN	01/07/2021	CN2021000744441	CN113467213	HOLOGRAPHIC IMAGING STRUCTURE AND STAGE EQUIPMENT	
<a href="#">N8190</a>	CN	113467212	01/10/2021	BEIJING DITING HORIZON CULTURE TECHNOLOGY	CN	01/07/2021	CN2021000744420	CN113467212	HOLOGRAPHIC IMAGING STRUCTURE AND STAGE FACILITY	

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<a href="#">N8191</a>	CN	113467211	01/10/2021	ZHEJIANG UNIVERSITY	CN	24/06/2021	CN2021000703230	CN113467211	HOLOGRAPHIC ENCODING METHOD BASED ON GRADIENT REDUCTION OF SPECTRAL LOSS FUNCTION	
<a href="#">N8192</a>	CN	113467210	01/10/2021	ANHUI UNIVERSITY	CN	22/06/2021	CN2021000692359	CN113467210	MULTI-DIMENSIONAL SPACE-TIME OPTICAL FIELD COMPRESSION HOLOGRAPHIC ENCRYPTION DEVICE AND METHOD	
<a href="#">N8193</a>	CN	113448234	28/09/2021	BEIHANG UNIVERSITY OF AERONAUTICS & ASTRONAUTICS	CN	19/07/2021	CN2021000812111	CN113448234	HOLOGRAPHIC 3D DISPLAY SYSTEM BASED ON VIRTUAL ARRAY SPLICING OF SPATIAL LIGHT MODULATOR	
<a href="#">N8194</a>	CN	113448233	28/09/2021	ANHUI UNIVERSITY	CN	13/07/2021	CN2021000790766	CN113448233	UNDER-SAMPLING HOLOGRAM COMPRESSION HOLOGRAPHIC MULTI-SCALE SELF-FOCUSING RECONSTRUCTION METHOD AND SYSTEM	
<a href="#">N8195</a>	CN	113448232	28/09/2021	HARBIN UNIVERSITY OF SCIENCE & TECHNOLOGY	CN	06/07/2021	CN2021000761139	CN113448232	MEASUREMENT MATRIX DIMENSION REDUCTION METHOD FOR THREE-DIMENSIONAL LAYERED TARGET COMPRESSION HOLOGRAPHY	
<a href="#">N8196</a>	CN	113448098	28/09/2021	ZHEJIANG UNIVERSITY	CN	16/06/2021	CN2021000663579	CN113448098	LIGHT FULL-COLOR FREE CURVED SURFACE-VOLUME HOLOGRAPHIC VISUAL OPTICAL IMAGING DEVICE AND NEAR-TO-EYE DISPLAY SYSTEM THEREOF	
<a href="#">N8197</a>	CN	113447244	28/09/2021	XIDIAN UNIVERSITY	CN	22/05/2021	CN2021000561408	CN113447244	ADJUSTABLE SINGLE-MODE VORTEX LIGHT BEAM ORBIT ANGULAR MOMENTUM DETECTION METHOD BASED ON HOLOGRAPHIC GRATING	
<a href="#">N8198</a>	CN	113442568	28/09/2021	ZHONGSHAN JINHAI PACKAGING TECHNOLOGY	CN	19/07/2021	CN2021000812510	CN113442568	HOLOGRAPHIC LASER PAPER PRODUCTION CONTROL DEVICE	
<a href="#">N8199</a>	CN	113437492	24/09/2021	COMBA NETWORK SYSTEMS	CN	22/06/2021	CN2021000690253	CN113437492	COMMUNICATION DEVICE, MILLIMETER WAVE HOLOGRAPHIC ANTENNA AND MANUFACTURING METHOD THEREOF	
<a href="#">N8200</a>	CN	113433788	24/09/2021	GUANGXI ZHONGGUANGYING PHOTOELECTRIC	CN	09/07/2021	CN2021000776795	CN113433788	FRONT PROJECTION TRANSPARENT HOLOGRAPHIC PROJECTION SCREEN	