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APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/372,240	08/12/2014	8801174	3373.0600001	8374

115626 7590 07/23/2014

Sterne, Kessler, Goldstein & Fox P.L.L.C.
1100 New York Avenue NW
Washington, DC 20005

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment is 0 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site http://pair.uspto.gov for additional applicants):

Charles Willey, Roanoke, VA;

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The USA offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to encourage and facilitate business investment. To learn more about why the USA is the best country in the world to develop technology, manufacture products, and grow your business, visit SelectUSA.gov.

IPR2024-01070
E-Vision Optics, LLC EX-2011

PTO/SB/08A&B (07-09)

Substitute for form 1449/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				**Application Number**	13/372,240
				Filing Date	February 13, 2012
				First Named Inventor	Charles Willey
				Art Unit	~~TBA~~ 2872
(Use as many sheets as necessary)				Examiner Name	~~TBA~~ M. Choudhury
Sheet	1	of	5	Attorney Docket Number	91904-831532(011310US)

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number Kind Code[2] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
/M.C./	AA	US-4,418,990	12/6/83	Gerber	
/M.C./	AB	US-5,742,379	4/21/98	Reifer	
/M.C./	AC	US-6,115,177	9/5/00	Vossler	
/M.C./	AD	US- 6,719,425	4/13/04	Conner	
/M.C./	AE	US-2001/0007493	7/2001	Masunaga et al.	
/M.C./	AF	US-2001/0043266	11/22/01	Robinson et al.	
/M.C./	AG	US-2002/0140899	10-2002	Blum et al.	
/M.C./	AH	US-2004/000733	1/1/04	Swab et al.	
/M.C./	AI	US-2005/0225723	10/13/05	Pilu	
/M.C./	AJ	US-2005/0237485	10/27/2005	Blum et al.	
/M.C./	AK	US-2005/0242771	11/3/2005	Blum et al.	
/M.C./	AL	US-2005/0264752	12-01-2005	Howell et al.	
/M.C./	AM	US-2005/078274	4/14/05	Howell et al.	
/M.C./	AN	US-2005/270479	12/8/05	Canavan et al.	
/M.C./	BA	US-2005/270481	12/8/05	Blum et al.	
/M.C./	BB	US-2006/023158	2/2/06	Howell et al.	
/M.C./	BC	US-2006/092340	5/4/06	Blum et al.	
/M.C./	BD	US-2006/203186	9/14/06	Ifergan	
/M.C./	BE	US-2007/0296918	12-2007	Blum et al.	
/M.C./	BF	US-2007/121061	5/31/07	Kim ~~Young~~	
/M.C./	BG	US-2007/258039	11/8/07	Duston et al.	
/M.C./	BH	US-2008/0106695	05-08-2008	Kokonaski et al.	
/M.C./	CA	US-2008/273166	11/6/08	Kokonaski	
/M.C./	CB	US-2008/316420	12 ~~10~~/25/08	Agazarova Mazal	
/M.C./	CC	US-2010/0177277	7/15/10	Kokonaski et al.	
/M.C./	CD	US-2010/0201938	8/12/10	Jackson et al.	
/M.C./	CE	US-2010/0309426	12/9/2010	Howell et al.	
/M.C./	CF	US-2930857	3/29/60	Hollingsworth	
/M.C./	CG	US-4,152,846	5/8/79	Witt	
/M.C./	CH	US-4,283,127	8/11/81	Rosenwinket et al.	

Change(s) applied to document
/C.L./
5/15/2014

Examiner Signature	/Mustak Choudhury/ (05/14/2013)	Date Considered	05/14/2013

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. [1] Applicant's unique citation designation number (optional). [2] See Kind Codes of U.S. Patent Documents at www.uspto.gov or MPEP 901.04. [3] Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). [4] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [5] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. [6] Applicant is to place a check mark here if English language Translation is attached.

64038089 v1

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /M.C./

PTO/SB/08A&B (07-09)

Substitute for form 1449/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet 2 of 5

Complete if Known	
Application Number	13/372,240
Filing Date	February 13, 2012
First Named Inventor	Charles Willey
Art Unit	TBA
Examiner Name	TBA
Attorney Docket Number	91904-831532(011310US)

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number / Number Kind Code[2] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
/M.C./	CI	US-4,756,605	07-12-1988	Okada etal.	
/M.C./	CJ	US-4,875,030	10/17/89	Chiu	
/M.C./	CK	US-4,907,860	3/13/90	Noble	
/M.C./	CL	US-4,967,268	10/30/90	Lipton et al.	
/M.C./	CM	US-4,991,258	2/12/91	Drlik	
/M.C./	CN	US-4,991,951	02-12-1991	Mizuno et al.	
/M.C./	DA	US-5,182,585	1/26/93	Stoner	
/M.C./	DB	US-5,463,428	10/31/95	Lipton et al.	
/M.C./	DC	US-5,657,107	8/12/97	Wagner et al.	
/M.C./	DD	US-5,760,869	6/2/98	Mitamura	
/M.C./	DE	US-5,764,338	6/9/98	Carol Anne Mack	
/M.C./	DF	US-5,835,185	11/10/98	Kallman et al.	
/M.C./	DG	US-6,097,450	8/1/00	Humphrey	
/M.C./	DH	US-6,336,250	1/8/02	Takeda et al.	
/M.C./	DI	US-6,582,075	6/24/03	Swab et al.	
/M.C./	DJ	US-6,595,634	07-22-2003	Pilat, Jr.	
/M.C./	DK	US-6,626,532	09-30-2003	Nishioka et al.	
/M.C./	DL	US-6,866,386	03-2005	Chen, Joy	
/M.C./	DM	US-7,009,757	3/7/06	Nishioka et al.	
/M.C./	DN	US-7,063,420	06-20-2006	Lerner et al.	
/M.C./	EA	US-7,104,645	09-12-2006	Pilat, Jr.	
/M.C./	EB	US-7,140,727	12-28-2006	Pilat, Jr. et al.	
/M.C./	EC	US-7,425,066	09-16-2008	Blum e tal.	
/M.C./	ED	US-7,784,935	8/31/10	Jackson et al.	
/M.C./	EE	US-7,813,048	10/12/2010	Lynch et al.	

Change(s) applied to document
/C.L./
5/21/2014

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]

Examiner Signature	/Mustak Choudhury/ (05/14/2013)	Date Considered	05/14/2013

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. [1] Applicant's unique citation designation number (optional). [2] See Kind Codes of U.S. Patent Documents at www.uspto.gov or MPEP 901.04. [3] Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). [4] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [5] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. [6] Applicant is to place a check mark here if English language Translation is attached.

64038089 v1

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /M.C./

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:	Confirmation No.: 8374
Charles WILLEY	Art Unit: 2872
Appln. No.: 13/372,240	Examiner: CHOUDHURY, Mustak
Filed: February 13, 2012	Atty. Docket: 3373.0600001
For: **Electronic Frames Comprising Electrical Conductors**	

Assertion of Small Entity Status under 37 C.F.R. § 1.27(c)

Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

Commissioner:

This application is entitled to small entity status and the same is respectfully asserted.

Respectfully submitted,

STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C.

Jason A. Fitzsimmons
Attorney for Applicant
Registration No. 65,367

Date: July 7, 2014

1100 New York Avenue, N.W.
Washington, D.C. 20005-3934
(202) 371-2600
1874819_1.DOCX

Electronic Patent Application Fee Transmittal

Application Number:	13372240
Filing Date:	13-Feb-2012
Title of Invention:	ELECTRONIC FRAMES COMPRISING ELECTRICAL CONDUCTORS
First Named Inventor/Applicant Name:	Charles Willey
Filer:	Jason Alan Fitzsimmons/cj .
Attorney Docket Number:	3373.0600001

Filed as Small Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Utility Appl Issue Fee	2501	1	480	480
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
Printed Copy of Patent - No Color	8001	1	3	3
		Total in USD ($)		**483**

Electronic Acknowledgement Receipt

EFS ID:	19508318
Application Number:	13372240
International Application Number:	
Confirmation Number:	8374
Title of Invention:	ELECTRONIC FRAMES COMPRISING ELECTRICAL CONDUCTORS
First Named Inventor/Applicant Name:	Charles Willey
Customer Number:	115626
Filer:	Jason Alan Fitzsimmons/cj .
Filer Authorized By:	Jason Alan Fitzsimmons
Attorney Docket Number:	3373.0600001
Receipt Date:	07-JUL-2014
Filing Date:	13-FEB-2012
Time Stamp:	17:44:18
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	$483
RAM confirmation Number	4956
Deposit Account	
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)

1		3373_0600001_issue_FEE_ASSERTION.pdf	143000 b19523b36009762c2a873843ff3ff3a6408f8adb	yes	3

Multipart Description/PDF files in .zip description		
Document Description	**Start**	**End**
Miscellaneous Incoming Letter	1	1
Issue Fee Payment (PTO-85B)	2	2
Assertion of entitlement to small entity status	3	3

Warnings:

Information:

2	Fee Worksheet (SB06)	fee-info.pdf	31947 9d479a0a763d8becad87be39883248e326871860	no	2

Warnings:

Information:

Total Files Size (in bytes):	174947

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

JASON A. FITZSIMMONS
ASSOCIATE
(202) 772-8701
JFITZSIMMONS@SKGF.COM

Sterne Kessler Goldstein Fox
ATTORNEYS AT LAW

July 7, 2014

Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

Confirmation No. 8374
Mail Stop Issue Fee

Re: Allowed U.S. Utility Patent Application
Appl. No. 13/372,240; Filed: February 13, 2012
For: **Electronic Frames Comprising Electrical Conductors**
Inventor: Charles WILLEY
Our Ref: 3373.0600001

Commissioner:

In response to the **Notice of Allowance and Fee(s) Due** dated April 10, 2014, the following documents are transmitted for appropriate action by the U.S. Patent and Trademark Office:

1. Issue Fee Transmittal (Form PTOL-85); and

2. Online Credit Card Payment Authorization for $483.00 to cover:
$480.00 - Issue Fee
$3.00 - One advance copy of patent; and

3. Assertion of Small Entity Status under 37 C.F.R. § 1.27(c).

The above-listed documents are filed electronically through EFS-Web.

Fee payment is provided through online credit card payment. The U.S. Patent and Trademark Office is hereby authorized to charge any fee deficiency, or credit any overpayment, to our Deposit Account No. 19-0036.

Respectfully submitted,
STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C.

Jason A. Fitzsimmons
Attorney for Applicant
Registration No. 65,367

JAF/cj
Enclosures
1873250_1.DOCX

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail **Mail Stop ISSUE FEE**
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

115626 7590 04/10/2014
Sterne, Kessler, Goldstein & Fox P.L.L.C.
1100 New York Avenue NW
Washington, DC 20005

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission
I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/372,240	02/13/2012	Charles Willey	3373.0600001	8374

TITLE OF INVENTION: ELECTRONIC FRAMES COMPRISING ELECTRICAL CONDUCTORS

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$960	$0	$0	$960	07/10/2014

EXAMINER	ART UNIT	CLASS-SUBCLASS
CHOUDHURY, MUSTAK	2872	351-158000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).
☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 Sterne, Kessler, Goldstein & Fox P.L.L.C.
2
3

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE: HPO Assets LLC

(B) RESIDENCE: (CITY and STATE OR COUNTRY): Farmington, CT

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:
☒ Issue Fee
☐ Publication Fee (No small entity discount permitted)
☒ Advance Order - # of Copies one (1)

4b. Payment of Fee(s): **(Please first reapply any previously paid issue fee shown above)**
☐ A check is enclosed.
☒ Payment by credit card. Form PTO-2038 is attached.
☒ The Director is hereby authorized to charge the required fee(s), any deficiency, or credits any overpayment, to Deposit Account Number 19-0036 (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)
☐ Applicant certifying micro entity status. See 37 CFR 1.29
NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.
☒ Applicant asserting small entity status. See 37 CFR 1.27
NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.
☐ Applicant changing to regular undiscounted fee status.
NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature [signature] Date July 7, 2014
Typed or printed name Jason A. Fitzsimmons Registration No. 65,367

PTO/ SB/ 85 Part B (10-13) Approved for use through 10/31/2013 OMB 0651-0033 U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

NOTICE OF ALLOWANCE AND FEE(S) DUE

115626 7590 04/10/2014
Sterne, Kessler, Goldstein & Fox P.L.L.C.
1100 New York Avenue NW
Washington, DC 20005

EXAMINER
CHOUDHURY, MUSTAK

ART UNIT	PAPER NUMBER
2872	

DATE MAILED: 04/10/2014

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/372,240	02/13/2012	Charles Willey	3373.0600001	8374

TITLE OF INVENTION: ELECTRONIC FRAMES COMPRISING ELECTRICAL CONDUCTORS

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$960	$0	$0	$960	07/10/2014

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 1/2 the amount of undiscounted fees, and micro entity fees are 1/2 the amount of small entity fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PART B - FEE(S) TRANSMITTAL

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Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885

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CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

115626 7590 04/10/2014
Sterne, Kessler, Goldstein & Fox P.L.L.C.
1100 New York Avenue NW
Washington, DC 20005

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(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/372,240	02/13/2012	Charles Willey	3373.0600001	8374

TITLE OF INVENTION: ELECTRONIC FRAMES COMPRISING ELECTRICAL CONDUCTORS

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$960	$0	$0	$960	07/10/2014

EXAMINER	ART UNIT	CLASS-SUBCLASS
CHOUDHURY, MUSTAK	2872	351-158000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).
- ❑ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
- ❑ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.
1 _____
2 _____
3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ❑ Individual ❑ Corporation or other private group entity ❑ Government

4a. The following fee(s) are submitted:
- ❑ Issue Fee
- ❑ Publication Fee (No small entity discount permitted)
- ❑ Advance Order - # of Copies _____

4b. Payment of Fee(s): **(Please first reapply any previously paid issue fee shown above)**
- ❑ A check is enclosed.
- ❑ Payment by credit card. Form PTO-2038 is attached.
- ❑ The Director is hereby authorized to charge the required fee(s), any deficiency, or credits any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)
- ❑ Applicant certifying micro entity status. See 37 CFR 1.29 — NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.
- ❑ Applicant asserting small entity status. See 37 CFR 1.27 — NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.
- ❑ Applicant changing to regular undiscounted fee status. — NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

PTOL-85 Part B (10-13) Approved for use through 10/31/2013. OMB 0651-0033 U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/372,240	02/13/2012	Charles Willey	3373.0600001	8374

115626 7590 04/10/2014

Sterne, Kessler, Goldstein & Fox P.L.L.C.
1100 New York Avenue NW
Washington, DC 20005

EXAMINER	
CHOUDHURY, MUSTAK	

ART UNIT	PAPER NUMBER
2872	

DATE MAILED: 04/10/2014

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 0 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 0 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Applicant-Initiated Interview Summary	Application No.	Applicant(s)	
	13/372,240	WILLEY, CHARLES	
	Examiner	Art Unit	
	MUSTAK CHOUDHURY	2872	

All participants (applicant, applicant's representative, PTO personnel):

(1) *MUSTAK CHOUDHURY*.

(3) *JASON A. FITZSIMMONS Red. No. 65,367* .

(2) *MOHAMMED HASAN*.

(4)_____.

Date of Interview: *24 March 2014*.

Type: ☒ Telephonic ☐ Video Conference
☐ Personal [copy given to: ☐ applicant ☐ applicant's representative]

Exhibit shown or demonstration conducted: ☐ Yes ☒ No.
If Yes, brief description: _____.

Issues Discussed ☐101 ☐112 ☐102 ☒103 ☐Others
(For each of the checked box(es) above, please describe below the issue and detailed description of the discussion)

Claim(s) discussed: *41*.

Identification of prior art discussed: *Swab et al (US 20050239502 A1)* .

Substance of Interview
(For each issue discussed, provide a detailed description and indicate if agreement was reached. Some topics may include: identification or clarification of a reference or a portion thereof, claim interpretation, proposed amendments, arguments of any applied references etc...)

Applicant clarifed the difference between the pending claim 41 and the references of record. Examiner discussed the general nature of the invention.
-Though no agreement has been made, examiners proposed after final claims amendment for further consideration .

Applicant recordation instructions: The formal written reply to the last Office action must include the substance of the interview. (See MPEP section 713.04). If a reply to the last Office action has already been filed, applicant is given a non-extendable period of the longer of one month or thirty days from this interview date, or the mailing date of this interview summary form, whichever is later, to file a statement of the substance of the interview

Examiner recordation instructions: Examiners must summarize the substance of any interview of record. A complete and proper recordation of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recordation including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.

☐ Attachment

/Scott J Sugarman/ Primary Examiner, Art Unit 2872	/MUSTAK CHOUDHURY/ Examiner, Art Unit 2872

Summary of Record of Interview Requirements

Manual of Patent Examining Procedure (MPEP), Section 713.04, Substance of Interview Must be Made of Record
A complete written statement as to the substance of any face-to-face, video conference, or telephone interview with regard to an application must be made of record in the application whether or not an agreement with the examiner was reached at the interview.

Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews
Paragraph (b)

In every instance where reconsideration is requested in view of an interview with an examiner, a complete written statement of the reasons presented at the interview as warranting favorable action must be filed by the applicant. An interview does not remove the necessity for reply to Office action as specified in §§ 1.111, 1.135. (35 U.S.C. 132)

37 CFR §1.2 Business to be transacted in writing.
All business with the Patent or Trademark Office should be transacted in writing. The personal attendance of applicants or their attorneys or agents at the Patent and Trademark Office is unnecessary. The action of the Patent and Trademark Office will be based exclusively on the written record in the Office. No attention will be paid to any alleged oral promise, stipulation, or understanding in relation to which there is disagreement or doubt.

The action of the Patent and Trademark Office cannot be based exclusively on the written record in the Office if that record is itself incomplete through the failure to record the substance of interviews.

It is the responsibility of the applicant or the attorney or agent to make the substance of an interview of record in the application file, unless the examiner indicates he or she will do so. It is the examiner's responsibility to see that such a record is made and to correct material inaccuracies which bear directly on the question of patentability.

Examiners must complete an Interview Summary Form for each interview held where a matter of substance has been discussed during the interview by checking the appropriate boxes and filling in the blanks. Discussions regarding only procedural matters, directed solely to restriction requirements for which interview recordation is otherwise provided for in Section 812.01 of the Manual of Patent Examining Procedure, or pointing out typographical errors or unreadable script in Office actions or the like, are excluded from the interview recordation procedures below. Where the substance of an interview is completely recorded in an Examiners Amendment, no separate Interview Summary Record is required.

The Interview Summary Form shall be given an appropriate Paper No., placed in the right hand portion of the file, and listed on the "Contents" section of the file wrapper. In a personal interview, a duplicate of the Form is given to the applicant (or attorney or agent) at the conclusion of the interview. In the case of a telephone or video-conference interview, the copy is mailed to the applicant's correspondence address either with or prior to the next official communication. If additional correspondence from the examiner is not likely before an allowance or if other circumstances dictate, the Form should be mailed promptly after the interview rather than with the next official communication.

The Form provides for recordation of the following information:
- Application Number (Series Code and Serial Number)
- Name of applicant
- Name of examiner
- Date of interview
- Type of interview (telephonic, video-conference, or personal)
- Name of participant(s) (applicant, attorney or agent, examiner, other PTO personnel, etc.)
- An indication whether or not an exhibit was shown or a demonstration conducted
- An identification of the specific prior art discussed
- An indication whether an agreement was reached and if so, a description of the general nature of the agreement (may be by attachment of a copy of amendments or claims agreed as being allowable). Note: Agreement as to allowability is tentative and does not restrict further action by the examiner to the contrary.
- The signature of the examiner who conducted the interview (if Form is not an attachment to a signed Office action)

It is desirable that the examiner orally remind the applicant of his or her obligation to record the substance of the interview of each case. It should be noted, however, that the Interview Summary Form will not normally be considered a complete and proper recordation of the interview unless it includes, or is supplemented by the applicant or the examiner to include, all of the applicable items required below concerning the substance of the interview.

A complete and proper recordation of the substance of any interview should include at least the following applicable items:
1) A brief description of the nature of any exhibit shown or any demonstration conducted,
2) an identification of the claims discussed,
3) an identification of the specific prior art discussed,
4) an identification of the principal proposed amendments of a substantive nature discussed, unless these are already described on the Interview Summary Form completed by the Examiner,
5) a brief identification of the general thrust of the principal arguments presented to the examiner,
   (The identification of arguments need not be lengthy or elaborate. A verbatim or highly detailed description of the arguments is not required. The identification of the arguments is sufficient if the general nature or thrust of the principal arguments made to the examiner can be understood in the context of the application file. Of course, the applicant may desire to emphasize and fully describe those arguments which he or she feels were or might be persuasive to the examiner.)
6) a general indication of any other pertinent matters discussed, and
7) if appropriate, the general results or outcome of the interview unless already described in the Interview Summary Form completed by the examiner.

Examiners are expected to carefully review the applicant's record of the substance of an interview. If the record is not complete and accurate, the examiner will give the applicant an extendable one month time period to correct the record.

Examiner to Check for Accuracy

If the claims are allowable for other reasons of record, the examiner should send a letter setting forth the examiner's version of the statement attributed to him or her. If the record is complete and accurate, the examiner should place the indication, "Interview Record OK" on the paper recording the substance of the interview along with the date and the examiner's initials.

Notice of Allowability	Application No. 13/372,240	Applicant(s) WILLEY, CHARLES	
	Examiner MUSTAK CHOUDHURY	Art Unit 2872	AIA (First Inventor to File) Status No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *AF amendment of 03/26/2014*.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on_____.
2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.
3. ☒ The allowed claim(s) is/are *41,43-45 and 47-61*. As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov .
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   Certified copies:

   a) ☐ All b) ☐ Some *c) ☐ None of the:
   1. ☐ Certified copies of the priority documents have been received.
   2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
   3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
4. ☒ Interview Summary (PTO-413), Paper No./Mail Date *3-24-2014* .
5. ☐ Examiner's Amendment/Comment
6. ☒ Examiner's Statement of Reasons for Allowance
7. ☐ Other _____.

DETAILED ACTION

1. The present application is being examined under the pre-AIA first to invent provisions.

Allowable Subject Matter

2. Claims 41, 43-45 and 47-61 are allowed.

3. The following is an examiner's statement of reasons for allowance: The prior art taken either singularly or in a combination fails to anticipate or fairly suggest the limitations of the independent claims, in such a manner that rejection under 35 U.S.C. 102 or 103 would be proper. The prior art fails to teach a combination of all the claimed features as presented in independent claims 41 and 57, for example wherein a first conductive path is provided from the first temple to the lens housing at least in part by the first electrical conductor; and a second electrical conductor coupled to the first temple, wherein a second conductive path is provided from the first temple to the lens housing at least in part by the second electrical conductor; wherein the first and second electrical conductors are configured to couple the electronics module to the first temple to constrain the electronics module.

4. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled “Comments on Statement of Reasons for Allowance”.

Conclusion

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MUSTAK CHOUDHURY whose telephone number is (571)272-5247. The examiner can normally be reached on Monday-Friday, 8:00AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner’s supervisor, Ricky Mack can be reached on 571-272-2333. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/MUSTAK CHOUDHURY/
Examiner, Art Unit 2872

April 2, 2014 31, 2014

/Scott J Sugarman/
Primary Examiner, Art Unit 2872

Applicant-Initiated Interview Summary	Application No.	Applicant(s)	
	13/372,240	WILLEY, CHARLES	
	Examiner	Art Unit	
	MUSTAK CHOUDHURY	2872	

All participants (applicant, applicant's representative, PTO personnel):

(1) *MUSTAK CHOUDHURY*.

(3) *JASON A. FITZSIMMONS Red. No. 65,367* .

(2) *MOHAMMED HASAN*.

(4) _____.

Date of Interview: *24 March 2014*.

Type: ☒ Telephonic ☐ Video Conference
☐ Personal [copy given to: ☐ applicant ☐ applicant's representative]

Exhibit shown or demonstration conducted: ☐ Yes ☒ No.
If Yes, brief description: _____.

Issues Discussed ☐101 ☐112 ☐102 ☒103 ☐Others
(For each of the checked box(es) above, please describe below the issue and detailed description of the discussion)

Claim(s) discussed: *41*.

Identification of prior art discussed: *Swab et al (US 20050239502 A1)* .

Substance of Interview
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☐ Attachment

/Scott J Sugarman/ Primary Examiner, Art Unit 2872	/MUSTAK CHOUDHURY/ Examiner, Art Unit 2872

Summary of Record of Interview Requirements

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- Name of applicant
- Name of examiner
- Date of interview
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- Name of participant(s) (applicant, attorney or agent, examiner, other PTO personnel, etc.)
- An indication whether or not an exhibit was shown or a demonstration conducted
- An identification of the specific prior art discussed
- An indication whether an agreement was reached and if so, a description of the general nature of the agreement (may be by attachment of a copy of amendments or claims agreed as being allowable). Note: Agreement as to allowability is tentative and does not restrict further action by the examiner to the contrary.
- The signature of the examiner who conducted the interview (if Form is not an attachment to a signed Office action)

It is desirable that the examiner orally remind the applicant of his or her obligation to record the substance of the interview of each case. It should be noted, however, that the Interview Summary Form will not normally be considered a complete and proper recordation of the interview unless it includes, or is supplemented by the applicant or the examiner to include, all of the applicable items required below concerning the substance of the interview.

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3) an identification of the specific prior art discussed,
4) an identification of the principal proposed amendments of a substantive nature discussed, unless these are already described on the Interview Summary Form completed by the Examiner,
5) a brief identification of the general thrust of the principal arguments presented to the examiner,
   (The identification of arguments need not be lengthy or elaborate. A verbatim or highly detailed description of the arguments is not required. The identification of the arguments is sufficient if the general nature or thrust of the principal arguments made to the examiner can be understood in the context of the application file. Of course, the applicant may desire to emphasize and fully describe those arguments which he or she feels were or might be persuasive to the examiner.)
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Examiner to Check for Accuracy

If the claims are allowable for other reasons of record, the examiner should send a letter setting forth the examiner's version of the statement attributed to him or her. If the record is complete and accurate, the examiner should place the indication, "Interview Record OK" on the paper recording the substance of the interview along with the date and the examiner's initials.

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13372240	WILLEY, CHARLES
	Examiner	Art Unit
	MUSTAK CHOUDHURY	2872

CPC- SEARCHED		
Symbol	Date	Examiner

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
351	158, 159.03	05/09/2013	MC
	Update EAST search	10/25/2013	MC
	Update EAST search	4/2/2014	MC

SEARCH NOTES		
Search Notes	Date	Examiner
EAST search history attached	05/14/2013	MC
Limited Keyword Search	10/25/2013	MC
Updated EAST search -- attached	10/25/2013	MC
Limited keyword search	4/2/2014	MC
Applicant Initiated Interview	3/24/2014	MC
Consulted with primary Mohammed Hasan	3/23/2014	MC

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner
	Claims interference search -- attached	4/2/2014	MC

/MUSTAK CHOUDHURY/ Examiner.Art Unit 2872	

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13372240	WILLEY, CHARLES
	Examiner	**Art Unit**
	MUSTAK CHOUDHURY	2872

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☒ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

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Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13372240	WILLEY, CHARLES
	Examiner	Art Unit
	MUSTAK CHOUDHURY	2872

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☒ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
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EAST Search History

EAST Search History (Prior Art)

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			DERWENT			
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L26	71	L6 and electric$3 near conductor and frame	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2014/04/02 14:54
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			FPRS; EPO; JPO; DERWENT			
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"5020150" | "5029216" | "5137342" |
"5159639" | "5249001" | "5260997" |
"5281957" | "5321443" | "5327178" |
"5335285" | "5353378" | "5367345" |
"5381114" | "5404385" | "5405385" |
"5406340" | "5481763" | "5483691" |
"5533130" | "5563951" | "5579400" |
"5581492").PN. OR ("5606743" |
"5608808" | "5613222" | "5617477" |
"5634201" | "5654786" | "5658502" |
"5668867" | "5680465" | "5682434" |
"5694475" | "5708724" | "5715323" |
"5717479" | "5721783" | "5737436" |
"5757929" | "5760868" | "5781272" |
"5796341" | "5805261" | "5835185" |
"5853005" | "5886822" | "5889843" |
"5892564" | "5953000" | "5953434" |
"5978689" | "5988812" | "6010216" |
"6012812" | "6013108" | "6018742" |
"6023241" | "6023372" | "6030342" |
"6057966" | "6074060" | "6091546" |
"6091832" | "6106116" | "6108197" |
"6110110" | "6126595" | "6157533" |
"6176576" | "6181956" | "6192253" |
"6204974" | "6211799" | "6212414" |
"6218958" | "6230327" | "6231181" |
"6233344" | "6233345" | "6239778" |
"6252970" | "6272359" | "6280838" |
"6285757" | "6301050" | "6301367" |
"6301593" | "6311155" | "6312811" |
"6314091" | "6325507" | "6344727" |
"6347095" | "6349001" | "6350129" |
"6351468" | "6353503" | "6356392" |
"6374177" | "6384982" | "6392798" |
"6409338" | "6417969" | "6421031" |
"6424820" | "6445805" | "6456721" |
"6483483" | "6490362" | "6510325" |
"6519475" | "6523006" | "6529804" |
"6549122" | "6560449" | "6564047" |
"6567651" | "6580405" | "6582075" |
"6618099" | "6629076" | "6639706" |
"6650894" | "6687486" | "6690807" |
"6691028" | "6717533" | "6724354" |
"6725022" | "6728531" | "6729726" |
"6731908" | "6735435" | "6763119" |
"6766182" | "6769767" | "6834192" |

		"6911172" | "6929365" | "6966647" | "7004582" | "7013009" | "7097300" | "7124425" | "7147324" | "7150526" | "7213917").PN. OR ("7216973" | "7219994" | "7231038" | "7264350" | "7278734" | "7321785" | "D130310" | "D201050" | "D207919" | "D212863" | "D228677" | "D229974" | "D292986" | "D325590" | "D392990" | "D418153" | "D426845" | "D430145" | "D435058" | "D445416" | "D462708" | "D462946" | "RE35051").PN. OR ("7461936").URPN.				
L66	27	L65 and electric$3 near conduct$3	US-PGPUB; USPAT; USOCR	OR	ON	2014/04/02 14:54
L67	1	L65 and electronic$3 near conduct$3	US-PGPUB; USPAT; USOCR	OR	ON	2014/04/02 14:54
L68	51	(("2930857") or ("2007121061") or ("2008273166") or ("2008273166") or ("20050237485") or ("6115177") or ("5742379") or ("6719425") or ("4418990") or ("20050225723") or ("2010080999") or ("5463428") or ("2008316420") or ("5764338") or ("2009081542")).PN. or (49/991951).APP.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/04/02 14:54
L69	182	(("2930857") or ("2007121061") or ("2008273166") or ("2008273166") or ("20050237485") or ("6115177") or ("5742379") or ("6719425") or ("4418990") or ("20050225723") or ("2010080999") or ("5463428") or ("2008316420") or ("5764338") or ("2009081542") or ("20110058141") or ("4,418,990") or ("5,742,379") or ("6,115,177") or ("6,719,425") or ("20010007493") or ("20010043266") or ("20020140899") or ("2004000733") or ("4,756,605") or ("4,875,030") or ("4,907,860") or ("4,967,268") or ("4,991,258") or ("4,991,951") or ("5,182,585") or ("5,463,428") or ("5,657,107") or ("5,760,869") or ("5,764,338") or ("5,835,185") or ("6,097,450") or ("6,336,250") or ("6,582,075") or ("6,595,634") or ("6,626,532") or ("6,866,386") or ("7,009,757") or ("7,063,420") or ("7,104,645") or ("7,140,727") or ("7,425,066") or ("7,784,935") or ("7,813,048") or ("20050225723") or ("20050237485") or ("20050242771") or ("20050264752") or ("2005078274") or ("2005270479") or ("2005270481") or ("2006023158") or ("2006092340") or ("2006203186") or ("20070296918") or ("2007121061") or ("2007258039") or ("2008O106695") or ("2008273166") or ("2008316420") or ("20100177277") or ("20100201938") or ("20100309426") or	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/04/02 14:54

		("2930857") or ("US-4,152,846US-4,283,127")).PN. or (49/991951).APP.				
L70	190	(("2930857") or ("2007121061") or ("2008273166") or ("2008273166") or ("20050237485") or ("6115177") or ("5742379") or ("6719425") or ("4418990") or ("20050225723") or ("2010080999") or ("5463428") or ("2008316420") or ("5764338") or ("2009081542") or ("20110058141") or ("4,418,990") or ("5,742,379") or ("6,115,177") or ("6,719,425") or ("20010007493") or ("20010043266") or ("20020140899") or ("2004000733") or ("4,756,605") or ("4,875,030") or ("4,907,860") or ("4,967,268") or ("4,991,258") or ("4,991,951") or ("5,182,585") or ("5,463,428") or ("5,657,107") or ("5,760,869") or ("5,764,338") or ("5,835,185") or ("6,097,450") or ("6,336,250") or ("6,582,075") or ("6,595,634") or ("6,626,532") or ("6,866,386") or ("7,009,757") or ("7,063,420") or ("7,104,645") or ("7,140,727") or ("7,425,066") or ("7,784,935") or ("7,813,048") or ("20050225723") or ("20050237485") or ("20050242771") or ("20050264752") or ("2005078274") or ("2005270479") or ("2005270481") or ("2006023158") or ("2006092340") or ("2006203186") or ("20070296918") or ("2007121061") or ("2007258039") or ("2008O106695") or ("2008273166") or ("2008316420") or ("20100177277") or ("20100201938") or ("20100309426") or ("2930857") or ("4,152,846") or ("4,283,127")).PN. or (49/991951).APP.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/04/02 14:54
L71	2	("20070296918").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/04/02 14:54
L72	2	("20050264752").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/04/02 14:54
L73	0	("2andelectric$3nearconductor").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/04/02 14:54
L74	76	L57 and electric$3 near conductor	US-PGPUB; USPAT;	OR	ON	2014/04/02 14:54

			USOCR; FPRS; EPO; JPO; DERWENT			
L75	0	L57 and electric$3 near conductor and elctron$3 near frame	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2014/04/02 14:54
L76	0	L57 and electric$3 near conductor and elctron$3 and frame	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2014/04/02 14:54
L77	71	L57 and electric$3 near conductor and frame	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2014/04/02 14:54
L78	71	L57 and electric$3 near conductor and frame	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2014/04/02 14:54
L79	3	("6259501").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/04/02 14:54
L80	9	("2004001178").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/04/02 14:54
L81	11	(("2007046887") or ("2007200998")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/04/02 14:54
L82	2	("20070216862").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/04/02 14:54
L83	17	(("2007046887") or ("2007200998") or	US-	OR	OFF	2014/04/02

		("20070216862") or ("2008273166") or ("5835185")).PN.	PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT			14:54
L84	190	(("2930857") or ("2007121061") or ("2008273166") or ("2008273166") or ("20050237485") or ("6115177") or ("5742379") or ("6719425") or ("4418990") or ("20050225723") or ("2010080999") or ("5463428") or ("2008316420") or ("5764338") or ("2009081542") or ("20110058141") or ("4,418,990") or ("5,742,379") or ("6,115,177") or ("6,719,425") or ("20010007493") or ("20010043266") or ("20020140899") or ("2004000733") or ("4,756,605") or ("4,875,030") or ("4,907,860") or ("4,967,268") or ("4,991,258") or ("4,991,951") or ("5,182,585") or ("5,463,428") or ("5,657,107") or ("5,760,869") or ("5,764,338") or ("5,835,185") or ("6,097,450") or ("6,336,250") or ("6,582,075") or ("6,595,634") or ("6,626,532") or ("6,866,386") or ("7,009,757") or ("7,063,420") or ("7,104,645") or ("7,140,727") or ("7,425,066") or ("7,784,935") or ("7,813,048") or ("20050225723") or ("20050237485") or ("20050242771") or ("20050264752") or ("2005078274") or ("2005270479") or ("2005270481") or ("2006023158") or ("2006092340") or ("2006203186") or ("20070296918") or ("2007121061") or ("2007258039") or ("2008O106695") or ("2008273166") or ("2008316420") or ("20100177277") or ("20100201938") or ("20100309426") or ("2930857") or ("4,152,846") or ("4,283,127")).PN. or (49/991951).APP.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/04/02 14:54
L85	2	("20080129955").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/04/02 14:54
L86	3	("20100066972").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/04/02 14:54
L87	2	("20080239452").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/04/02 14:54

L88	24	("2005/0264752").URPN.	USPAT	OR	ON	2014/04/02 14:54
L89	2	("20100271588").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/04/02 14:54
L90	3	("20110102734").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/04/02 14:54
L91	0	("2009/0201460").URPN.	USPAT	OR	ON	2014/04/02 14:54
L92	0	("2010/0066972").URPN.	USPAT	OR	ON	2014/04/02 14:54
L93	7	("2005/0159182").URPN.	USPAT	OR	ON	2014/04/02 14:54
L94	0	("2010/0177277").URPN.	USPAT	OR	ON	2014/04/02 14:54
L95	80	("3245315" | "4300818").PN. OR ("4991951").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2014/04/02 14:54
L96	2	("2008/0239452").URPN.	USPAT	OR	ON	2014/04/02 14:54
L97	3	("20080089545").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/04/02 14:54
L98	1	("2010/0271588").URPN.	USPAT	OR	ON	2014/04/02 14:54
L99	18	("2008/0089545").URPN.	USPAT	OR	ON	2014/04/02 14:54
L100	3	("2005/0239502").URPN.	USPAT	OR	ON	2014/04/02 14:54
L101	20	(charles near willey).in.	USPAT	OR	ON	2014/04/02 14:54
L102	3	("20110058141").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/04/02 14:54
L103	3	("2005/0239502").URPN.	USPAT	OR	ON	2014/04/02 14:54
L104	0	("2009/0201460").URPN.	USPAT	OR	ON	2014/04/02 14:54
L105	34804	electric$3 near conductor and frame	US-	OR	ON	2014/04/02

			PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT			14:54
L106	71	L57 and electric$3 near conductor and frame	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2014/04/02 14:54
L107	42	((Charles) near2 (Willey)).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2014/04/02 14:54
L108	2	("20140016213").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/04/02 14:54
L109	8	(("20080273166") or ("4991951") or ("20070258039")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/04/02 14:54
L110	1	(13/372240).APP.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/04/02 14:54
L111	1571	(351/158).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/04/02 14:54
L112	1687	(351/158,159.03).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/04/02 14:54
L113	50	L112 and eye near glass$3 near frame	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2014/04/02 14:54
L114	6	("2005/0248722").URPN.	USPAT	OR	ON	2014/04/02 14:54

L119	301	("1026272" | "1370806" | "20010038491" | "20020087330" | "20020098877" | "20020118825" | "20020143912" | "20020159023" | "20020169539" | "20020176330" | "20020197961" | "20030003969" | "20030022690" | "20030067585" | "20030068057" | "20030073460" | "20030162510" | "20040000733" | "20040029552" | "20040044427" | "20040048569" | "20040128399" | "20040128737" | "20040132509" | "20040136293" | "20040156012" | "20040157649" | "20040160572" | "20040160573" | "20040239874" | "20050040192" | "20050046789" | "20050046790" | "20050128431" | "20050159182" | "20050185815" | "20050201585" | "20050202857" | "20050248722" | "20060072067" | "20060132382" | "20060146277" | "20060160573" | "20060183427" | "20060197907" | "20060203183" | "20060203184" | "20070037520" | "20070046887" | "20070201000" | "20080089545" | "2424935" | "2504524" | "2688900" | "2856466" | "2882348" | "2947822" | "2999136" | "3104290" | "3119903" | "3247330" | "3371979" | "3495898" | "3536385" | "3588384" | "3665122" | "3769663" | "3809829" | "3853393" | "3883701" | "4006974" | "4149780" | "4283127" | "4294792" | "4537612" | "4550984" | "4636048" | "4683587" | "4712244" | "4773095" | "4803487" | "4806011" | "4856086" | "4882769" | "4902120" | "4904078" | "5020150" | "5029216" | "5137342" | "5159639" | "5249001" | "5260997" | "5281957" | "5321443" | "5327178" | "5335285" | "5353378" | "5367345" | "5381114" | "5404385" | "5405385" | "5406340" | "5481763" | "5483691" | "5533130" | "5563951" | "5579400" | "5581492").PN. OR ("5606743" | "5608808" | "5613222" | "5617477" | "5634201" | "5654786" | "5658502" | "5668867" | "5680465" | "5682434" | "5694475" | "5708724" | "5715323" | "5717479" | "5721783" | "5737436" | "5757929" | "5760868" | "5781272" | "5796341" | "5805261" | "5835185" | "5853005" | "5886822" | "5889843" | "5892564" | "5953000" | "5953434" | "5978689" | "5988812" | "6010216" | "6012812" | "6013108" | "6018742" | "6023241" | "6023372" | "6030342" | "6057966" | "6074060" | "6091546" | "6091832" | "6106116" | "6108197" | "6110110" | "6126595" | "6157533" | "6176576" | "6181956" | "6192253" | "6204974" | "6211799" | "6212414" | "6218958" | "6230327" | "6231181" | "6233344" | "6233345" | "6239778" |	US-PGPUB; USPAT; USOCR	OR	ON	2014/04/02 14:54

		"6252970" | "6272359" | "6280838" | "6285757" | "6301050" | "6301367" | "6301593" | "6311155" | "6312811" | "6314091" | "6325507" | "6344727" | "6347095" | "6349001" | "6350129" | "6351468" | "6353503" | "6356392" | "6374177" | "6384982" | "6392798" | "6409338" | "6417969" | "6421031" | "6424820" | "6445805" | "6456721" | "6483483" | "6490362" | "6510325" | "6519475" | "6523006" | "6529804" | "6549122" | "6560449" | "6564047" | "6567651" | "6580405" | "6582075" | "6618099" | "6629076" | "6639706" | "6650894" | "6687486" | "6690807" | "6691028" | "6717533" | "6724354" | "6725022" | "6728531" | "6729726" | "6731908" | "6735435" | "6763119" | "6766182" | "6769767" | "6834192" | "6911172" | "6929365" | "6966647" | "7004582" | "7013009" | "7097300" | "7124425" | "7147324" | "7150526" | "7213917").PN. OR ("7216973" | "7219994" | "7231038" | "7264350" | "7278734" | "7321785" | "D130310" | "D201050" | "D207919" | "D212863" | "D228677" | "D229974" | "D292986" | "D325590" | "D392990" | "D418153" | "D426845" | "D430145" | "D435058" | "D445416" | "D462708" | "D462946" | "RE35051").PN. OR ("7461936").URPN.				
L120	27	L119 and electric$3 near conduct$3	US-PGPUB; USPAT; USOCR	OR	ON	2014/04/02 14:54
L121	1	L119 and electronic$3 near conduct$3	US-PGPUB; USPAT; USOCR	OR	ON	2014/04/02 14:54
L122	51	(("2930857") or ("2007121061") or ("2008273166") or ("2008273166") or ("20050237485") or ("6115177") or ("5742379") or ("6719425") or ("4418990") or ("20050225723") or ("2010080999") or ("5463428") or ("2008316420") or ("5764338") or ("2009081542")).PN. or (49/991951).APP.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/04/02 14:54
L123	182	(("2930857") or ("2007121061") or ("2008273166") or ("2008273166") or ("20050237485") or ("6115177") or ("5742379") or ("6719425") or ("4418990") or ("20050225723") or ("2010080999") or ("5463428") or ("2008316420") or ("5764338") or ("2009081542") or ("20110058141") or ("4,418,990") or ("5,742,379") or ("6,115,177") or ("6,719,425") or ("20010007493") or ("20010043266") or ("20020140899") or ("2004000733") or ("4,756,605") or ("4,875,030") or ("4,907,860") or ("4,967,268") or ("4,991,258") or ("4,991,951") or	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/04/02 14:54

		("5,182,585") or ("5,463,428") or ("5,657,107") or ("5,760,869") or ("5,764,338") or ("5,835,185") or ("6,097,450") or ("6,336,250") or ("6,582,075") or ("6,595,634") or ("6,626,532") or ("6,866,386") or ("7,009,757") or ("7,063,420") or ("7,104,645") or ("7,140,727") or ("7,425,066") or ("7,784,935") or ("7,813,048") or ("20050225723") or ("20050237485") or ("20050242771") or ("20050264752") or ("2005078274") or ("2005270479") or ("2005270481") or ("2006023158") or ("2006092340") or ("2006203186") or ("20070296918") or ("2007121061") or ("2007258039") or ("2008O106695") or ("2008273166") or ("2008316420") or ("20100177277") or ("20100201938") or ("20100309426") or ("2930857") or ("US-4,152,846US-4,283,127")).PN. or (49/991951).APP.				
L124	190	(("2930857") or ("2007121061") or ("2008273166") or ("2008273166") or ("20050237485") or ("6115177") or ("5742379") or ("6719425") or ("4418990") or ("20050225723") or ("2010080999") or ("5463428") or ("2008316420") or ("5764338") or ("2009081542") or ("20110058141") or ("4,418,990") or ("5,742,379") or ("6,115,177") or ("6,719,425") or ("20010007493") or ("20010043266") or ("20020140899") or ("2004000733") or ("4,756,605") or ("4,875,030") or ("4,907,860") or ("4,967,268") or ("4,991,258") or ("4,991,951") or ("5,182,585") or ("5,463,428") or ("5,657,107") or ("5,760,869") or ("5,764,338") or ("5,835,185") or ("6,097,450") or ("6,336,250") or ("6,582,075") or ("6,595,634") or ("6,626,532") or ("6,866,386") or ("7,009,757") or ("7,063,420") or ("7,104,645") or ("7,140,727") or ("7,425,066") or ("7,784,935") or ("7,813,048") or ("20050225723") or ("20050237485") or ("20050242771") or ("20050264752") or ("2005078274") or ("2005270479") or ("2005270481") or ("2006023158") or ("2006092340") or ("2006203186") or ("20070296918") or ("2007121061") or ("2007258039") or ("2008O106695") or ("2008273166") or ("2008316420") or ("20100177277") or ("20100201938") or ("20100309426") or ("2930857") or ("4,152,846") or ("4,283,127")).PN. or (49/991951).APP.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/04/02 14:54
L125	2	("20070296918").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/04/02 14:54

L126	2	("20050264752").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/04/02 14:54
L127	0	("2andelectric$3nearconductor").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/04/02 14:54
L128	76	L111 and electric$3 near conductor	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2014/04/02 14:54
L129	0	L111 and electric$3 near conductor and elctron$3 near frame	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2014/04/02 14:54
L130	0	L111 and electric$3 near conductor and elctron$3 and frame	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2014/04/02 14:54
L131	71	L111 and electric$3 near conductor and frame	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2014/04/02 14:54
L132	71	L111 and electric$3 near conductor and frame	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2014/04/02 14:54
L133	3	("6259501").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/04/02 14:54
L134	9	("2004001178").PN.	US-PGPUB; USPAT; USOCR; FPRS;	OR	OFF	2014/04/02 14:54

			EPO; JPO; DERWENT			
L135	11	(("2007046887") or ("2007200998")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/04/02 14:54
L136	2	("20070216862").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/04/02 14:54
L137	17	(("2007046887") or ("2007200998") or ("20070216862") or ("2008273166") or ("5835185")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/04/02 14:54
L138	190	(("2930857") or ("2007121061") or ("2008273166") or ("2008273166") or ("20050237485") or ("6115177") or ("5742379") or ("6719425") or ("4418990") or ("20050225723") or ("2010080999") or ("5463428") or ("2008316420") or ("5764338") or ("2009081542") or ("20110058141") or ("4,418,990") or ("5,742,379") or ("6,115,177") or ("6,719,425") or ("20010007493") or ("20010043266") or ("20020140899") or ("2004000733") or ("4,756,605") or ("4,875,030") or ("4,907,860") or ("4,967,268") or ("4,991,258") or ("4,991,951") or ("5,182,585") or ("5,463,428") or ("5,657,107") or ("5,760,869") or ("5,764,338") or ("5,835,185") or ("6,097,450") or ("6,336,250") or ("6,582,075") or ("6,595,634") or ("6,626,532") or ("6,866,386") or ("7,009,757") or ("7,063,420") or ("7,104,645") or ("7,140,727") or ("7,425,066") or ("7,784,935") or ("7,813,048") or ("20050225723") or ("20050237485") or ("20050242771") or ("20050264752") or ("2005078274") or ("2005270479") or ("2005270481") or ("2006023158") or ("2006092340") or ("2006203186") or ("20070296918") or ("2007121061") or ("2007258039") or ("2008O106695") or ("2008273166") or ("2008316420") or ("20100177277") or ("20100201938") or ("20100309426") or ("2930857") or ("4,152,846") or ("4,283,127")).PN. or (49/991951).APP.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/04/02 14:54
L139	2	("20080129955").PN.	US-PGPUB; USPAT;	OR	OFF	2014/04/02 14:54

			USOCR; FPRS; EPO; JPO; DERWENT			
L140	3	("20100066972").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/04/02 14:54
L141	2	("20080239452").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/04/02 14:54
L142	24	("2005/0264752").URPN.	USPAT	OR	ON	2014/04/02 14:54
L143	2	("20100271588").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/04/02 14:54
L144	3	("20110102734").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/04/02 14:54
L145	0	("2009/0201460").URPN.	USPAT	OR	ON	2014/04/02 14:54
L146	0	("2010/0066972").URPN.	USPAT	OR	ON	2014/04/02 14:54
L147	7	("2005/0159182").URPN.	USPAT	OR	ON	2014/04/02 14:54
L148	0	("2010/0177277").URPN.	USPAT	OR	ON	2014/04/02 14:54
L149	80	("3245315" | "4300818").PN. OR ("4991951").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2014/04/02 14:54
L150	2	("2008/0239452").URPN.	USPAT	OR	ON	2014/04/02 14:54
L151	125	("2794085" | "2830132" | "2856466" | "3095483" | "3329957" | "3769663" | "3943925" | "4636866" | "4648130" | "4682363" | "4712244" | "4753514" | "4796987" | "4824233" | "4856086" | "4858248" | "4864646" | "4882769" | "4904078" | "4952024" | "5003300" | "5020150" | "5059017" | "5106179" | "5128659" | "5133596" | "5146619" | "5323189").PN. OR ("5606743").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2014/04/02 14:54
L152	3	("20080089545").PN.	US-	OR	OFF	2014/04/02

			PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT			14:54
L153	2	("20050239502").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/04/02 14:54
L154	1	("2010/0271588").URPN.	USPAT	OR	ON	2014/04/02 14:54
L155	18	("2008/0089545").URPN.	USPAT	OR	ON	2014/04/02 14:54
L156	3	("2005/0239502").URPN.	USPAT	OR	ON	2014/04/02 14:54
L157	20	(charles near willey).in.	USPAT	OR	ON	2014/04/02 14:54
L158	3	("20110058141").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/04/02 14:54
L159	3	("2005/0239502").URPN.	USPAT	OR	ON	2014/04/02 14:54
L160	0	("2009/0201460").URPN.	USPAT	OR	ON	2014/04/02 14:54
L161	1	(13/372240).APP.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/04/02 14:54
L162	1571	(351/158).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/04/02 14:54
L163	1687	(351/158,159.03).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/04/02 14:54
L164	50	L163 and eye near glass$3 near frame	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2014/04/02 14:54

L165	6	("2005/0248722").URPN.	USPAT	OR	ON	2014/04/02 14:54
L170	301	("1026272" | "1370806" | "20010038491" | "20020087330" | "20020098877" | "20020118825" | "20020143912" | "20020159023" | "20020169539" | "20020176330" | "20020197961" | "20030003969" | "20030022690" | "20030067585" | "20030068057" | "20030073460" | "20030162510" | "20040000733" | "20040029552" | "20040044427" | "20040048569" | "20040128399" | "20040128737" | "20040132509" | "20040136293" | "20040156012" | "20040157649" | "20040160572" | "20040160573" | "20040239874" | "20050040192" | "20050046789" | "20050046790" | "20050128431" | "20050159182" | "20050185815" | "20050201585" | "20050202857" | "20050248722" | "20060072067" | "20060132382" | "20060146277" | "20060160573" | "20060183427" | "20060197907" | "20060203183" | "20060203184" | "20070037520" | "20070046887" | "20070201000" | "20080089545" | "2424935" | "2504524" | "2688900" | "2856466" | "2882348" | "2947822" | "2999136" | "3104290" | "3119903" | "3247330" | "3371979" | "3495898" | "3536385" | "3588384" | "3665122" | "3769663" | "3809829" | "3853393" | "3883701" | "4006974" | "4149780" | "4283127" | "4294792" | "4537612" | "4550984" | "4636048" | "4683587" | "4712244" | "4773095" | "4803487" | "4806011" | "4856086" | "4882769" | "4902120" | "4904078" | "5020150" | "5029216" | "5137342" | "5159639" | "5249001" | "5260997" | "5281957" | "5321443" | "5327178" | "5335285" | "5353378" | "5367345" | "5381114" | "5404385" | "5405385" | "5406340" | "5481763" | "5483691" | "5533130" | "5563951" | "5579400" | "5581492").PN. OR ("5606743" | "5608808" | "5613222" | "5617477" | "5634201" | "5654786" | "5658502" | "5668867" | "5680465" | "5682434" | "5694475" | "5708724" | "5715323" | "5717479" | "5721783" | "5737436" | "5757929" | "5760868" | "5781272" | "5796341" | "5805261" | "5835185" | "5853005" | "5886822" | "5889843" | "5892564" | "5953000" | "5953434" | "5978689" | "5988812" | "6010216" | "6012812" | "6013108" | "6018742" | "6023241" | "6023372" | "6030342" | "6057966" | "6074060" | "6091546" | "6091832" | "6106116" | "6108197" | "6110110" | "6126595" | "6157533" | "6176576" | "6181956" | "6192253" | "6204974" | "6211799" | "6212414"	US-PGPUB; USPAT; USOCR	OR	ON	2014/04/02 14:54

		"6218958" | "6230327" | "6231181" | "6233344" | "6233345" | "6239778" | "6252970" | "6272359" | "6280838" | "6285757" | "6301050" | "6301367" | "6301593" | "6311155" | "6312811" | "6314091" | "6325507" | "6344727" | "6347095" | "6349001" | "6350129" | "6351468" | "6353503" | "6356392" | "6374177" | "6384982" | "6392798" | "6409338" | "6417969" | "6421031" | "6424820" | "6445805" | "6456721" | "6483483" | "6490362" | "6510325" | "6519475" | "6523006" | "6529804" | "6549122" | "6560449" | "6564047" | "6567651" | "6580405" | "6582075" | "6618099" | "6629076" | "6639706" | "6650894" | "6687486" | "6690807" | "6691028" | "6717533" | "6724354" | "6725022" | "6728531" | "6729726" | "6731908" | "6735435" | "6763119" | "6766182" | "6769767" | "6834192" | "6911172" | "6929365" | "6966647" | "7004582" | "7013009" | "7097300" | "7124425" | "7147324" | "7150526" | "7213917").PN. OR ("7216973" | "7219994" | "7231038" | "7264350" | "7278734" | "7321785" | "D130310" | "D201050" | "D207919" | "D212863" | "D228677" | "D229974" | "D292986" | "D325590" | "D392990" | "D418153" | "D426845" | "D430145" | "D435058" | "D445416" | "D462708" | "D462946" | "RE35051").PN. OR ("7461936").URPN.				
L171	27	L170 and electric$3 near conduct$3	US-PGPUB; USPAT; USOCR	OR	ON	2014/04/02 14:54
L172	1	L170 and electronic$3 near conduct$3	US-PGPUB; USPAT; USOCR	OR	ON	2014/04/02 14:54
L173	51	(("2930857") or ("2007121061") or ("2008273166") or ("2008273166") or ("20050237485") or ("6115177") or ("5742379") or ("6719425") or ("4418990") or ("20050225723") or ("2010080999") or ("5463428") or ("2008316420") or ("5764338") or ("2009081542")).PN. or (49/991951).APP.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/04/02 14:54
L174	182	(("2930857") or ("2007121061") or ("2008273166") or ("2008273166") or ("20050237485") or ("6115177") or ("5742379") or ("6719425") or ("4418990") or ("20050225723") or ("2010080999") or ("5463428") or ("2008316420") or ("5764338") or ("2009081542") or ("20110058141") or ("4,418,990") or ("5,742,379") or ("6,115,177") or ("6,719,425") or ("20010007493") or ("20010043266") or ("20020140899") or ("2004000733") or ("4,756,605") or ("4,875,030") or	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/04/02 14:54

		("4,907,860") or ("4,967,268") or ("4,991,258") or ("4,991,951") or ("5,182,585") or ("5,463,428") or ("5,657,107") or ("5,760,869") or ("5,764,338") or ("5,835,185") or ("6,097,450") or ("6,336,250") or ("6,582,075") or ("6,595,634") or ("6,626,532") or ("6,866,386") or ("7,009,757") or ("7,063,420") or ("7,104,645") or ("7,140,727") or ("7,425,066") or ("7,784,935") or ("7,813,048") or ("20050225723") or ("20050237485") or ("20050242771") or ("20050264752") or ("2005078274") or ("2005270479") or ("2005270481") or ("2006023158") or ("2006092340") or ("2006203186") or ("20070296918") or ("2007121061") or ("2007258039") or ("2008O106695") or ("2008273166") or ("2008316420") or ("20100177277") or ("20100201938") or ("20100309426") or ("2930857") or ("US-4,152,846US-4,283,127")).PN. or (49/991951).APP.				
L175	190	(("2930857") or ("2007121061") or ("2008273166") or ("2008273166") or ("20050237485") or ("6115177") or ("5742379") or ("6719425") or ("4418990") or ("20050225723") or ("2010080999") or ("5463428") or ("2008316420") or ("5764338") or ("2009081542") or ("20110058141") or ("4,418,990") or ("5,742,379") or ("6,115,177") or ("6,719,425") or ("20010007493") or ("20010043266") or ("20020140899") or ("2004000733") or ("4,756,605") or ("4,875,030") or ("4,907,860") or ("4,967,268") or ("4,991,258") or ("4,991,951") or ("5,182,585") or ("5,463,428") or ("5,657,107") or ("5,760,869") or ("5,764,338") or ("5,835,185") or ("6,097,450") or ("6,336,250") or ("6,582,075") or ("6,595,634") or ("6,626,532") or ("6,866,386") or ("7,009,757") or ("7,063,420") or ("7,104,645") or ("7,140,727") or ("7,425,066") or ("7,784,935") or ("7,813,048") or ("20050225723") or ("20050237485") or ("20050242771") or ("20050264752") or ("2005078274") or ("2005270479") or ("2005270481") or ("2006023158") or ("2006092340") or ("2006203186") or ("20070296918") or ("2007121061") or ("2007258039") or ("2008O106695") or ("2008273166") or ("2008316420") or ("20100177277") or ("20100201938") or ("20100309426") or ("2930857") or ("4,152,846") or ("4,283,127")).PN. or (49/991951).APP.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/04/02 14:54
L176	2	("20070296918").PN.	US-PGPUB; USPAT; USOCR; FPRS;	OR	OFF	2014/04/02 14:54

			EPO; JPO; DERWENT			
L177	2	("20050264752").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/04/02 14:54
L178	0	("2andelectric$3nearconductor").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/04/02 14:54
L179	76	L162 and electric$3 near conductor	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2014/04/02 14:54
L180	0	L162 and electric$3 near conductor and elctron$3 near frame	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2014/04/02 14:54
L181	0	L162 and electric$3 near conductor and elctron$3 and frame	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2014/04/02 14:54
L182	71	L162 and electric$3 near conductor and frame	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2014/04/02 14:54
L183	71	L162 and electric$3 near conductor and frame	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2014/04/02 14:54
L184	3	("6259501").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/04/02 14:54
L185	9	("2004001178").PN.	US-PGPUB; USPAT;	OR	OFF	2014/04/02 14:54

			USOCR; FPRS; EPO; JPO; DERWENT			
L186	11	(("2007046887") or ("2007200998")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/04/02 14:54
L187	2	("20070216862").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/04/02 14:54
L188	17	(("2007046887") or ("2007200998") or ("20070216862") or ("2008273166") or ("5835185")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/04/02 14:54
L189	190	(("2930857") or ("2007121061") or ("2008273166") or ("2008273166") or ("20050237485") or ("6115177") or ("5742379") or ("6719425") or ("4418990") or ("20050225723") or ("2010080999") or ("5463428") or ("2008316420") or ("5764338") or ("2009081542") or ("20110058141") or ("4,418,990") or ("5,742,379") or ("6,115,177") or ("6,719,425") or ("20010007493") or ("20010043266") or ("20020140899") or ("2004000733") or ("4,756,605") or ("4,875,030") or ("4,907,860") or ("4,967,268") or ("4,991,258") or ("4,991,951") or ("5,182,585") or ("5,463,428") or ("5,657,107") or ("5,760,869") or ("5,764,338") or ("5,835,185") or ("6,097,450") or ("6,336,250") or ("6,582,075") or ("6,595,634") or ("6,626,532") or ("6,866,386") or ("7,009,757") or ("7,063,420") or ("7,104,645") or ("7,140,727") or ("7,425,066") or ("7,784,935") or ("7,813,048") or ("20050225723") or ("20050237485") or ("20050242771") or ("20050264752") or ("2005078274") or ("2005270479") or ("2005270481") or ("2006023158") or ("2006092340") or ("2006203186") or ("20070296918") or ("2007121061") or ("2007258039") or ("2008O106695") or ("2008273166") or ("2008316420") or ("20100177277") or ("20100201938") or ("20100309426") or ("2930857") or ("4,152,846") or ("4,283,127")).PN. or (49/991951).APP.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/04/02 14:54
L190	2	("20080129955").PN.	US-	OR	OFF	2014/04/02

			PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT			14:54
L191	3	("20100066972").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/04/02 14:54
L192	2	("20080239452").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/04/02 14:54
L193	24	("2005/0264752").URPN.	USPAT	OR	ON	2014/04/02 14:54
L194	2	("20100271588").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/04/02 14:54
L195	3	("20110102734").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/04/02 14:54
L196	0	("2009/0201460").URPN.	USPAT	OR	ON	2014/04/02 14:54
L197	0	("2010/0066972").URPN.	USPAT	OR	ON	2014/04/02 14:54
L198	7	("2005/0159182").URPN.	USPAT	OR	ON	2014/04/02 14:54
L199	0	("2010/0177277").URPN.	USPAT	OR	ON	2014/04/02 14:54
L200	80	("3245315" | "4300818").PN. OR ("4991951").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2014/04/02 14:54
L201	2	("2008/0239452").URPN.	USPAT	OR	ON	2014/04/02 14:54
L202	3	("20080089545").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/04/02 14:54
L203	1	("2010/0271588").URPN.	USPAT	OR	ON	2014/04/02 14:54

L204	18	("2008/0089545").URPN.	USPAT	OR	ON	2014/04/02 14:54
L205	3	("2005/0239502").URPN.	USPAT	OR	ON	2014/04/02 14:54
L206	20	(charles near willey).in.	USPAT	OR	ON	2014/04/02 14:54
L207	3	("20110058141").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/04/02 14:54
L208	3	("2005/0239502").URPN.	USPAT	OR	ON	2014/04/02 14:54
L209	0	("2009/0201460").URPN.	USPAT	OR	ON	2014/04/02 14:54
L210	34804	electric$3 near conductor and frame	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2014/04/02 14:54
L211	71	L162 and electric$3 near conductor and frame	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2014/04/02 14:54
L212	42	((Charles) near2 (Willey)).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2014/04/02 14:54
L213	2	("20140016213").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/04/02 14:54
L214	122	L111 and electric$3 near3 conduct$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2014/04/02 14:54
L215	10	L111 and (first near3 electric$3 near3 conduct$4)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2014/04/02 14:54
L216	10	L111 and (second near3 electric$3 near3 conduct$4)	US-PGPUB; USPAT; USOCR;	OR	ON	2014/04/02 14:54

			FPRS; EPO; JPO; DERWENT			
L217	9	L215 and L216	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2014/04/02 14:54
L218	1587	eye and (first near3 electric$3 near3 conduct$4)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2014/04/02 14:54
L219	1419	eye and (second near3 electric$3 near3 conduct$4)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2014/04/02 14:54
L220	20	eye and lens and temple and (second near3 electric$3 near3 conduct$4)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2014/04/02 14:54
L221	391	eye and lens and (second near3 electric$3 near3 conduct$4)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2014/04/02 14:54
L222	465	eye and lens and (first near3 electric$3 near3 conduct$4)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2014/04/02 14:54
L223	261	L221 and L222	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2014/04/02 14:54
L224	21	eye and lens and temple and (first near3 electric$3 near3 conduct$4)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2014/04/02 14:54
L225	17	L220 and L224	US-PGPUB;	OR	ON	2014/04/02 14:54

			USPAT; USOCR; FPRS; EPO; JPO; DERWENT			
L226	109	L163 and electric$3 near3 conductor	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2014/04/02 14:54
S1	1	(13/372240).APP.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/05/09 11:18
S2	1336	(351/158).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/05/09 14:52
S3	1406	(351/158,159.03).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/05/09 15:01
S4	46	S3 and eye near glass$3 near frame	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2013/05/09 15:03
S5	4	("2005/0248722").URPN.	USPAT	OR	ON	2013/05/09 15:08
S6	297	("1026272" | "1370806" | "20010038491" | "20020087330" | "20020098877" | "20020118825" | "20020143912" | "20020159023" | "20020169539" | "20020176330" | "20020197961" | "20030003969" | "20030022690" | "20030067585" | "20030068057" | "20030073460" | "20030162510" | "20040000733" | "20040029552" | "20040044427" | "20040048569" | "20040128399" | "20040128737" | "20040132509" | "20040136293" | "20040156012" | "20040157649" | "20040160572" | "20040160573" | "20040239874" | "20050040192" | "20050046789" | "20050046790" | "20050128431" | "20050159182" | "20050185815" | "20050201585" | "20050202857" | "20050248722" | "20060072067" |	US-PGPUB; USPAT; USOCR	OR	ON	2013/05/09 15:09

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| "2688900" | "2856466" | "2882348" |
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		"7004582" | "7013009" | "7097300" | "7124425" | "7147324" | "7150526" | "7213917").PN. OR ("7216973" | "7219994" | "7231038" | "7264350" | "7278734" | "7321785" | "D130310" | "D201050" | "D207919" | "D212863" | "D228677" | "D229974" | "D292986" | "D325590" | "D392990" | "D418153" | "D426845" | "D430145" | "D435058" | "D445416" | "D462708" | "D462946" | "RE35051").PN. OR ("7461936").URPN.				
S7	27	S6 and electric$3 near conduct$3	US-PGPUB; USPAT; USOCR	OR	ON	2013/05/09 15:56
S8	1	S6 and electronic$3 near conduct$3	US-PGPUB; USPAT; USOCR	OR	ON	2013/05/09 15:59
S9	39	(("2930857") or ("2007121061") or ("2008273166") or ("2008273166") or ("20050237485") or ("6115177") or ("5742379") or ("6719425") or ("4418990") or ("20050225723") or ("2010080999") or ("5463428") or ("2008316420") or ("5764338") or ("2009081542")).PN. or (49/991951).APP.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/05/09 16:14
S10	142	(("2930857") or ("2007121061") or ("2008273166") or ("2008273166") or ("20050237485") or ("6115177") or ("5742379") or ("6719425") or ("4418990") or ("20050225723") or ("2010080999") or ("5463428") or ("2008316420") or ("5764338") or ("2009081542") or ("20110058141") or ("4,418,990") or ("5,742,379") or ("6,115,177") or ("6,719,425") or ("20010007493") or ("20010043266") or ("20020140899") or ("2004000733") or ("4,756,605") or ("4,875,030") or ("4,907,860") or ("4,967,268") or ("4,991,258") or ("4,991,951") or ("5,182,585") or ("5,463,428") or ("5,657,107") or ("5,760,869") or ("5,764,338") or ("5,835,185") or ("6,097,450") or ("6,336,250") or ("6,582,075") or ("6,595,634") or ("6,626,532") or ("6,866,386") or ("7,009,757") or ("7,063,420") or ("7,104,645") or ("7,140,727") or ("7,425,066") or ("7,784,935") or ("7,813,048") or ("20050225723") or ("20050237485") or ("20050242771") or ("20050264752") or ("2005078274") or ("2005270479") or ("2005270481") or ("2006023158") or ("2006092340") or ("2006203186") or ("20070296918") or ("2007121061") or ("2007258039") or ("2008O106695") or ("2008273166") or ("2008316420") or ("20100177277") or ("20100201938") or ("20100309426") or ("2930857") or ("US-4,152,846US-	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/05/09 16:24

		4,283,127")).PN. or (49/991951).APP.				
S11	148	(("2930857") or ("2007121061") or ("2008273166") or ("2008273166") or ("20050237485") or ("6115177") or ("5742379") or ("6719425") or ("4418990") or ("20050225723") or ("2010080999") or ("5463428") or ("2008316420") or ("5764338") or ("2009081542") or ("20110058141") or ("4,418,990") or ("5,742,379") or ("6,115,177") or ("6,719,425") or ("20010007493") or ("20010043266") or ("20020140899") or ("2004000733") or ("4,756,605") or ("4,875,030") or ("4,907,860") or ("4,967,268") or ("4,991,258") or ("4,991,951") or ("5,182,585") or ("5,463,428") or ("5,657,107") or ("5,760,869") or ("5,764,338") or ("5,835,185") or ("6,097,450") or ("6,336,250") or ("6,582,075") or ("6,595,634") or ("6,626,532") or ("6,866,386") or ("7,009,757") or ("7,063,420") or ("7,104,645") or ("7,140,727") or ("7,425,066") or ("7,784,935") or ("7,813,048") or ("20050225723") or ("20050237485") or ("20050242771") or ("20050264752") or ("2005078274") or ("2005270479") or ("2005270481") or ("2006023158") or ("2006092340") or ("2006203186") or ("20070296918") or ("2007121061") or ("2007258039") or ("2008O106695") or ("2008273166") or ("2008316420") or ("20100177277") or ("20100201938") or ("20100309426") or ("2930857") or ("4,152,846") or ("4,283,127")).PN. or (49/991951).APP.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/05/09 16:24
S12	2	("20070296918").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/05/09 16:58
S13	2	("20050264752").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/05/09 17:00
S14	0	("2andelectric$3nearconductor").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/05/09 17:06
S15	64	S2 and electric$3 near conductor	US-PGPUB; USPAT; USOCR;	OR	ON	2013/05/09 17:06

			FPRS; EPO; JPO; DERWENT			
S16	0	S2 and electric$3 near conductor and elctron$3 near frame	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2013/05/09 17:07
S17	0	S2 and electric$3 near conductor and elctron$3 and frame	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2013/05/09 17:07
S18	60	S2 and electric$3 near conductor and frame	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2013/05/09 17:07
S19	60	S2 and electric$3 near conductor and frame	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2013/05/09 17:13
S20	2	("6259501").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/05/09 17:14
S21	6	("2004001178").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/05/09 17:15
S22	8	(("2007046887") or ("2007200998")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/05/09 17:16
S23	2	("20070216862").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/05/09 17:19
S24	14	(("2007046887") or ("2007200998") or ("20070216862") or ("2008273166") or	US-PGPUB;	OR	OFF	2013/05/09 17:33

		("5835185")).PN.	USPAT; USOCR; FPRS; EPO; JPO; DERWENT			
S25	148	(("2930857") or ("2007121061") or ("2008273166") or ("2008273166") or ("20050237485") or ("6115177") or ("5742379") or ("6719425") or ("4418990") or ("20050225723") or ("2010080999") or ("5463428") or ("2008316420") or ("5764338") or ("2009081542") or ("20110058141") or ("4,418,990") or ("5,742,379") or ("6,115,177") or ("6,719,425") or ("20010007493") or ("20010043266") or ("20020140899") or ("2004000733") or ("4,756,605") or ("4,875,030") or ("4,907,860") or ("4,967,268") or ("4,991,258") or ("4,991,951") or ("5,182,585") or ("5,463,428") or ("5,657,107") or ("5,760,869") or ("5,764,338") or ("5,835,185") or ("6,097,450") or ("6,336,250") or ("6,582,075") or ("6,595,634") or ("6,626,532") or ("6,866,386") or ("7,009,757") or ("7,063,420") or ("7,104,645") or ("7,140,727") or ("7,425,066") or ("7,784,935") or ("7,813,048") or ("20050225723") or ("20050237485") or ("20050242771") or ("20050264752") or ("2005078274") or ("2005270479") or ("2005270481") or ("2006023158") or ("2006092340") or ("2006203186") or ("20070296918") or ("2007121061") or ("2007258039") or ("2008O106695") or ("2008273166") or ("2008316420") or ("20100177277") or ("20100201938") or ("20100309426") or ("2930857") or ("4,152,846") or ("4,283,127")).PN. or (49/991951).APP.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/05/09 17:35
S26	2	("20080129955").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/05/10 07:50
S27	2	("20100066972").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/05/10 07:51
S28	2	("20080239452").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/05/10 08:04

S29	22	("2005/0264752").URPN.	USPAT	OR	ON	2013/05/10 08:10
S30	2	("20100271588").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/05/10 08:14
S31	2	("20110102734").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/05/10 08:21
S32	0	("2009/0201460").URPN.	USPAT	OR	ON	2013/05/10 08:22
S33	0	("2010/0066972").URPN.	USPAT	OR	ON	2013/05/10 08:22
S34	7	("2005/0159182").URPN.	USPAT	OR	ON	2013/05/10 08:22
S35	0	("2010/0177277").URPN.	USPAT	OR	ON	2013/05/10 08:23
S36	77	("3245315" | "4300818").PN. OR ("4991951").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2013/05/10 08:23
S37	0	("2008/0239452").URPN.	USPAT	OR	ON	2013/05/10 08:28
S38	112	("2794085" | "2830132" | "2856466" | "3095483" | "3329957" | "3769663" | "3943925" | "4636866" | "4648130" | "4682363" | "4712244" | "4753514" | "4796987" | "4824233" | "4856086" | "4858248" | "4864646" | "4882769" | "4904078" | "4952024" | "5003300" | "5020150" | "5059017" | "5106179" | "5128659" | "5133596" | "5146619" | "5323189").PN. OR ("5606743").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2013/05/10 08:28
S39	2	("20080089545").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/05/10 08:31
S40	2	("20050239502").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/05/10 08:33
S41	1	("2010/0271588").URPN.	USPAT	OR	ON	2013/05/10 08:36
S42	14	("2008/0089545").URPN.	USPAT	OR	ON	2013/05/10 08:37
S43	2	("2005/0239502").URPN.	USPAT	OR	ON	2013/05/10

						08:38
S44	19	(charles near willey).in.	USPAT	OR	ON	2013/05/10 08:43
S45	2	("20110058141").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/05/14 12:13
S46	2	("2005/0239502").URPN.	USPAT	OR	ON	2013/05/14 13:35
S47	0	("2009/0201460").URPN.	USPAT	OR	ON	2013/05/14 13:38
S48	1	(13/372240).APP.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/10/25 16:02
S49	1510	(351/158).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/10/25 16:02
S50	1604	(351/158,159.03).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/10/25 16:02
S51	49	S50 and eye near glass$3 near frame	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2013/10/25 16:02
S52	5	("2005/0248722").URPN.	USPAT	OR	ON	2013/10/25 16:02
S53	299	("1026272" | "1370806" | "20010038491" | "20020087330" | "20020098877" | "20020118825" | "20020143912" | "20020159023" | "20020169539" | "20020176330" | "20020197961" | "20030003969" | "20030022690" | "20030067585" | "20030068057" | "20030073460" | "20030162510" | "20040000733" | "20040029552" | "20040044427" | "20040048569" | "20040128399" | "20040128737" | "20040132509" | "20040136293" | "20040156012" | "20040157649" | "20040160572" | "20040160573" | "20040239874" | "20050040192" | "20050046789" |	US-PGPUB; USPAT; USOCR	OR	ON	2013/10/25 16:02

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"5581492").PN. OR ("5606743" |
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S54	27	S53 and electric$3 near conduct$3	US-PGPUB; USPAT; USOCR	OR	ON	2013/10/25 16:02
S55	1	S53 and electronic$3 near conduct$3	US-PGPUB; USPAT; USOCR	OR	ON	2013/10/25 16:02
S56	39	(("2930857") or ("2007121061") or ("2008273166") or ("2008273166") or ("20050237485") or ("6115177") or ("5742379") or ("6719425") or ("4418990") or ("20050225723") or ("2010080999") or ("5463428") or ("2008316420") or ("5764338") or ("2009081542")).PN. or (49/991951).APP.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/10/25 16:02
S57	144	(("2930857") or ("2007121061") or ("2008273166") or ("2008273166") or ("20050237485") or ("6115177") or ("5742379") or ("6719425") or ("4418990") or ("20050225723") or ("2010080999") or ("5463428") or ("2008316420") or ("5764338") or ("2009081542") or ("20110058141") or ("4,418,990") or ("5,742,379") or ("6,115,177") or ("6,719,425") or ("20010007493") or ("20010043266") or ("20020140899") or ("2004000733") or ("4,756,605") or ("4,875,030") or ("4,907,860") or ("4,967,268") or ("4,991,258") or ("4,991,951") or ("5,182,585") or ("5,463,428") or ("5,657,107") or ("5,760,869") or ("5,764,338") or ("5,835,185") or ("6,097,450") or ("6,336,250") or ("6,582,075") or ("6,595,634") or ("6,626,532") or ("6,866,386") or ("7,009,757") or ("7,063,420") or ("7,104,645") or ("7,140,727") or ("7,425,066") or ("7,784,935") or ("7,813,048") or ("20050225723") or ("20050237485") or ("20050242771") or ("20050264752") or ("2005078274") or ("2005270479") or ("2005270481") or ("2006023158") or ("2006092340") or ("2006203186") or ("20070296918") or ("2007121061") or ("2007258039") or	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/10/25 16:02

		("2008O106695") or ("2008273166") or ("2008316420") or ("20100177277") or ("20100201938") or ("20100309426") or ("2930857") or ("US-4,152,846US-4,283,127")).PN. or (49/991951).APP.				
S58	150	(("2930857") or ("2007121061") or ("2008273166") or ("2008273166") or ("20050237485") or ("6115177") or ("5742379") or ("6719425") or ("4418990") or ("20050225723") or ("2010080999") or ("5463428") or ("2008316420") or ("5764338") or ("2009081542") or ("20110058141") or ("4,418,990") or ("5,742,379") or ("6,115,177") or ("6,719,425") or ("20010007493") or ("20010043266") or ("20020140899") or ("2004000733") or ("4,756,605") or ("4,875,030") or ("4,907,860") or ("4,967,268") or ("4,991,258") or ("4,991,951") or ("5,182,585") or ("5,463,428") or ("5,657,107") or ("5,760,869") or ("5,764,338") or ("5,835,185") or ("6,097,450") or ("6,336,250") or ("6,582,075") or ("6,595,634") or ("6,626,532") or ("6,866,386") or ("7,009,757") or ("7,063,420") or ("7,104,645") or ("7,140,727") or ("7,425,066") or ("7,784,935") or ("7,813,048") or ("20050225723") or ("20050237485") or ("20050242771") or ("20050264752") or ("2005078274") or ("2005270479") or ("2005270481") or ("2006023158") or ("2006092340") or ("2006203186") or ("20070296918") or ("2007121061") or ("2007258039") or ("2008O106695") or ("2008273166") or ("2008316420") or ("20100177277") or ("20100201938") or ("20100309426") or ("2930857") or ("4,152,846") or ("4,283,127")).PN. or (49/991951).APP.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/10/25 16:02
S59	2	("20070296918").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/10/25 16:02
S60	2	("20050264752").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/10/25 16:02
S61	0	("2andelectric$3nearconductor").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/10/25 16:02

S62	76	S49 and electric$3 near conductor	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2013/10/25 16:02
S63	0	S49 and electric$3 near conductor and elctron$3 near frame	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2013/10/25 16:02
S64	0	S49 and electric$3 near conductor and elctron$3 and frame	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2013/10/25 16:02
S65	71	S49 and electric$3 near conductor and frame	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2013/10/25 16:02
S66	71	S49 and electric$3 near conductor and frame	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2013/10/25 16:02
S67	2	("6259501").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/10/25 16:02
S68	7	("2004001178").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/10/25 16:02
S69	8	(("2007046887") or ("2007200998")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/10/25 16:02
S70	2	("20070216862").PN.	US-PGPUB; USPAT; USOCR; FPRS;	OR	OFF	2013/10/25 16:02

			EPO; JPO; DERWENT			
S71	14	(("2007046887") or ("2007200998") or ("20070216862") or ("2008273166") or ("5835185")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/10/25 16:02
S72	150	(("2930857") or ("2007121061") or ("2008273166") or ("2008273166") or ("20050237485") or ("6115177") or ("5742379") or ("6719425") or ("4418990") or ("20050225723") or ("2010080999") or ("5463428") or ("2008316420") or ("5764338") or ("2009081542") or ("20110058141") or ("4,418,990") or ("5,742,379") or ("6,115,177") or ("6,719,425") or ("20010007493") or ("20010043266") or ("20020140899") or ("2004000733") or ("4,756,605") or ("4,875,030") or ("4,907,860") or ("4,967,268") or ("4,991,258") or ("4,991,951") or ("5,182,585") or ("5,463,428") or ("5,657,107") or ("5,760,869") or ("5,764,338") or ("5,835,185") or ("6,097,450") or ("6,336,250") or ("6,582,075") or ("6,595,634") or ("6,626,532") or ("6,866,386") or ("7,009,757") or ("7,063,420") or ("7,104,645") or ("7,140,727") or ("7,425,066") or ("7,784,935") or ("7,813,048") or ("20050225723") or ("20050237485") or ("20050242771") or ("20050264752") or ("2005078274") or ("2005270479") or ("2005270481") or ("2006023158") or ("2006092340") or ("2006203186") or ("20070296918") or ("2007121061") or ("2007258039") or ("2008O106695") or ("2008273166") or ("2008316420") or ("20100177277") or ("20100201938") or ("20100309426") or ("2930857") or ("4,152,846") or ("4,283,127")).PN. or (49/991951).APP.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/10/25 16:02
S73	2	("20080129955").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/10/25 16:02
S74	2	("20100066972").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/10/25 16:02
S75	2	("20080239452").PN.	US-PGPUB; USPAT;	OR	OFF	2013/10/25 16:02

			USOCR; FPRS; EPO; JPO; DERWENT			
S76	24	("2005/0264752").URPN.	USPAT	OR	ON	2013/10/25 16:02
S77	2	("20100271588").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/10/25 16:02
S78	2	("20110102734").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/10/25 16:02
S79	0	("2009/0201460").URPN.	USPAT	OR	ON	2013/10/25 16:02
S80	0	("2010/0066972").URPN.	USPAT	OR	ON	2013/10/25 16:02
S81	7	("2005/0159182").URPN.	USPAT	OR	ON	2013/10/25 16:02
S82	0	("2010/0177277").URPN.	USPAT	OR	ON	2013/10/25 16:02
S83	78	("3245315" | "4300818").PN. OR ("4991951").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2013/10/25 16:02
S84	1	("2008/0239452").URPN.	USPAT	OR	ON	2013/10/25 16:02
S86	2	("20080089545").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/10/25 16:02
S88	1	("2010/0271588").URPN.	USPAT	OR	ON	2013/10/25 16:02
S89	18	("2008/0089545").URPN.	USPAT	OR	ON	2013/10/25 16:02
S90	3	("2005/0239502").URPN.	USPAT	OR	ON	2013/10/25 16:02
S91	19	(charles near willey).in.	USPAT	OR	ON	2013/10/25 16:02
S92	2	("20110058141").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/10/25 16:02
S93	3	("2005/0239502").URPN.	USPAT	OR	ON	2013/10/25 16:02

S94	0	("2009/0201460").URPN.	USPAT	OR	ON	2013/10/25 16:02
S95	33036	electric$3 near conductor and frame	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2013/10/25 16:13
S96	71	S49 and electric$3 near conductor and frame	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2013/10/25 16:13
S97	42	((Charles) near2 (Willey)).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2014/03/24 08:47
S98	2	("20140016213").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/03/24 11:27
S99	8	(("20080273166") or ("4991951") or ("20070258039")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/03/31 06:46
S100	1	(13/372240).APP.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/03/31 06:50
S101	1570	(351/158).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/03/31 06:50
S102	1686	(351/158,159.03).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/03/31 06:50
S103	50	S102 and eye near glass$3 near frame	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	OR	ON	2014/03/31 06:50

			DERWENT			
S104	6	("2005/0248722").URPN.	USPAT	OR	ON	2014/03/31 06:50
S105	301	("1026272" | "1370806" | "20010038491" | "20020087330" | "20020098877" | "20020118825" | "20020143912" | "20020159023" | "20020169539" | "20020176330" | "20020197961" | "20030003969" | "20030022690" | "20030067585" | "20030068057" | "20030073460" | "20030162510" | "20040000733" | "20040029552" | "20040044427" | "20040048569" | "20040128399" | "20040128737" | "20040132509" | "20040136293" | "20040156012" | "20040157649" | "20040160572" | "20040160573" | "20040239874" | "20050040192" | "20050046789" | "20050046790" | "20050128431" | "20050159182" | "20050185815" | "20050201585" | "20050202857" | "20050248722" | "20060072067" | "20060132382" | "20060146277" | "20060160573" | "20060183427" | "20060197907" | "20060203183" | "20060203184" | "20070037520" | "20070046887" | "20070201000" | "20080089545" | "2424935" | "2504524" | "2688900" | "2856466" | "2882348" | "2947822" | "2999136" | "3104290" | "3119903" | "3247330" | "3371979" | "3495898" | "3536385" | "3588384" | "3665122" | "3769663" | "3809829" | "3853393" | "3883701" | "4006974" | "4149780" | "4283127" | "4294792" | "4537612" | "4550984" | "4636048" | "4683587" | "4712244" | "4773095" | "4803487" | "4806011" | "4856086" | "4882769" | "4902120" | "4904078" | "5020150" | "5029216" | "5137342" | "5159639" | "5249001" | "5260997" | "5281957" | "5321443" | "5327178" | "5335285" | "5353378" | "5367345" | "5381114" | "5404385" | "5405385" | "5406340" | "5481763" | "5483691" | "5533130" | "5563951" | "5579400" | "5581492").PN. OR ("5606743" | "5608808" | "5613222" | "5617477" | "5634201" | "5654786" | "5658502" | "5668867" | "5680465" | "5682434" | "5694475" | "5708724" | "5715323" | "5717479" | "5721783" | "5737436" | "5757929" | "5760868" | "5781272" | "5796341" | "5805261" | "5835185" | "5853005" | "5886822" | "5889843" | "5892564" | "5953000" | "5953434" | "5978689" | "5988812" | "6010216" | "6012812" | "6013108" | "6018742" | "6023241" | "6023372" | "6030342" | "6057966" | "6074060" | "6091546" | "6091832" | "6106116" | "6108197" | "6110110" | "6126595" | "6157533" | "6176576" | "6181956" | "6192253"	US-PGPUB; USPAT; USOCR	OR	ON	2014/03/31 06:50

		"6204974" | "6211799" | "6212414" | "6218958" | "6230327" | "6231181" | "6233344" | "6233345" | "6239778" | "6252970" | "6272359" | "6280838" | "6285757" | "6301050" | "6301367" | "6301593" | "6311155" | "6312811" | "6314091" | "6325507" | "6344727" | "6347095" | "6349001" | "6350129" | "6351468" | "6353503" | "6356392" | "6374177" | "6384982" | "6392798" | "6409338" | "6417969" | "6421031" | "6424820" | "6445805" | "6456721" | "6483483" | "6490362" | "6510325" | "6519475" | "6523006" | "6529804" | "6549122" | "6560449" | "6564047" | "6567651" | "6580405" | "6582075" | "6618099" | "6629076" | "6639706" | "6650894" | "6687486" | "6690807" | "6691028" | "6717533" | "6724354" | "6725022" | "6728531" | "6729726" | "6731908" | "6735435" | "6763119" | "6766182" | "6769767" | "6834192" | "6911172" | "6929365" | "6966647" | "7004582" | "7013009" | "7097300" | "7124425" | "7147324" | "7150526" | "7213917").PN. OR ("7216973" | "7219994" | "7231038" | "7264350" | "7278734" | "7321785" | "D130310" | "D201050" | "D207919" | "D212863" | "D228677" | "D229974" | "D292986" | "D325590" | "D392990" | "D418153" | "D426845" | "D430145" | "D435058" | "D445416" | "D462708" | "D462946" | "RE35051").PN. OR ("7461936").URPN.				
S106	27	S105 and electric$3 near conduct$3	US-PGPUB; USPAT; USOCR	OR	ON	2014/03/31 06:50
S107	1	S105 and electronic$3 near conduct$3	US-PGPUB; USPAT; USOCR	OR	ON	2014/03/31 06:50
S108	51	(("2930857") or ("2007121061") or ("2008273166") or ("2008273166") or ("20050237485") or ("6115177") or ("5742379") or ("6719425") or ("4418990") or ("20050225723") or ("2010080999") or ("5463428") or ("2008316420") or ("5764338") or ("2009081542")).PN. or (49/991951).APP.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/03/31 06:50
S109	182	(("2930857") or ("2007121061") or ("2008273166") or ("2008273166") or ("20050237485") or ("6115177") or ("5742379") or ("6719425") or ("4418990") or ("20050225723") or ("2010080999") or ("5463428") or ("2008316420") or ("5764338") or ("2009081542") or ("20110058141") or ("4,418,990") or ("5,742,379") or ("6,115,177") or ("6,719,425") or ("20010007493") or ("20010043266") or ("20020140899") or ("2004000733") or	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/03/31 06:50

		("4,756,605") or ("4,875,030") or ("4,907,860") or ("4,967,268") or ("4,991,258") or ("4,991,951") or ("5,182,585") or ("5,463,428") or ("5,657,107") or ("5,760,869") or ("5,764,338") or ("5,835,185") or ("6,097,450") or ("6,336,250") or ("6,582,075") or ("6,595,634") or ("6,626,532") or ("6,866,386") or ("7,009,757") or ("7,063,420") or ("7,104,645") or ("7,140,727") or ("7,425,066") or ("7,784,935") or ("7,813,048") or ("20050225723") or ("20050237485") or ("20050242771") or ("20050264752") or ("2005078274") or ("2005270479") or ("2005270481") or ("2006023158") or ("2006092340") or ("2006203186") or ("20070296918") or ("2007121061") or ("2007258039") or ("2008O106695") or ("2008273166") or ("2008316420") or ("20100177277") or ("20100201938") or ("20100309426") or ("2930857") or ("US-4,152,846US-4,283,127")).PN. or (49/991951).APP.				
S110	190	(("2930857") or ("2007121061") or ("2008273166") or ("2008273166") or ("20050237485") or ("6115177") or ("5742379") or ("6719425") or ("4418990") or ("20050225723") or ("2010080999") or ("5463428") or ("2008316420") or ("5764338") or ("2009081542") or ("20110058141") or ("4,418,990") or ("5,742,379") or ("6,115,177") or ("6,719,425") or ("20010007493") or ("20010043266") or ("20020140899") or ("2004000733") or ("4,756,605") or ("4,875,030") or ("4,907,860") or ("4,967,268") or ("4,991,258") or ("4,991,951") or ("5,182,585") or ("5,463,428") or ("5,657,107") or ("5,760,869") or ("5,764,338") or ("5,835,185") or ("6,097,450") or ("6,336,250") or ("6,582,075") or ("6,595,634") or ("6,626,532") or ("6,866,386") or ("7,009,757") or ("7,063,420") or ("7,104,645") or ("7,140,727") or ("7,425,066") or ("7,784,935") or ("7,813,048") or ("20050225723") or ("20050237485") or ("20050242771") or ("20050264752") or ("2005078274") or ("2005270479") or ("2005270481") or ("2006023158") or ("2006092340") or ("2006203186") or ("20070296918") or ("2007121061") or ("2007258039") or ("2008O106695") or ("2008273166") or ("2008316420") or ("20100177277") or ("20100201938") or ("20100309426") or ("2930857") or ("4,152,846") or ("4,283,127")).PN. or (49/991951).APP.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/03/31 06:50
S111	2	("20070296918").PN.	US-PGPUB; USPAT; USOCR;	OR	OFF	2014/03/31 06:50

			FPRS; EPO; JPO; DERWENT			
S112	2	("20050264752").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/03/31 06:50
S113	0	("2andelectric$3nearconductor").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/03/31 06:50
S114	76	S101 and electric$3 near conductor	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2014/03/31 06:50
S115	0	S101 and electric$3 near conductor and elctron$3 near frame	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2014/03/31 06:50
S116	0	S101 and electric$3 near conductor and elctron$3 and frame	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2014/03/31 06:50
S117	71	S101 and electric$3 near conductor and frame	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2014/03/31 06:50
S118	71	S101 and electric$3 near conductor and frame	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2014/03/31 06:50
S119	3	("6259501").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/03/31 06:50
S120	9	("2004001178").PN.	US-PGPUB;	OR	OFF	2014/03/31 06:50

			USPAT; USOCR; FPRS; EPO; JPO; DERWENT			
S121	11	(("2007046887") or ("2007200998")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/03/31 06:50
S122	2	("20070216862").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/03/31 06:50
S123	17	(("2007046887") or ("2007200998") or ("20070216862") or ("2008273166") or ("5835185")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/03/31 06:50
S124	190	(("2930857") or ("2007121061") or ("2008273166") or ("2008273166") or ("20050237485") or ("6115177") or ("5742379") or ("6719425") or ("4418990") or ("20050225723") or ("2010080999") or ("5463428") or ("2008316420") or ("5764338") or ("2009081542") or ("20110058141") or ("4,418,990") or ("5,742,379") or ("6,115,177") or ("6,719,425") or ("20010007493") or ("20010043266") or ("20020140899") or ("2004000733") or ("4,756,605") or ("4,875,030") or ("4,907,860") or ("4,967,268") or ("4,991,258") or ("4,991,951") or ("5,182,585") or ("5,463,428") or ("5,657,107") or ("5,760,869") or ("5,764,338") or ("5,835,185") or ("6,097,450") or ("6,336,250") or ("6,582,075") or ("6,595,634") or ("6,626,532") or ("6,866,386") or ("7,009,757") or ("7,063,420") or ("7,104,645") or ("7,140,727") or ("7,425,066") or ("7,784,935") or ("7,813,048") or ("20050225723") or ("20050237485") or ("20050242771") or ("20050264752") or ("2005078274") or ("2005270479") or ("2005270481") or ("2006023158") or ("2006092340") or ("2006203186") or ("20070296918") or ("2007121061") or ("2007258039") or ("2008O106695") or ("2008273166") or ("2008316420") or ("20100177277") or ("20100201938") or ("20100309426") or ("2930857") or ("4,152,846") or ("4,283,127")).PN. or (49/991951).APP.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/03/31 06:50

S125	2	("20080129955").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/03/31 06:50
S126	3	("20100066972").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/03/31 06:50
S127	2	("20080239452").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/03/31 06:50
S128	24	("2005/0264752").URPN.	USPAT	OR	ON	2014/03/31 06:50
S129	2	("20100271588").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/03/31 06:50
S130	3	("20110102734").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/03/31 06:50
S131	0	("2009/0201460").URPN.	USPAT	OR	ON	2014/03/31 06:50
S132	0	("2010/0066972").URPN.	USPAT	OR	ON	2014/03/31 06:50
S133	7	("2005/0159182").URPN.	USPAT	OR	ON	2014/03/31 06:50
S134	0	("2010/0177277").URPN.	USPAT	OR	ON	2014/03/31 06:50
S135	80	("3245315" | "4300818").PN. OR ("4991951").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2014/03/31 06:50
S136	1	("2008/0239452").URPN.	USPAT	OR	ON	2014/03/31 06:50
S137	125	("2794085" | "2830132" | "2856466" | "3095483" | "3329957" | "3769663" | "3943925" | "4636866" | "4648130" | "4682363" | "4712244" | "4753514" | "4796987" | "4824233" | "4856086" | "4858248" | "4864646" | "4882769" | "4904078" | "4952024" | "5003300" | "5020150" | "5059017" | "5106179" | "5128659" | "5133596" | "5146619" |	US-PGPUB; USPAT; USOCR	OR	ON	2014/03/31 06:50

		"5323189").PN. OR ("5606743").URPN.				
S138	3	("20080089545").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/03/31 06:50
S139	2	("20050239502").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/03/31 06:50
S140	1	("2010/0271588").URPN.	USPAT	OR	ON	2014/03/31 06:50
S141	18	("2008/0089545").URPN.	USPAT	OR	ON	2014/03/31 06:50
S142	3	("2005/0239502").URPN.	USPAT	OR	ON	2014/03/31 06:50
S143	20	(charles near willey).in.	USPAT	OR	ON	2014/03/31 06:50
S144	3	("20110058141").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/03/31 06:50
S145	3	("2005/0239502").URPN.	USPAT	OR	ON	2014/03/31 06:50
S146	0	("2009/0201460").URPN.	USPAT	OR	ON	2014/03/31 06:50
S147	1	(13/372240).APP.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/03/31 06:50
S148	1570	(351/158).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/03/31 06:50
S149	1686	(351/158,159.03).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/03/31 06:50
S150	50	S149 and eye near glass$3 near frame	US-PGPUB; USPAT; USOCR;	OR	ON	2014/03/31 06:50

			FPRS; EPO; JPO; DERWENT			
S151	6	("2005/0248722").URPN.	USPAT	OR	ON	2014/03/31 06:50
S152	301	("1026272" | "1370806" | "20010038491" | "20020087330" | "20020098877" | "20020118825" | "20020143912" | "20020159023" | "20020169539" | "20020176330" | "20020197961" | "20030003969" | "20030022690" | "20030067585" | "20030068057" | "20030073460" | "20030162510" | "20040000733" | "20040029552" | "20040044427" | "20040048569" | "20040128399" | "20040128737" | "20040132509" | "20040136293" | "20040156012" | "20040157649" | "20040160572" | "20040160573" | "20040239874" | "20050040192" | "20050046789" | "20050046790" | "20050128431" | "20050159182" | "20050185815" | "20050201585" | "20050202857" | "20050248722" | "20060072067" | "20060132382" | "20060146277" | "20060160573" | "20060183427" | "20060197907" | "20060203183" | "20060203184" | "20070037520" | "20070046887" | "20070201000" | "20080089545" | "2424935" | "2504524" | "2688900" | "2856466" | "2882348" | "2947822" | "2999136" | "3104290" | "3119903" | "3247330" | "3371979" | "3495898" | "3536385" | "3588384" | "3665122" | "3769663" | "3809829" | "3853393" | "3883701" | "4006974" | "4149780" | "4283127" | "4294792" | "4537612" | "4550984" | "4636048" | "4683587" | "4712244" | "4773095" | "4803487" | "4806011" | "4856086" | "4882769" | "4902120" | "4904078" | "5020150" | "5029216" | "5137342" | "5159639" | "5249001" | "5260997" | "5281957" | "5321443" | "5327178" | "5335285" | "5353378" | "5367345" | "5381114" | "5404385" | "5405385" | "5406340" | "5481763" | "5483691" | "5533130" | "5563951" | "5579400" | "5581492").PN. OR ("5606743" | "5608808" | "5613222" | "5617477" | "5634201" | "5654786" | "5658502" | "5668867" | "5680465" | "5682434" | "5694475" | "5708724" | "5715323" | "5717479" | "5721783" | "5737436" | "5757929" | "5760868" | "5781272" | "5796341" | "5805261" | "5835185" | "5853005" | "5886822" | "5889843" | "5892564" | "5953000" | "5953434" | "5978689" | "5988812" | "6010216" | "6012812" | "6013108" | "6018742" | "6023241" | "6023372" | "6030342" | "6057966" | "6074060" | "6091546" | "6091832" | "6106116" | "6108197" |	US-PGPUB; USPAT; USOCR	OR	ON	2014/03/31 06:50

		"6110110" | "6126595" | "6157533" | "6176576" | "6181956" | "6192253" | "6204974" | "6211799" | "6212414" | "6218958" | "6230327" | "6231181" | "6233344" | "6233345" | "6239778" | "6252970" | "6272359" | "6280838" | "6285757" | "6301050" | "6301367" | "6301593" | "6311155" | "6312811" | "6314091" | "6325507" | "6344727" | "6347095" | "6349001" | "6350129" | "6351468" | "6353503" | "6356392" | "6374177" | "6384982" | "6392798" | "6409338" | "6417969" | "6421031" | "6424820" | "6445805" | "6456721" | "6483483" | "6490362" | "6510325" | "6519475" | "6523006" | "6529804" | "6549122" | "6560449" | "6564047" | "6567651" | "6580405" | "6582075" | "6618099" | "6629076" | "6639706" | "6650894" | "6687486" | "6690807" | "6691028" | "6717533" | "6724354" | "6725022" | "6728531" | "6729726" | "6731908" | "6735435" | "6763119" | "6766182" | "6769767" | "6834192" | "6911172" | "6929365" | "6966647" | "7004582" | "7013009" | "7097300" | "7124425" | "7147324" | "7150526" | "7213917").PN. OR ("7216973" | "7219994" | "7231038" | "7264350" | "7278734" | "7321785" | "D130310" | "D201050" | "D207919" | "D212863" | "D228677" | "D229974" | "D292986" | "D325590" | "D392990" | "D418153" | "D426845" | "D430145" | "D435058" | "D445416" | "D462708" | "D462946" | "RE35051").PN. OR ("7461936").URPN.				
S153	27	S152 and electric$3 near conduct$3	US-PGPUB; USPAT; USOCR	OR	ON	2014/03/31 06:50
S154	1	S152 and electronic$3 near conduct$3	US-PGPUB; USPAT; USOCR	OR	ON	2014/03/31 06:50
S155	51	(("2930857") or ("2007121061") or ("2008273166") or ("2008273166") or ("20050237485") or ("6115177") or ("5742379") or ("6719425") or ("4418990") or ("20050225723") or ("2010080999") or ("5463428") or ("2008316420") or ("5764338") or ("2009081542")).PN. or (49/991951).APP.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/03/31 06:50
S156	182	(("2930857") or ("2007121061") or ("2008273166") or ("2008273166") or ("20050237485") or ("6115177") or ("5742379") or ("6719425") or ("4418990") or ("20050225723") or ("2010080999") or ("5463428") or ("2008316420") or ("5764338") or ("2009081542") or ("20110058141") or ("4,418,990") or ("5,742,379") or ("6,115,177") or ("6,719,425") or	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/03/31 06:50

		("20010007493") or ("20010043266") or ("20020140899") or ("2004000733") or ("4,756,605") or ("4,875,030") or ("4,907,860") or ("4,967,268") or ("4,991,258") or ("4,991,951") or ("5,182,585") or ("5,463,428") or ("5,657,107") or ("5,760,869") or ("5,764,338") or ("5,835,185") or ("6,097,450") or ("6,336,250") or ("6,582,075") or ("6,595,634") or ("6,626,532") or ("6,866,386") or ("7,009,757") or ("7,063,420") or ("7,104,645") or ("7,140,727") or ("7,425,066") or ("7,784,935") or ("7,813,048") or ("20050225723") or ("20050237485") or ("20050242771") or ("20050264752") or ("2005078274") or ("2005270479") or ("2005270481") or ("2006023158") or ("2006092340") or ("2006203186") or ("20070296918") or ("2007121061") or ("2007258039") or ("2008O106695") or ("2008273166") or ("2008316420") or ("20100177277") or ("20100201938") or ("20100309426") or ("2930857") or ("US-4,152,846US-4,283,127")).PN. or (49/991951).APP.				
S157	190	(("2930857") or ("2007121061") or ("2008273166") or ("2008273166") or ("20050237485") or ("6115177") or ("5742379") or ("6719425") or ("4418990") or ("20050225723") or ("2010080999") or ("5463428") or ("2008316420") or ("5764338") or ("2009081542") or ("20110058141") or ("4,418,990") or ("5,742,379") or ("6,115,177") or ("6,719,425") or ("20010007493") or ("20010043266") or ("20020140899") or ("2004000733") or ("4,756,605") or ("4,875,030") or ("4,907,860") or ("4,967,268") or ("4,991,258") or ("4,991,951") or ("5,182,585") or ("5,463,428") or ("5,657,107") or ("5,760,869") or ("5,764,338") or ("5,835,185") or ("6,097,450") or ("6,336,250") or ("6,582,075") or ("6,595,634") or ("6,626,532") or ("6,866,386") or ("7,009,757") or ("7,063,420") or ("7,104,645") or ("7,140,727") or ("7,425,066") or ("7,784,935") or ("7,813,048") or ("20050225723") or ("20050237485") or ("20050242771") or ("20050264752") or ("2005078274") or ("2005270479") or ("2005270481") or ("2006023158") or ("2006092340") or ("2006203186") or ("20070296918") or ("2007121061") or ("2007258039") or ("2008O106695") or ("2008273166") or ("2008316420") or ("20100177277") or ("20100201938") or ("20100309426") or ("2930857") or ("4,152,846") or ("4,283,127")).PN. or (49/991951).APP.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/03/31 06:50
S158	2	("20070296918").PN.	US-PGPUB;	OR	OFF	2014/03/31 06:50

			USPAT; USOCR; FPRS; EPO; JPO; DERWENT			
S159	2	("20050264752").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/03/31 06:50
S160	0	("2andelectric$3nearconductor").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/03/31 06:50
S161	76	S148 and electric$3 near conductor	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2014/03/31 06:50
S162	0	S148 and electric$3 near conductor and elctron$3 near frame	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2014/03/31 06:50
S163	0	S148 and electric$3 near conductor and elctron$3 and frame	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2014/03/31 06:50
S164	71	S148 and electric$3 near conductor and frame	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2014/03/31 06:50
S165	71	S148 and electric$3 near conductor and frame	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2014/03/31 06:50
S166	3	("6259501").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/03/31 06:50

S167	9	("2004001178").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/03/31 06:50
S168	11	(("2007046887") or ("2007200998")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/03/31 06:50
S169	2	("20070216862").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/03/31 06:50
S170	17	(("2007046887") or ("2007200998") or ("20070216862") or ("2008273166") or ("5835185")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/03/31 06:50
S171	190	(("2930857") or ("2007121061") or ("2008273166") or ("2008273166") or ("20050237485") or ("6115177") or ("5742379") or ("6719425") or ("4418990") or ("20050225723") or ("2010080999") or ("5463428") or ("2008316420") or ("5764338") or ("2009081542") or ("20110058141") or ("4,418,990") or ("5,742,379") or ("6,115,177") or ("6,719,425") or ("20010007493") or ("20010043266") or ("20020140899") or ("2004000733") or ("4,756,605") or ("4,875,030") or ("4,907,860") or ("4,967,268") or ("4,991,258") or ("4,991,951") or ("5,182,585") or ("5,463,428") or ("5,657,107") or ("5,760,869") or ("5,764,338") or ("5,835,185") or ("6,097,450") or ("6,336,250") or ("6,582,075") or ("6,595,634") or ("6,626,532") or ("6,866,386") or ("7,009,757") or ("7,063,420") or ("7,104,645") or ("7,140,727") or ("7,425,066") or ("7,784,935") or ("7,813,048") or ("20050225723") or ("20050237485") or ("20050242771") or ("20050264752") or ("2005078274") or ("2005270479") or ("2005270481") or ("2006023158") or ("2006092340") or ("2006203186") or ("20070296918") or ("2007121061") or ("2007258039") or ("2008O106695") or ("2008273166") or ("2008316420") or ("20100177277") or ("20100201938") or ("20100309426") or ("2930857") or ("4,152,846") or	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/03/31 06:50

		("4,283,127")).PN. or (49/991951).APP.				
S172	2	("20080129955").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/03/31 06:50
S173	3	("20100066972").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/03/31 06:50
S174	2	("20080239452").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/03/31 06:50
S175	24	("2005/0264752").URPN.	USPAT	OR	ON	2014/03/31 06:50
S176	2	("20100271588").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/03/31 06:50
S177	3	("20110102734").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/03/31 06:50
S178	0	("2009/0201460").URPN.	USPAT	OR	ON	2014/03/31 06:50
S179	0	("2010/0066972").URPN.	USPAT	OR	ON	2014/03/31 06:50
S180	7	("2005/0159182").URPN.	USPAT	OR	ON	2014/03/31 06:50
S181	0	("2010/0177277").URPN.	USPAT	OR	ON	2014/03/31 06:50
S182	80	("3245315" | "4300818").PN. OR ("4991951").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2014/03/31 06:50
S183	1	("2008/0239452").URPN.	USPAT	OR	ON	2014/03/31 06:50
S184	3	("20080089545").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/03/31 06:50

S185	1	("2010/0271588").URPN.	USPAT	OR	ON	2014/03/31 06:50
S186	18	("2008/0089545").URPN.	USPAT	OR	ON	2014/03/31 06:50
S187	3	("2005/0239502").URPN.	USPAT	OR	ON	2014/03/31 06:50
S188	20	(charles near willey).in.	USPAT	OR	ON	2014/03/31 06:50
S189	3	("20110058141").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/03/31 06:50
S190	3	("2005/0239502").URPN.	USPAT	OR	ON	2014/03/31 06:50
S191	0	("2009/0201460").URPN.	USPAT	OR	ON	2014/03/31 06:50
S192	34786	electric$3 near conductor and frame	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2014/03/31 06:50
S193	71	S148 and electric$3 near conductor and frame	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2014/03/31 06:50
S194	42	((Charles) near2 (Willey)).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2014/03/31 06:50
S195	2	("20140016213").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2014/03/31 06:50
S196	122	S101 and electric$3 near3 conduct$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2014/03/31 06:57
S197	10	S101 and (first near3 electric$3 near3 conduct$4)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2014/03/31 06:57
S198	10	S101 and (second near3 electric$3 near3	US-	OR	ON	2014/03/31

		conduct$4)	PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT			06:58
S199	9	S197 and S198	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2014/03/31 06:58
S200	1586	eye and (first near3 electric$3 near3 conduct$4)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2014/03/31 07:01
S201	1417	eye and (second near3 electric$3 near3 conduct$4)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2014/03/31 07:01
S202	20	eye and lens and temple and (second near3 electric$3 near3 conduct$4)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2014/03/31 07:03
S203	390	eye and lens and (second near3 electric$3 near3 conduct$4)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2014/03/31 07:03
S204	465	eye and lens and (first near3 electric$3 near3 conduct$4)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2014/03/31 07:03
S205	261	S203 and S204	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2014/03/31 07:04
S206	21	eye and lens and temple and (first near3 electric$3 near3 conduct$4)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	OR	ON	2014/03/31 07:06

			DERWENT			
S207	17	S202 and S206	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2014/03/31 07:06
S208	109	S149 and electric$3 near3 conductor	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2014/03/31 07:11

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L227	44	"L55" and electric$3 near3 conductor	US-PGPUB; USPAT; UPAD	OR	ON	2014/04/02 14:54
L228	3662	lens and electric$3 near conductor and frame	US-PGPUB; USPAT; UPAD	OR	ON	2014/04/02 14:54
L229	805	lens and (second same electric$3 near conductor) and frame	US-PGPUB; USPAT; UPAD	OR	ON	2014/04/02 14:54
L230	851	lens and (first same electric$3 near conductor) and frame	US-PGPUB; USPAT; UPAD	OR	ON	2014/04/02 14:54
L231	702	L229 and L230	US-PGPUB; USPAT; UPAD	OR	ON	2014/04/02 14:54
L232	23	L229 and L230 and temple	US-PGPUB; USPAT; UPAD	OR	ON	2014/04/02 14:54
L233	246	L229 and L230 and (temple or arm)	US-PGPUB; USPAT; UPAD	OR	ON	2014/04/02 14:54
S209	44	"L55" and electric$3 near3 conductor	US-PGPUB; USPAT; UPAD	OR	ON	2014/03/31 07:23
S210	3661	lens and electric$3 near conductor and frame	US-PGPUB; USPAT; UPAD	OR	ON	2014/03/31 07:25
S211	805	lens and (second same electric$3 near conductor) and frame	US-PGPUB; USPAT; UPAD	OR	ON	2014/03/31 07:25
S212	851	lens and (first same electric$3 near conductor) and frame	US-PGPUB; USPAT; UPAD	OR	ON	2014/03/31 07:26
S213	702	S211 and S212	US-PGPUB; USPAT; UPAD	OR	ON	2014/03/31 07:26
S214	23	S211 and S212 and temple	US-PGPUB; USPAT; UPAD	OR	ON	2014/03/31 07:30
S215	246	S211 and S212 and (temple or arm)	US-PGPUB; USPAT; UPAD	OR	ON	2014/03/31 07:30

4/2/2014 3:31:14 PM
C:\Users\mchoudhury\Documents\EAST\Workspaces\13372240.wsp

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

BIB DATA SHEET

CONFIRMATION NO. 8374

SERIAL NUMBER	FILING or 371(c) DATE RULE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
13/372,240	02/13/2012	351	2872	3373.0600001

APPLICANTS

INVENTORS
Charles Willey, Roanoke, VA;

**** CONTINUING DATA ***************************
This appln claims benefit of 61/441,817 02/11/2011

**** FOREIGN APPLICATIONS ***************************

**** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ****
02/24/2012

Foreign Priority claimed ☐ Yes ☑ No 35 USC 119(a-d) conditions met ☐ Yes ☑ No Verified and Acknowledged /MUSTAK CHOUDHURY/ Examiner's Signature	☐ Met after Allowance Initials	STATE OR COUNTRY	SHEETS DRAWINGS	TOTAL CLAIMS	INDEPENDENT CLAIMS
		VA	30	~~21~~ 19	2

ADDRESS

Sterne, Kessler, Goldstein & Fox P.L.L.C.
1100 New York Avenue NW
Washington, DC 20005
UNITED STATES

TITLE

ELECTRONIC FRAMES COMPRISING ELECTRICAL CONDUCTORS

FILING FEE RECEIVED		
1440	FEES: Authority has been given in Paper No._____ to charge/credit DEPOSIT ACCOUNT No._____ for following:	☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other _____ ☐ Credit

BIB (Rev. 05/07).

Amendment Under 37 C.F.R. § 1.116
Expedited Procedure – Art Unit 2872

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:	Confirmation No.: 8374
Charles WILLEY	Art Unit: 2872
Appl. No.: 13/372,240	Examiner: CHOUDHURY, Mustak
Filed: February 13, 2012	Atty. Docket: 3373.0600001
For: **Electronic Frames Comprising Electrical Conductors**	

Amendment and Reply Under 37 C.F.R. § 1.116

Mail Stop AF

Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

After Final ---
Entry Approved
/MC/
04/04/2014

Commissioner:

In reply to the Office Action dated November 6, 2013, Applicant submits the following Amendment and Remarks.

Amendments to the Claims begin on page 2 of this paper.

Remarks begin on page 6 of this paper.

It is not believed that extensions of time are required beyond those that may otherwise be provided for in documents accompanying this paper. However, if additional extensions of time are necessary to prevent abandonment of this application, then such extensions of time are hereby petitioned under 37 C.F.R. § 1.136(a), and any additional fees required to continue prosecution or appeal of this application (including issue fee, fees for net addition of claims or forwarding to appeal) are hereby authorized to be charged to our Deposit Account No. 19-0036.

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13372240	WILLEY, CHARLES
	Examiner	**Art Unit**
	MUSTAK CHOUDHURY	2872

CPC		
Symbol	**Type**	**Version**

CPC Combination Sets				
Symbol	**Type**	**Set**	**Ranking**	**Version**

/MUSTAK CHOUDHURY/ Examiner.Art Unit 2872	04/02/2014	**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	19	
/SCOTT J SUGARMAN/ Primary Examiner.Art Unit 2872	04/04/2014	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	2

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13372240	WILLEY, CHARLES
	Examiner	**Art Unit**
	MUSTAK CHOUDHURY	2872

US ORIGINAL CLASSIFICATION		INTERNATIONAL CLASSIFICATION										
CLASS	SUBCLASS	CLAIMED					NON-CLAIMED					
351	158	G	0	2	C	1 / 00 (2006.0)						
CROSS REFERENCE(S)												
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)											

/MUSTAK CHOUDHURY/ Examiner.Art Unit 2872	04/02/2014	**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	19	
/SCOTT J SUGARMAN/ Primary Examiner.Art Unit 2872	04/04/2014	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	2

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13372240	WILLEY, CHARLES
	Examiner	**Art Unit**
	MUSTAK CHOUDHURY	2872

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
	1		17		33	7	49								
	2		18		34	8	50								
	3		19		35	9	51								
	4		20		36	10	52								
	5		21		37	11	53								
	6		22		38	12	54								
	7		23		39	13	55								
	8		24		40	14	56								
	9		25	1	41	15	57								
	10		26		42	16	58								
	11		27	2	43	17	59								
	12		28	3	44	18	60								
	13		29	4	45	19	61								
	14		30		46										
	15		31	5	47										
	16		32	6	48										

/MUSTAK CHOUDHURY/ Examiner.Art Unit 2872	04/02/2014	**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	19	
/SCOTT J SUGARMAN/ Primary Examiner.Art Unit 2872	04/04/2014	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	2

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Sterne Kessler Goldstein Fox
ATTORNEYS AT LAW

April 8, 2014

Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

Confirmation No. 8374
Art Unit 2872

Re: U.S. Utility Patent Application
Appl. No. 13/372,240; Filing Date: February 13, 2012
For: **Electronic Frames Comprising Electrical Conductors**
Inventor: Charles WILLEY
Our Ref: 3373.0600001

Commissioner:

Transmitted herewith for appropriate action is the following document:

1. Statement of Substance of Interview In Accordance With 37 C.F.R. § 1.133(b) and MPEP § 713.04.

The above-listed document is filed electronically through EFS-Web.

In the event that extensions of time are necessary to prevent abandonment of this patent application, then such extensions of time are hereby petitioned.

The U.S. Patent and Trademark Office is hereby authorized to charge any fee deficiency, or credit any overpayment, to our Deposit Account No. 19-0036.

Respectfully submitted,

STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C.

Jason A. Fitzsimmons
Attorney for Applicant
Registration No. 65,367

JAF/cj
Enclosure

1836616_1

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:	Confirmation No.: 8374
Charles WILLEY	Art Unit: 2872
Appl. No.: 13/372,240	Examiner: CHOUDHURY, Mustak
Filed: February 13, 2012	Atty. Docket: 3373.0600001
For: **Electronic Frames Comprising Electrical Conductors**	

Statement of Substance of Interview In Accordance With 37 C.F.R. § 1.133(b) and MPEP § 713.04

Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

Commissioner:

Applicant submits the following Statement of Substance of Interview held with Examiner Choudhury on April 2, 2014 via telephone regarding the above captioned application in accordance with 37 C.F.R. § 1.133(b) and M.P.E.P. § 713.04.

It is not believed that extensions of time are required beyond those that may otherwise be provided for in documents accompanying this paper. However, if additional extensions of time are necessary to prevent abandonment of this application, then such extensions of time are hereby petitioned under 37 C.F.R. § 1.136(a), and any additional fees required to continue prosecution or appeal of this application (including issue fee, fees for net addition of claims or forwarding to appeal) are hereby authorized to be charged to our Deposit Account No. 19-0036.

Interview Summary

Applicant wishes to thank Examiner Choudhury for the courtesies extended to Applicant's representatives John P. McGroarty (Reg. No. 41,186) and Jason A. Fitzsimmons (Reg. No. 65,367) during the telephone interview on April 2, 2014. Applicant provides below the substance of the interview. The lettered sections correspond to those described in MPEP 713.04.

A. No exhibits were shown.

B. The parties discussed independent claim 41 as amended in the response submitted on March 26, 2014.

C. The parties discussed U.S. Patent No. 6,099,117 to Gregory ("Gregory") and U.S. Publication No. 2009/0182688 to van der Zwan *et al.* ("van der Zwan").

D. It was agreed that no amendments were necessary.

E. The Examiner asked to discuss Gregory and van der Zwan with the Applicant's representatives in view of the pending claims. Applicant's representatives explained how the pending claims are patentable over Gregory and van der Zwan.

F. No other pertinent matters were discussed.

G. It was agreed that the pending claims are patentable over Gregory and van der Zwan.

H. The interview did not involve e-mail.

Conclusion

In view of the foregoing Statement of Substance of Interview, Applicant respectfully requests that the pending claims be allowed.

Respectfully submitted,

STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C.

Jason A. Fitzsimmons
Attorney for Applicant
Registration No. 65,367

Date: April 8, 2014

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1836156_1

Electronic Acknowledgement Receipt

EFS ID:	18708202
Application Number:	13372240
International Application Number:	
Confirmation Number:	8374
Title of Invention:	ELECTRONIC FRAMES COMPRISING ELECTRICAL CONDUCTORS
First Named Inventor/Applicant Name:	Charles Willey
Customer Number:	115626
Filer:	Jason Alan Fitzsimmons/Kim Perry
Filer Authorized By:	Jason Alan Fitzsimmons
Attorney Docket Number:	3373.0600001
Receipt Date:	08-APR-2014
Filing Date:	13-FEB-2012
Time Stamp:	17:41:16
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		33730600001.pdf	401082 8f0339e227087f8f311422f3ab100204da5691fb	yes	4

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Miscellaneous Incoming Letter	1	1
	Applicant summary of interview with examiner	2	4
Warnings:			
Information:			
	Total Files Size (in bytes):	401082	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Amendment Under 37 C.F.R. § 1.116
Expedited Procedure – Art Unit 2872

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:	Confirmation No.: 8374
Charles WILLEY	Art Unit: 2872
Appl. No.: 13/372,240	Examiner: CHOUDHURY, Mustak
Filed: February 13, 2012	Atty. Docket: 3373.0600001
For: **Electronic Frames Comprising Electrical Conductors**	

Amendment and Reply Under 37 C.F.R. § 1.116

Mail Stop AF

Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

Commissioner:

In reply to the Office Action dated November 6, 2013, Applicant submits the following Amendment and Remarks.

Amendments to the Claims begin on page 2 of this paper.

Remarks begin on page 6 of this paper.

It is not believed that extensions of time are required beyond those that may otherwise be provided for in documents accompanying this paper. However, if additional extensions of time are necessary to prevent abandonment of this application, then such extensions of time are hereby petitioned under 37 C.F.R. § 1.136(a), and any additional fees required to continue prosecution or appeal of this application (including issue fee, fees for net addition of claims or forwarding to appeal) are hereby authorized to be charged to our Deposit Account No. 19-0036.

Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application.

41. (Currently Amended) A first device, comprising:

a lens housing adapted to support a first lens and a second lens;

a first temple movably coupled to the lens housing;

a second temple movably coupled to the lens housing;

an electronics module disposed at least partially within the first temple; [[and]]

a first electrical conductor coupled to the first temple,[[;]]

wherein a first conductive path is provided from the first temple to the lens housing at least in part by the first electrical conductor; and

a second electrical conductor coupled to the first temple,

wherein a second conductive path is provided from the first temple to the lens housing at least in part by the second electrical conductor;

wherein the first and second electrical conductors [[is]] are configured to couple the electronics module to the first temple to constrain the electronics module.

42. (Canceled)

43. (Previously Presented) The first device of claim 41, wherein the first electrical conductor is integrally coupled to the first temple.

44. (Previously Presented) The first device of claim 43, wherein the first electrical conductor is insert molded with the first temple.

45. (Previously Presented) The first device of claim 41, wherein the first electrical conductor comprises a lug.

46. (Canceled)

47. (Previously Presented) The first device of claim 41, wherein the electronics module comprises any two of: a power source, a controller, and a sensor.

48. (Previously Presented) The first device of claim 47, wherein the sensor comprises a touch switch.

49. (Previously Presented) The first device of claim 41, wherein the first electrical conductor is electrically coupled to a slip ring.

50. (Previously Presented) The first device of claim 49, further comprising a hinge, wherein the slip ring is disposed substantially within the hinge.

51. (Previously Presented) The first device of claim 41, wherein the electronics module is configured to be removably coupled to the first temple.

52. (Previously Presented) The first device of claim 41, wherein the electronics module comprises an opening;

wherein the first electrical conductor has a first portion that extends a first distance of at least approximately 1 cm into the electronic module through the opening, and

wherein the first electrical conductor has a second portion that extends a second distance of at least approximately 1 cm outside of the electronics module away from the opening.

53. (Previously Presented) The first device of claim 52,

wherein the first distance that the first portion of the first electrical conductor extends into the electronics module is at least approximately 2 cm, and

wherein the second distance that the second portion of the first electrical conductor extends away from the opening is at least approximately 2 cm.

54. (Previously Presented) The first device of claim 41, wherein the first electrical conductor comprises a single structural element.

55. (Previously Presented) The first device of claim 41, wherein the first electrical conductor is configured to maintain the first conductive path as the first temple is moved relative to the lens housing.

56. (Previously Presented) The first device of claim 41, further comprising a first lens and a second lens coupled to the lens housing;

wherein the first lens has a first electrical contact; and

wherein the first conductive path is electrically coupled to the first electrical contact.

57. (Currently Amended) A first method, comprising:

providing a capacitive touch switch;

disposing a plurality of electronic components on the capacitive switch; and

coupling the capacitive touch switch to a partial enclosure to constrain the capacitive touch switch.

58. (Previously Presented) The first method of claim 57, further comprising the step of disposing the enclosure substantially within a temple of an eyeglass frame.

59. (Previously Presented) The first method of claim 58,

wherein the eye glass frame comprises electro-active eyeglass frames;

wherein the eyeglass frame comprises a first conductive path; and

wherein the first method further comprises the step of electrically coupling at least one of the electronic components to the first conductive path.

60. (Previously Presented) The first method of claim 57, further comprising the step of applying a conformal coating to the plurality of electronic components.

61. (Previously Presented) The first method of claim 57, wherein the capacitive touch switch and the enclosure are configured to be pressure fitted.

Remarks

Reconsideration of this Application is respectfully requested. Applicants assert that this amendment after-final should be entered under 37 C.F.R. § 1.116(b) because it places each of the pending claims in condition for allowance.

Upon entry of the foregoing amendment, claims 41, 43-45, and 47-61 are pending in the application, with claims 41 and 57 being the independent claims. Claims 1-40 were previously canceled without prejudice to or disclaimer of the subject matter therein. Claims 42 and 46 are presently sought to be canceled without prejudice to or disclaimer of the subject matter therein. Independent claims 41 and 57 are amended. These changes are believed to introduce no new matter, and their entry is respectfully requested.

Based on the above amendment and the following remarks, Applicant respectfully requests that the Examiner reconsider all outstanding rejections and that they be withdrawn.

I. Interview Summary

Applicant wishes to thank Examiner Choudhury for the courtesies extended to Applicant's representative Jason A. Fitzsimmons during the telephone interview on March 24, 2014. Applicant provides below the substance of the interview. The lettered sections correspond to those described in MPEP 713.04.

A. No exhibits were shown.

B. The parties discussed claim 41 and the features previously recited in claims 42 and 46, now canceled and incorporated into independent claim 41.

C. The parties discussed the applied references, U.S. Publication No. 2005/0239502 to Swab *et al.* and U.S. Publication No. 2009/0201460 to Blum *et al.*

D. Applicant proposed amending independent claim 41 to incorporate the features previously recited in claims 42 and 46.

E. The Examiner asked the Applicants to include the proposed amendments along with remarks in this Reply. The Examiner reserved the right to consider the amendment when filed.

F. No other pertinent matters were discussed.

G. No agreement was reached.

H. The interview did not involve e-mail.

II. Rejections under 35 U.S.C. § 103

Claims 41-61 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over U.S. Publication No. 2005/0239502 to Swab *et al.* ("Swab") in view of U.S. Publication No. 2009/0201460 to Blum *et al.* ("Blum"). Applicant respectfully traverses this rejection.

A. Independent Claim 41

Independent claim 41 has been amended to incorporate features previously recited in dependent claims 42 and 46. As amended, claim 41 recites that "a second electrical conductor coupled to the first temple, wherein a second conductive path is provided from the first temple to the lens housing at least in part by the second electrical conductor" and that "the first and second electrical conductors are configured to couple the electronics module to the first temple *to constrain the electronics module*." Neither

Swab nor Blum disclose or suggest this physical coupling of the electronics module to a temple by a first and second electrical conductor in order to constrain the electronics module.

For at least these reasons, the combination of Swab and Blum fails to teach or suggest each of the features recited by independent claim 41. Thus, claim 41 is patentable over Swab and Blum. Claims 43-45 and 47-56 depend from and add features to independent claim 41, and are therefore also patentable for at least these same reasons. Claims 42 and 46 have been canceled, rendering their rejection moot. Accordingly, Applicant respectfully requests that the rejection of claims 41-56 under 35 U.S.C. § 103(a) be reconsidered and withdrawn.

B. Independent Claim 57

Independent claim 57 has been amended to recite coupling the capacitive touch switch to a partial enclosure "to constrain the capacitive touch switch." The Office acknowledges that Swab fails to teach: 1) disposing a plurality of electronic components on the capacitive switch, and 2) coupling the capacitive touch switch to a partial enclosure. (Final Office Action, p. 6.) Instead, the Office asserts that "Blum teaches [a] power switch for applying and removing power to either the lenses or to the electronics." (*Id.*) But this does not meet the recited feature. Although Blum discloses "the opening and the closing of the frame may act as a power switch" (Blum at [0063]), Blum does not disclose or suggest *coupling* the capacitive touch switch *to a partial enclosure* in order to *constrain* the capacitive touch switch, as recited by independent claim 57. Further, the Office also fails to indicate how Blum teaches disposing a plurality of electronic components on the capacitive switch.

For at least these reasons, the combination of Swab and Blum fails to teach or suggest each of the features recited by independent claim 57. Thus, claim 57 is patentable over Swab and Blum. Claims 58-61 depend from and add features to independent claim 57, and are therefore also patentable for at least these same reasons. Accordingly, Applicant respectfully requests that the rejection of claims 57-61 under 35 U.S.C. § 103(a) be reconsidered and withdrawn.

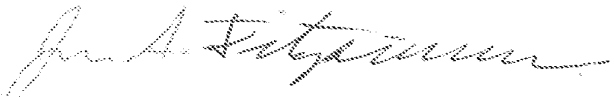
Conclusion

All of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicant therefore respectfully requests that the Examiner reconsider all presently outstanding rejections and that they be withdrawn. Applicant believes that a full and complete reply has been made to the outstanding Office Action and, as such, the present application is in condition for allowance. If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at the number provided.

Prompt and favorable consideration of this Amendment and Reply is respectfully requested.

Respectfully submitted,

STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C.



Jason A. Fitzsimmons
Attorney for Applicant
Registration No. 65,367

Date: March 26, 2014

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1809410_1

PTO/SB/22 (03-13)
Approved for use through 3/31/2013. OMB 0651-0031
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PETITION FOR EXTENSION OF TIME UNDER 37 CFR 1.136(a)

Docket Number (Optional): 3373.0600001

Application Number	Filed
13/372,240	February 13, 2012

For: Electronic Frames Comprising Electrical Conductors

Art Unit	Examiner
2872	CHOUDHURY, Mustak

This is a request under the provisions of 37 CFR 1.136(a) to extend the period for filing a reply in the above-identified application.

The requested extension and fee are as follows (check time period desired and enter the appropriate fee below):

		Fee	Small Entity Fee	Micro Entity Fee	
☐	One month (37 CFR 1.17(a)(1))	$200	$100	$50	$
☒	Two months (37 CFR 1.17(a)(2))	$600	$300	$150	$ 600.00
☐	Three months (37 CFR 1.17(a)(3))	$1,400	$700	$350	$
☐	Four months (37 CFR 1.17(a)(4))	$2,200	$1,100	$550	$
☐	Five months (37 CFR 1.17(a)(5))	$3,000	$1,500	$750	$

☐ Applicant asserts small entity status. See 37 CFR 1.27.

☐ Applicant certifies micro entity status. See 37 CFR 1.29.
Form PTO/SB/15A or B or equivalent must either be enclosed or have been submitted previously.

☐ A check in the amount of the fee is enclosed.

☐ Payment by credit card. Form PTO-2038 is attached.

☐ The Director has already been authorized to charge fees in this application to a Deposit Account.

☒ The Director is hereby authorized to charge any fees which may be required, or credit any overpayment, to Deposit Account Number 19-0036.

☒ Payment made via EFS-Web.

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

I am the

☐ applicant/inventor.

☐ assignee of record of the entire interest. See 37 CFR 3.71. 37 CFR 3.73(b) statement is enclosed (Form PTO/SB/96).

☒ attorney or agent of record. Registration number 65,367

☐ attorney or agent acting under 37 CFR 1.34. Registration number _____.



Signature

March 26, 2014
Date

Jason A. Fitzsimmons
Typed or printed name

(202) 371-2600
Telephone Number

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. Submit multiple forms if more than one signature is required, see below*.

☐ * Total of _____ forms are submitted.

This collection of information is required by 37 CFR 1.136(a). The information is required to obtain or retain a benefit by the public, which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 6 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

1830887

Electronic Patent Application Fee Transmittal

Application Number:	13372240
Filing Date:	13-Feb-2012
Title of Invention:	ELECTRONIC FRAMES COMPRISING ELECTRICAL CONDUCTORS
First Named Inventor/Applicant Name:	Charles Willey
Filer:	Jason Alan Fitzsimmons/cj .
Attorney Docket Number:	3373.0600001

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Extension - 2 months with $0 paid	1252	1	600	600

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
			Total in USD ($)	**600**

Electronic Acknowledgement Receipt

EFS ID:	18591611
Application Number:	13372240
International Application Number:	
Confirmation Number:	8374
Title of Invention:	ELECTRONIC FRAMES COMPRISING ELECTRICAL CONDUCTORS
First Named Inventor/Applicant Name:	Charles Willey
Customer Number:	115626
Filer:	Jason Alan Fitzsimmons/cj .
Filer Authorized By:	Jason Alan Fitzsimmons
Attorney Docket Number:	3373.0600001
Receipt Date:	26-MAR-2014
Filing Date:	13-FEB-2012
Time Stamp:	17:11:59
Application Type:	Utility under 35 USC 111(a)

Payment information:

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Payment Type	Credit Card
Payment was successfully received in RAM	$600
RAM confirmation Number	4020
Deposit Account	
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)

1		3373_0600001_AMD_EOT.pdf	1303820 ef4d241550baee6a2e4a0e90d6626921e7f83152	yes	12

Multipart Description/PDF files in .zip description		
Document Description	**Start**	**End**
Miscellaneous Incoming Letter	1	1
Response After Final Action	2	2
Claims	3	6
Applicant Arguments/Remarks Made in an Amendment	7	11
Extension of Time	12	12

Warnings:

Information:

2	Fee Worksheet (SB06)	fee-info.pdf	30506 92da0f308a2ef613a7a2e13b232521cbe26e1be2	no	2

Warnings:

Information:

Total Files Size (in bytes):	1334326

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New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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Sterne Kessler Goldstein Fox
ATTORNEYS AT LAW

March 26, 2014

Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

Confirmation No. 8374
Art Unit 2872

Re: U.S. Utility Patent Application
Appl. No. 13/372,240; Filing Date: February 13, 2012
For: **Electronic Frames Comprising Electrical Conductors**
Inventor: Charles WILLEY
Our Ref: 3373.0600001

Commissioner:

Transmitted herewith for appropriate action are the following documents:

1. Online Credit Card Payment Authorization in the amount of $600.00 to cover Petition for Extension of time of 2 months;

2. Amendment and Reply Under 37 C.F.R. §1.116; and

3. Petition for Extension of Time of 2 months.

The above-listed documents are filed electronically through EFS-Web.

In the event that extensions of time are necessary to prevent abandonment of this patent application, then such extensions of time are hereby petitioned.

Fee payment is provided through online credit card payment. The U.S. Patent and Trademark Office is hereby authorized to charge any fee deficiency, or credit any overpayment, to our Deposit Account No. 19-0036.

Respectfully submitted,
STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C.

Jason A. Fitzsimmons
Attorney for Applicant
Registration No. 65,367

JAF/cj
Enclosures

1830888_1

PTO/SB/06 (09-11)
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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 13/372,240	Filing Date 02/13/2012	☐ To be Mailed

ENTITY: ☒ LARGE ☐ SMALL ☐ MICRO

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT

03/26/2014	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	* 19	Minus	** 21	= 0	X $80 =	0
Independent (37 CFR 1.16(h))	* 2	Minus	***3	= 0	X $420 =	0
☐ Application Size Fee (37 CFR 1.16(s))						
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
					TOTAL ADD'L FEE	0

AMENDMENT

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =	
☐ Application Size Fee (37 CFR 1.16(s))						
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
					TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

LIE
/ZURIASHWORK ZENEBE/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**
If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

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Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/372,240	02/13/2012	Charles Willey	3373.0600001	8374

115626 7590 11/06/2013

Sterne, Kessler, Goldstein & Fox P.L.L.C.
1100 New York Avenue NW
Washington, DC 20005

EXAMINER	
CHOUDHURY, MUSTAK	
ART UNIT	PAPER NUMBER
2872	
MAIL DATE	DELIVERY MODE
11/06/2013	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 13/372,240	Applicant(s) WILLEY, CHARLES	
	Examiner MUSTAK CHOUDHURY	Art Unit 2872	AIA (First Inventor to File) Status No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08/23/2013*.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

5)☒ Claim(s) *41-61* is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6)☐ Claim(s) _____ is/are allowed.

7)☒ Claim(s) *41-61* is/are rejected.

8)☐ Claim(s) _____ is/are objected to.

9)☐ Claim(s) _____ are subject to restriction and/or election requirement.

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a)☐ All b)☐ Some * c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

4) ☐ Other: _____.

DETAILED ACTION

1. The present application is being examined under the pre-AIA first to invent provisions.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 41-61 are rejected under 35 U.S.C. 103(a) as being unpatentable over Swab et al. (US PUB 2005/0239502 A1, herein after "Swab") in view of Blum et al. (US PUB 2009/0201460 A1, herein after "Blum"), both of record.

Regarding claim 41, Swab teaches (fig. 1 and 2a) a first device (12), comprising: a lens housing (24) adapted to support a first lens and a second lens; a first temple (19) movably coupled to the lens housing (24); a second temple (20) movably coupled to the lens housing (24); an electronics module (18) disposed at least partially within the first temple (19); and a first electrical conductor (40) coupled to the first temple (paragraph 35, lines 1-5); wherein a first conductive path is provided from the first temple (19) to the lens housing (24) at least in part by the first electrical conductor

(40); and wherein the first electrical conductor is configured to couple the electronics module to the first temple (paragraph 39).

Swab does not specifically teach the first electrical conductor is configured to couple the electronics module to the first temple. Blum teaches a conductor may be housed in each temple of a frame where each temple provides a single power terminal connection to the electronics (paragraph 63, lines 23-26). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to include first electrical conductor is configured to couple the electronics module to the first temple as taught by Blum in the device of Swab, since it would have provided the predictable result of charging both batteries simultaneously by having circuitry and/or conducting material traversing the entire length of the spectacle frame.

Regarding claim 42, Swab teaches (fig. 2a) wherein the first electrical conductor is configured to constrain the electronics module (paragraph 39, lines 7-9).

Regarding claim 43, Swab teaches (fig. 2a) wherein the first electrical conductor is integrally coupled to the first temple (paragraph 45, lines 5-11).

Regarding claim 44, Swab teaches (fig. 2a) wherein the first electrical conductor is insert molded with the first temple (paragraph 39, lines 7-9).

Regarding claim 45, Swab teaches wherein the first electrical conductor comprises a lug (paragraph 45, line 9).

Regarding claim 46, Swab teaches further comprising: a second electrical conductor coupled to the first temple; wherein a second conductive path is provided from the first temple to the lens housing at least in part by the second electrical conductor; and wherein the second electrical conductor is configured to constrain the electronics module (paragraph 39).

Regarding claim 47, Swab teaches wherein the electronics module comprises any two of: a power source (paragraph 45, lines 4-7), a controller, and a sensor (paragraph 44, lines 20-23).

Regarding claim 48, the combination of Swab and Blum teaches, wherein the sensor (paragraph 44, line 2 as taught by Swab) comprises a touch switch (paragraph 14, line 7 as taught by Blum).

Regarding claim 49, the combination of Swab and Blum teaches wherein the first electrical conductor is electrically coupled (fig. 2a, 40; paragraph 45, lines 4-7 as taught by Swab) to a slip ring (fig. 8, element 950, 951; paragraph 54, lines 7-9 as taught by Blum).

Regarding claim 50, the combination of Swab and Blum teaches further comprising a hinge (fig. 2d; paragraph 38, lines 4-6 as taught by Swab), wherein the slip ring is disposed substantially within the hinge (fig. 10B; paragraph 57, lines 1-7 as taught by Blum).

Regarding claim 51, Swab teaches wherein the electronics module is configured to be removably coupled to the first temple (fig. 2d; paragraph 35, line 21-24).

Regarding claim 52, Swab teaches wherein the electronics module comprises an opening; wherein the first electrical conductor has a first portion that extends a first distance of at least approximately 1 cm into the electronic module through the opening, and wherein the first electrical conductor has a second portion that extends a second distance of at least approximately 1 cm outside of the electronics module away from the opening (figs. 2b-2f; paragraph 35, lines 10-17 “one-eighth inch audio connector”, paragraph 38).

Regarding claim 53, Swab teaches wherein the first distance that the first portion of the first electrical conductor extends into the electronics module is at least approximately 2 cm, and wherein the second distance that the second portion of the first electrical conductor extends away from the opening is at least approximately 2 cm (figs. 2b-2f; paragraph 35, lines 10-17, paragraph 38).

Regarding claim 54, Swab teaches (fig. 2a) wherein the first electrical conductor (40) comprises a single structural element (paragraph 39, lines 8-9).

Regarding claim 55, Swab teaches (fig. 2a) wherein the first electrical conductor (40) is configured to maintain the first conductive path as the first temple (19) is moved relative to the lens housing (24) (paragraph 37, lines 1-4).

Regarding claim 56, the combination of Swab and Blum teaches further comprising a first lens and a second lens coupled to the lens housing (fig. 1; paragraph 44, lines 1-3, as thought by Blum); wherein the first lens has a first electrical contact; and wherein the first conductive path is electrically coupled to the first electrical contact (fig. 1 and 2a; paragraph 37, lines 1-4, as thought by Swab).

Regarding claim 57, Swab teaches (fig. 1) teaches a first method (paragraph 45), comprising: providing a capacitive touch switch (50) (paragraph 36, lines 6-8);

Swab does not teach disposing a plurality of electronic components on the capacitive switch; and coupling the capacitive touch switch to a partial enclosure. Blum teaches power switch for applying and removing power to either the lenses or to the electronics (paragraph 63, lines 16-19). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the power switch as taught by Blum in the device of Swab, since it would have provided the predictable result of

applying and removing power to either the lenses or to the electronics or both which may either be built into the lenses or the frame front or both.

Regarding claim 58, Swab teaches further comprising the step of disposing the enclosure substantially within a temple of an eyeglass frame (fig.1, 50; paragraph 36, lines 6-8).

Regarding claim 59, Swab teaches (fig. 1) wherein the eye glass frame comprises electro-active eyeglass frames; wherein the eyeglass frame comprises a first conductive path; and wherein the first method further comprises the step of electrically coupling at least one of the electronic components to the first conductive path (paragraph 45).

Regarding claim 60, Swab teaches further comprising the step of applying a conformal coating to the plurality of electronic components (fig. 8; paragraph 46).

Regarding claim 61, Swab teaches wherein the capacitive touch switch and the enclosure are configured to be pressure fitted (paragraph 36, lines 6-8).

Response to Arguments

3. Applicant's arguments filed 08/23/2013 have been fully considered but they are not persuasive.

In response to applicant's arguments that the Independent Claim 41 recites, "wherein the first electrical conductor is configured to couple the electronics module to the first temple." The Examiner acknowledges that Swab fails to teach this feature. Instead, the Examiner asserts that "Blum teaches a conductor may be housed in each temple of a frame where each temple provides a single power terminal connection to the electronics". This does not meet the recited feature.

The specification at paragraphs [0074]-[0076] clearly defines a conductor that "couples" a module to the frame as physically securing or applying a force to the module, as opposed to simply providing an electrical connection:

Some embodiments provided herein may comprise an electrical conductor (such as a lug) that may be disposed in, or coupled to, one of the temples of an electronic eyeglass frame that may both provide a part of a conductive path from the temple to the lens housing, as well as securing electronic components (or an electronics module that may hold one or more electronic components) to the temple. That is, for example, the electrical conductor may be configured in such a way that it may hold (or secure) an electronics module in place on the frames (i.e. coupled to and/or within the temple). In this manner, the inventors have found that, in some embodiments, such electrical conductors may provide for a more robust electrical connection from the electrical

components disposed within the electronics module to other components on the frame (such as those that may be located on the lens housing). This may be due, in part, to the configuration of the electrical conductors to apply a force to the electronic module or the components therein, which may thereby maintain the electrical contact even when the eyewear is in use. Moreover, utilizing a conductor in this manner may also reduce the need to use multiple fasteners for the electronics module because, for instance, at least a portion (e.g. one side of) the electronics module may be held in place by the electrical conductor (Specification at [0074].)

Blum does not disclose or suggest this type of physical coupling of an electronics module to a temple by an electrical conductor.

As shown in FIGS. 11A and 11B, Blum discloses that a conductor (e.g., electrical contact points 4115) provides a power terminal connection to the electronics and/or lenses near hinge 4105 (See Blum at [0063].) But Blum does not disclose or suggest that the electrical conductor can be configured to couple the electronics themselves to the temple, as recited by independent claim 41.

The examiner respectfully disagrees with applicants arguments regarding independent claim 41 because Swab discloses Frame 24 has pads 42 and 44 located near hinges 28 and 26, respectively. Temples 20 and 19 also have pads 46 and 48 which contact pads 42 and 44 respectively when temples 20 and 19 are in open position. The pads, when in contact, complete the electrical path thereby activating the circuits of apparatus 36. Alternatively, a switch 50 may be located on temples 19 or 20

to activate the circuits in paragraph [0036], fig. 2a. Swab also discloses the connected hinge which permits electrical conduction between the both temples and the frame enables the sharing of functionality between the left and right temples in paragraph [0037].

The Examiner acknowledges that Swab does not "**specifically**" teaches this limitation but Blum discloses "a conductor may be housed in each temple of a frame where each temple provides a single power terminal connection to the electronics and or lenses in the frame" in paragraph [0063] as indicated in page 3 of office action. Blum also discloses "The charging device may be adapted for directly or indirectly coupling to an energy source. The temple or the hinge or the end-piece may be adapted for providing an electrical connection with the frame only when the frame is opened and the end-piece may be capable of attaching to a plurality of different temples each capable of receiving the end-piece".

Therefore, any ordinary skill in the art would conclude that the teachings of Swab and Blum substantially satisfy the limitations of claim 41. Thus, in view of the above reasons, Examiner maintains rejections.

In response to applicant's arguments that Blum does not disclose or suggest coupling the capacitive touch switch to a partial enclosure, as that term is used in the specification and recited by independent claim 57. Further, the Examiner also fails to indicate how Blum teaches disposing a plurality of electronic components on the capacitive switch.

The examiner respectfully disagrees with applicants arguments regarding independent claim 41 because Blum discloses “a tilt switch 1080 may be used to break the electrical connection from one of the two conductive wires 1070, 1071 as part of a control mechanism for electro-active lenses” in paragraph [0055], fig. 9. Tilt switch may contain plurality of electrical contacts.

Therefore, any ordinary skill in the art would conclude that the teachings of Blum substantially satisfy the limitations of claim 57. Thus, in view of the above reasons, Examiner maintains rejections.

Conclusion

4. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MUSTAK CHOUDHURY whose telephone number is (571)272-5247. The examiner can normally be reached on Monday-Friday, 8:00AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ricky Mack can be reached on 571-272-2333. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/MUSTAK CHOUDHURY/
Examiner, Art Unit 2872

October 28, 2013

/Scott J Sugarman/
Primary Examiner, Art Unit 2872

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13372240	WILLEY, CHARLES
	Examiner	Art Unit
	MUSTAK CHOUDHURY	2872

CPC- SEARCHED		
Symbol	Date	Examiner

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
351	158, 159.03	05/09/2013	MC
	Update EAST search	10/25/2013	MC

SEARCH NOTES		
Search Notes	Date	Examiner
EAST search history attached	05/14/2013	MC
Limited Keyword Search	10/25/2013	MC
Updated EAST search -- attached	10/25/2013	MC

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner

/MUSTAK CHOUDHURY/ Examiner.Art Unit 2872	

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13372240	WILLEY, CHARLES
	Examiner	Art Unit
	MUSTAK CHOUDHURY	2872

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☒ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

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Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13372240	WILLEY, CHARLES
	Examiner	**Art Unit**
	MUSTAK CHOUDHURY	2872

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
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CLAIM		DATE								
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EAST Search History

EAST Search History (Prior Art)

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L13	39	(("2930857") or ("2007121061") or ("2008273166") or ("2008273166") or ("20050237485") or ("6115177") or ("5742379") or ("6719425") or ("4418990") or ("20050225723") or ("2010080999") or ("5463428") or ("2008316420") or ("5764338") or ("2009081542")).PN. or (49/991951).APP.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/10/25 16:02
L14	144	(("2930857") or ("2007121061") or ("2008273166") or ("2008273166") or ("20050237485") or ("6115177") or ("5742379") or ("6719425") or ("4418990") or ("20050225723") or ("2010080999") or ("5463428") or ("2008316420") or ("5764338") or ("2009081542") or ("20110058141") or ("4,418,990") or ("5,742,379") or ("6,115,177") or ("6,719,425") or ("20010007493") or ("20010043266") or ("20020140899") or ("2004000733") or ("4,756,605") or ("4,875,030") or ("4,907,860") or ("4,967,268") or ("4,991,258") or ("4,991,951") or ("5,182,585") or ("5,463,428") or ("5,657,107") or ("5,760,869") or ("5,764,338") or ("5,835,185") or ("6,097,450") or ("6,336,250") or ("6,582,075") or ("6,595,634") or ("6,626,532") or ("6,866,386") or ("7,009,757") or ("7,063,420") or ("7,104,645") or ("7,140,727") or ("7,425,066") or ("7,784,935") or ("7,813,048") or ("20050225723") or ("20050237485") or ("20050242771") or ("20050264752") or ("2005078274") or ("2005270479") or ("2005270481") or ("2006023158") or ("2006092340") or ("2006203186") or ("20070296918") or ("2007121061") or ("2007258039") or ("2008O106695") or ("2008273166") or ("2008316420") or ("20100177277") or ("20100201938") or ("20100309426") or ("2930857") or ("US-4,152,846US-4,283,127")).PN. or (49/991951).APP.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/10/25 16:02

L15	150	(("2930857") or ("2007121061") or ("2008273166") or ("2008273166") or ("20050237485") or ("6115177") or ("5742379") or ("6719425") or ("4418990") or ("20050225723") or ("2010080999") or ("5463428") or ("2008316420") or ("5764338") or ("2009081542") or ("20110058141") or ("4,418,990") or ("5,742,379") or ("6,115,177") or ("6,719,425") or ("20010007493") or ("20010043266") or ("20020140899") or ("2004000733") or ("4,756,605") or ("4,875,030") or ("4,907,860") or ("4,967,268") or ("4,991,258") or ("4,991,951") or ("5,182,585") or ("5,463,428") or ("5,657,107") or ("5,760,869") or ("5,764,338") or ("5,835,185") or ("6,097,450") or ("6,336,250") or ("6,582,075") or ("6,595,634") or ("6,626,532") or ("6,866,386") or ("7,009,757") or ("7,063,420") or ("7,104,645") or ("7,140,727") or ("7,425,066") or ("7,784,935") or ("7,813,048") or ("20050225723") or ("20050237485") or ("20050242771") or ("20050264752") or ("2005078274") or ("2005270479") or ("2005270481") or ("2006023158") or ("2006092340") or ("2006203186") or ("20070296918") or ("2007121061") or ("2007258039") or ("2008O106695") or ("2008273166") or ("2008316420") or ("20100177277") or ("20100201938") or ("20100309426") or ("2930857") or ("4,152,846") or ("4,283,127")).PN. or (49/991951).APP.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/10/25 16:02
L16	2	("20070296918").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/10/25 16:02
L17	2	("20050264752").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/10/25 16:02
L18	0	("2andelectric$3nearconductor").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/10/25 16:02
L19	76	L2 and electric$3 near conductor	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	OR	ON	2013/10/25 16:02

			DERWENT			
L20	0	L2 and electric$3 near conductor and elctron$3 near frame	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2013/10/25 16:02
L21	0	L2 and electric$3 near conductor and elctron$3 and frame	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2013/10/25 16:02
L22	71	L2 and electric$3 near conductor and frame	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2013/10/25 16:02
L23	71	L2 and electric$3 near conductor and frame	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2013/10/25 16:02
L24	2	("6259501").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/10/25 16:02
L25	7	("2004001178").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/10/25 16:02
L26	8	(("2007046887") or ("2007200998")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/10/25 16:02
L27	2	("20070216862").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/10/25 16:02
L28	14	(("2007046887") or ("2007200998") or ("20070216862") or ("2008273166") or ("5835185")).PN.	US-PGPUB; USPAT; USOCR;	OR	OFF	2013/10/25 16:02

			FPRS; EPO; JPO; DERWENT			
L29	150	(("2930857") or ("2007121061") or ("2008273166") or ("2008273166") or ("20050237485") or ("6115177") or ("5742379") or ("6719425") or ("4418990") or ("20050225723") or ("2010080999") or ("5463428") or ("2008316420") or ("5764338") or ("2009081542") or ("20110058141") or ("4,418,990") or ("5,742,379") or ("6,115,177") or ("6,719,425") or ("20010007493") or ("20010043266") or ("20020140899") or ("2004000733") or ("4,756,605") or ("4,875,030") or ("4,907,860") or ("4,967,268") or ("4,991,258") or ("4,991,951") or ("5,182,585") or ("5,463,428") or ("5,657,107") or ("5,760,869") or ("5,764,338") or ("5,835,185") or ("6,097,450") or ("6,336,250") or ("6,582,075") or ("6,595,634") or ("6,626,532") or ("6,866,386") or ("7,009,757") or ("7,063,420") or ("7,104,645") or ("7,140,727") or ("7,425,066") or ("7,784,935") or ("7,813,048") or ("20050225723") or ("20050237485") or ("20050242771") or ("20050264752") or ("2005078274") or ("2005270479") or ("2005270481") or ("2006023158") or ("2006092340") or ("2006203186") or ("20070296918") or ("2007121061") or ("2007258039") or ("2008O106695") or ("2008273166") or ("2008316420") or ("20100177277") or ("20100201938") or ("20100309426") or ("2930857") or ("4,152,846") or ("4,283,127")).PN. or (49/991951).APP.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/10/25 16:02
L30	2	("20080129955").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/10/25 16:02
L31	2	("20100066972").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/10/25 16:02
L32	2	("20080239452").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/10/25 16:02
L33	24	("2005/0264752").URPN.	USPAT	OR	ON	2013/10/25 16:02

L34	2	("20100271588").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/10/25 16:02
L35	2	("20110102734").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/10/25 16:02
L36	0	("2009/0201460").URPN.	USPAT	OR	ON	2013/10/25 16:02
L37	0	("2010/0066972").URPN.	USPAT	OR	ON	2013/10/25 16:02
L38	7	("2005/0159182").URPN.	USPAT	OR	ON	2013/10/25 16:02
L39	0	("2010/0177277").URPN.	USPAT	OR	ON	2013/10/25 16:02
L40	78	("3245315" | "4300818").PN. OR ("4991951").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2013/10/25 16:02
L41	1	("2008/0239452").URPN.	USPAT	OR	ON	2013/10/25 16:02
L43	2	("20080089545").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/10/25 16:02
L45	1	("2010/0271588").URPN.	USPAT	OR	ON	2013/10/25 16:02
L46	18	("2008/0089545").URPN.	USPAT	OR	ON	2013/10/25 16:02
L47	3	("2005/0239502").URPN.	USPAT	OR	ON	2013/10/25 16:02
L48	19	(charles near willey).in.	USPAT	OR	ON	2013/10/25 16:02
L49	2	("20110058141").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/10/25 16:02
L50	3	("2005/0239502").URPN.	USPAT	OR	ON	2013/10/25 16:02
L51	0	("2009/0201460").URPN.	USPAT	OR	ON	2013/10/25 16:02
L52	33036	electric$3 near conductor and frame	US-PGPUB; USPAT; USOCR;	OR	ON	2013/10/25 16:13

			FPRS; EPO; JPO; DERWENT			
L53	71	2 and electric$3 near conductor and frame	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2013/10/25 16:13
S1	1	(13/372240).APP.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/05/09 11:18
S2	1336	(351/158).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/05/09 14:52
S3	1406	(351/158,159.03).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/05/09 15:01
S4	46	S3 and eye near glass$3 near frame	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2013/05/09 15:03
S5	4	("2005/0248722").URPN.	USPAT	OR	ON	2013/05/09 15:08
S6	297	("1026272" | "1370806" | "20010038491" | "20020087330" | "20020098877" | "20020118825" | "20020143912" | "20020159023" | "20020169539" | "20020176330" | "20020197961" | "20030003969" | "20030022690" | "20030067585" | "20030068057" | "20030073460" | "20030162510" | "20040000733" | "20040029552" | "20040044427" | "20040048569" | "20040128399" | "20040128737" | "20040132509" | "20040136293" | "20040156012" | "20040157649" | "20040160572" | "20040160573" | "20040239874" | "20050040192" | "20050046789" | "20050046790" | "20050128431" | "20050159182" | "20050185815" | "20050201585" | "20050202857" | "20050248722" | "20060072067" | "20060132382" | "20060146277" | "20060160573" | "20060183427" | "20060197907" |	US-PGPUB; USPAT; USOCR	OR	ON	2013/05/09 15:09

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S7	27	S6 and electric$3 near conduct$3	US-PGPUB; USPAT; USOCR	OR	ON	2013/05/09 15:56
S8	1	S6 and electronic$3 near conduct$3	US-PGPUB; USPAT; USOCR	OR	ON	2013/05/09 15:59
S9	39	(("2930857") or ("2007121061") or ("2008273166") or ("2008273166") or ("20050237485") or ("6115177") or ("5742379") or ("6719425") or ("4418990") or ("20050225723") or ("2010080999") or ("5463428") or ("2008316420") or ("5764338") or ("2009081542")).PN. or (49/991951).APP.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/05/09 16:14
S10	142	(("2930857") or ("2007121061") or ("2008273166") or ("2008273166") or ("20050237485") or ("6115177") or ("5742379") or ("6719425") or ("4418990") or ("20050225723") or ("2010080999") or ("5463428") or ("2008316420") or ("5764338") or ("2009081542") or ("20110058141") or ("4,418,990") or ("5,742,379") or ("6,115,177") or ("6,719,425") or ("20010007493") or ("20010043266") or ("20020140899") or ("2004000733") or ("4,756,605") or ("4,875,030") or ("4,907,860") or ("4,967,268") or ("4,991,258") or ("4,991,951") or ("5,182,585") or ("5,463,428") or ("5,657,107") or ("5,760,869") or ("5,764,338") or ("5,835,185") or ("6,097,450") or ("6,336,250") or ("6,582,075") or ("6,595,634") or ("6,626,532") or ("6,866,386") or ("7,009,757") or ("7,063,420") or ("7,104,645") or ("7,140,727") or ("7,425,066") or ("7,784,935") or ("7,813,048") or ("20050225723") or ("20050237485") or ("20050242771") or ("20050264752") or ("2005078274") or ("2005270479") or ("2005270481") or ("2006023158") or ("2006092340") or ("2006203186") or ("20070296918") or ("2007121061") or ("2007258039") or ("2008O106695") or ("2008273166") or ("2008316420") or ("20100177277") or ("20100201938") or ("20100309426") or ("2930857") or ("US-4,152,846US-4,283,127")).PN. or (49/991951).APP.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/05/09 16:24

S11	148	(("2930857") or ("2007121061") or ("2008273166") or ("2008273166") or ("20050237485") or ("6115177") or ("5742379") or ("6719425") or ("4418990") or ("20050225723") or ("2010080999") or ("5463428") or ("2008316420") or ("5764338") or ("2009081542") or ("20110058141") or ("4,418,990") or ("5,742,379") or ("6,115,177") or ("6,719,425") or ("20010007493") or ("20010043266") or ("20020140899") or ("2004000733") or ("4,756,605") or ("4,875,030") or ("4,907,860") or ("4,967,268") or ("4,991,258") or ("4,991,951") or ("5,182,585") or ("5,463,428") or ("5,657,107") or ("5,760,869") or ("5,764,338") or ("5,835,185") or ("6,097,450") or ("6,336,250") or ("6,582,075") or ("6,595,634") or ("6,626,532") or ("6,866,386") or ("7,009,757") or ("7,063,420") or ("7,104,645") or ("7,140,727") or ("7,425,066") or ("7,784,935") or ("7,813,048") or ("20050225723") or ("20050237485") or ("20050242771") or ("20050264752") or ("2005078274") or ("2005270479") or ("2005270481") or ("2006023158") or ("2006092340") or ("2006203186") or ("20070296918") or ("2007121061") or ("2007258039") or ("2008O106695") or ("2008273166") or ("2008316420") or ("20100177277") or ("20100201938") or ("20100309426") or ("2930857") or ("4,152,846") or ("4,283,127")).PN. or (49/991951).APP.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/05/09 16:24
S12	2	("20070296918").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/05/09 16:58
S13	2	("20050264752").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/05/09 17:00
S14	0	("2andelectric$3nearconductor").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/05/09 17:06
S15	64	S2 and electric$3 near conductor	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	OR	ON	2013/05/09 17:06

			DERWENT			
S16	0	S2 and electric$3 near conductor and elctron$3 near frame	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2013/05/09 17:07
S17	0	S2 and electric$3 near conductor and elctron$3 and frame	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2013/05/09 17:07
S18	60	S2 and electric$3 near conductor and frame	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2013/05/09 17:07
S19	60	S2 and electric$3 near conductor and frame	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2013/05/09 17:13
S20	2	("6259501").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/05/09 17:14
S21	6	("2004001178").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/05/09 17:15
S22	8	(("2007046887") or ("2007200998")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/05/09 17:16
S23	2	("20070216862").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/05/09 17:19
S24	14	(("2007046887") or ("2007200998") or ("20070216862") or ("2008273166") or ("5835185")).PN.	US-PGPUB; USPAT; USOCR;	OR	OFF	2013/05/09 17:33

			FPRS; EPO; JPO; DERWENT			
S25	148	(("2930857") or ("2007121061") or ("2008273166") or ("2008273166") or ("20050237485") or ("6115177") or ("5742379") or ("6719425") or ("4418990") or ("20050225723") or ("2010080999") or ("5463428") or ("2008316420") or ("5764338") or ("2009081542") or ("20110058141") or ("4,418,990") or ("5,742,379") or ("6,115,177") or ("6,719,425") or ("20010007493") or ("20010043266") or ("20020140899") or ("2004000733") or ("4,756,605") or ("4,875,030") or ("4,907,860") or ("4,967,268") or ("4,991,258") or ("4,991,951") or ("5,182,585") or ("5,463,428") or ("5,657,107") or ("5,760,869") or ("5,764,338") or ("5,835,185") or ("6,097,450") or ("6,336,250") or ("6,582,075") or ("6,595,634") or ("6,626,532") or ("6,866,386") or ("7,009,757") or ("7,063,420") or ("7,104,645") or ("7,140,727") or ("7,425,066") or ("7,784,935") or ("7,813,048") or ("20050225723") or ("20050237485") or ("20050242771") or ("20050264752") or ("2005078274") or ("2005270479") or ("2005270481") or ("2006023158") or ("2006092340") or ("2006203186") or ("20070296918") or ("2007121061") or ("2007258039") or ("2008O106695") or ("2008273166") or ("2008316420") or ("20100177277") or ("20100201938") or ("20100309426") or ("2930857") or ("4,152,846") or ("4,283,127")).PN. or (49/991951).APP.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/05/09 17:35
S26	2	("20080129955").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/05/10 07:50
S27	2	("20100066972").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/05/10 07:51
S28	2	("20080239452").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/05/10 08:04
S29	22	("2005/0264752").URPN.	USPAT	OR	ON	2013/05/10 08:10

S30	2	("20100271588").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/05/10 08:14
S31	2	("20110102734").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/05/10 08:21
S32	0	("2009/0201460").URPN.	USPAT	OR	ON	2013/05/10 08:22
S33	0	("2010/0066972").URPN.	USPAT	OR	ON	2013/05/10 08:22
S34	7	("2005/0159182").URPN.	USPAT	OR	ON	2013/05/10 08:22
S35	0	("2010/0177277").URPN.	USPAT	OR	ON	2013/05/10 08:23
S36	77	("3245315" | "4300818").PN. OR ("4991951").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2013/05/10 08:23
S37	0	("2008/0239452").URPN.	USPAT	OR	ON	2013/05/10 08:28
S38	112	("2794085" | "2830132" | "2856466" | "3095483" | "3329957" | "3769663" | "3943925" | "4636866" | "4648130" | "4682363" | "4712244" | "4753514" | "4796987" | "4824233" | "4856086" | "4858248" | "4864646" | "4882769" | "4904078" | "4952024" | "5003300" | "5020150" | "5059017" | "5106179" | "5128659" | "5133596" | "5146619" | "5323189").PN. OR ("5606743").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2013/05/10 08:28
S39	2	("20080089545").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/05/10 08:31
S40	2	("20050239502").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/05/10 08:33
S41	1	("2010/0271588").URPN.	USPAT	OR	ON	2013/05/10 08:36
S42	14	("2008/0089545").URPN.	USPAT	OR	ON	2013/05/10 08:37
S43	2	("2005/0239502").URPN.	USPAT	OR	ON	2013/05/10 08:38
S44	19	(charles near willey).in.	USPAT	OR	ON	2013/05/10

						08:43
S45	2	("20110058141").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/05/14 12:13
S46	2	("2005/0239502").URPN.	USPAT	OR	ON	2013/05/14 13:35
S47	0	("2009/0201460").URPN.	USPAT	OR	ON	2013/05/14 13:38

10/25/2013 6:24:31 PM
C:\Users\mchoudhury\Documents\EAST\Workspaces\13372240.wsp

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:	Confirmation No.: 8374
Charles WILLEY	Art Unit: 2872
Appl. No.: 13/372,240	Examiner: CHOUDHURY, Mustak
Filed: February 13, 2012	Atty. Docket: 3373.0600001
For: **Electronic Frames Comprising Electrical Conductors**	

Reply Under 37 C.F.R. § 1.111

Mail Stop Amendment

Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

Commissioner:

In reply to the Office Action dated May 23, 2013, Applicant submits the following Remarks.

A Listing of the Claims begins on page 2 of this paper.

Remarks begin on page 7 of this paper.

It is not believed that extensions of time or fees for net addition of claims are required beyond those that may otherwise be provided for in documents accompanying this paper. However, if additional extensions of time are necessary to prevent abandonment of this application, then such extensions of time are hereby petitioned under 37 C.F.R. § 1.136(a), and any fees required therefor (including fees for net addition of claims) are hereby authorized to be charged to our Deposit Account No. 19-0036.

Listing of the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application.

1. - 40. (Cancelled)

41. (Previously Presented) A first device, comprising:

a lens housing adapted to support a first lens and a second lens;

a first temple movably coupled to the lens housing;

a second temple movably coupled to the lens housing;

an electronics module disposed at least partially within the first temple; and

a first electrical conductor coupled to the first temple;

wherein a first conductive path is provided from the first temple to the lens housing at least in part by the first electrical conductor; and

wherein the first electrical conductor is configured to couple the electronics module to the first temple.

42. (Previously Presented) The first device of claim 41, wherein the first electrical conductor is configured to constrain the electronics module.

43. (Previously Presented) The first device of claim 41, wherein the first electrical conductor is integrally coupled to the first temple.

44. (Previously Presented) The first device of claim 43, wherein the first electrical conductor is insert molded with the first temple.

45. (Previously Presented) The first device of claim 41, wherein the first electrical conductor comprises a lug.

46. (Previously Presented) The first device of claim 41, further comprising:

a second electrical conductor coupled to the first temple;

wherein a second conductive path is provided from the first temple to the lens housing at least in part by the second electrical conductor; and

wherein the second electrical conductor is configured to constrain the electronics module.

47. (Previously Presented) The first device of claim 41, wherein the electronics module comprises any two of: a power source, a controller, and a sensor.

48. (Previously Presented) The first device of claim 47, wherein the sensor comprises a touch switch.

49. (Previously Presented) The first device of claim 41, wherein the first electrical conductor is electrically coupled to a slip ring.

50. (Previously Presented) The first device of claim 49, further comprising a hinge, wherein the slip ring is disposed substantially within the hinge.

51. (Previously Presented) The first device of claim 41, wherein the electronics module is configured to be removably coupled to the first temple.

52. (Previously Presented) The first device of claim 41, wherein the electronics module comprises an opening;

wherein the first electrical conductor has a first portion that extends a first distance of at least approximately 1 cm into the electronic module through the opening, and

wherein the first electrical conductor has a second portion that extends a second distance of at least approximately 1 cm outside of the electronics module away from the opening.

53. (Previously Presented) The first device of claim 52,

wherein the first distance that the first portion of the first electrical conductor extends into the electronics module is at least approximately 2 cm, and

wherein the second distance that the second portion of the first electrical conductor extends away from the opening is at least approximately 2 cm.

54. (Previously Presented) The first device of claim 41, wherein the first electrical conductor comprises a single structural element.

55. (Previously Presented) The first device of claim 41, wherein the first electrical conductor is configured to maintain the first conductive path as the first temple is moved relative to the lens housing.

56. (Previously Presented) The first device of claim 41, further comprising a first lens and a second lens coupled to the lens housing;

wherein the first lens has a first electrical contact; and

wherein the first conductive path is electrically coupled to the first electrical contact.

57. (Previously Presented) A first method, comprising:

providing a capacitive touch switch;

disposing a plurality of electronic components on the capacitive switch; and

coupling the capacitive touch switch to a partial enclosure.

58. (Previously Presented) The first method of claim 57, further comprising the step of disposing the enclosure substantially within a temple of an eyeglass frame.

59. (Previously Presented) The first method of claim 58,

wherein the eye glass frame comprises electro-active eyeglass frames;

wherein the eyeglass frame comprises a first conductive path; and

wherein the first method further comprises the step of electrically coupling at least one of the electronic components to the first conductive path.

60. (Previously Presented) The first method of claim 57, further comprising the step of applying a conformal coating to the plurality of electronic components.

61. (Previously Presented) The first method of claim 57, wherein the capacitive touch switch and the enclosure are configured to be pressure fitted.

Remarks

Reconsideration of this Application is respectfully requested.

Claims 41-61 are pending in the application, with claims 41 and 57 being the independent claims. Claims 1-40 were previously canceled without prejudice to or disclaimer of the subject matter therein.

Based on the following remarks, Applicant respectfully requests that the Examiner reconsider all outstanding rejections and that they be withdrawn.

I. Rejections under 35 U.S.C. § 103

Claims 41-61 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over U.S. Publication No. 2005/0239502 to Swab *et al.* ("Swab") in view of U.S. Publication No. 2009/0201460 to Blum *et al.* ("Blum"). Applicants respectfully traverse this rejection.

A. Independent Claim 41

Independent claim 41 recites, *inter alia*, "wherein the first electrical conductor is *configured to couple* the electronics module *to the first temple*." The Examiner acknowledges that Swab fails to teach this feature. (Office Action, p. 3.) Instead, the Examiner asserts that "Blum teaches a conductor may be housed in each temple of a frame where each temple provides a single power terminal connection to the electronics." (*Id.*) This does not meet the recited feature.

The specification at paragraphs [0074]-[0076] clearly defines a conductor that "couples" a module to the frame as physically securing or applying a force to the module, as opposed to simply providing an electrical connection:

> Some embodiments provided herein may comprise an electrical conductor (such as a lug) that may be disposed in, or coupled to, one of the temples

> of an electronic eyeglass frame that may both provide a part of a conductive path from the temple to the lens housing, as well as securing electronic components (or an electronics module that may hold one or more electronic components) to the temple. That is, for example, the electrical conductor may be configured in such a way that it may hold (or secure) an electronics module in place on the frames (i.e. coupled to and/or within the temple). In this manner, the inventors have found that, in some embodiments, such electrical conductors may provide for a more robust electrical connection from the electrical components disposed within the electronics module to other components on the frame (such as those that may be located on the lens housing). This may be due, in part, to the configuration of the electrical conductors to apply a force to the electronic module or the components therein, which may thereby maintain the electrical contact even when the eyewear is in use. Moreover, utilizing a conductor in this manner may also reduce the need to use multiple fasteners for the electronics module because, for instance, at least a portion (e.g. one side of) the electronics module may be held in place by the electrical conductor.

(Specification at [0074].) Blum does not disclose or suggest this type of physical coupling of an electronics module to a temple by an electrical conductor.

As shown in FIGS. 11A and 11B, Blum discloses that a conductor (e.g., electrical contact points 4115) provides a power terminal connection to the electronics and/or lenses near hinge 4105. (*See* Blum at [0063].) But Blum does not disclose or suggest that the electrical conductor can be configured to *couple* the electronics themselves *to the temple*, as recited by independent claim 41. Rather, Blum teaches that a conductor can provide a power connection for the electronics and/or lenses, not that the conductor couples the electronic to the temple. The Examiner's assertion that the combination of Swab and Blum "would have provided the predictable result of charging both batteries simultaneously by having circuitry and/or conducting material traversing the entire length of the spectacle frame" (Office Action, p. 3) suggests the Examiner interprets Blum as teaching electrical coupling of components within the frame. Without addressing the merits of this interpretation with respect to Blum, Applicants assert that

such an interpretation clearly does not meet the features recited by claim 41 in light of the description of the term "coupled" provided in the specification.

For at least these reasons, the combination of Swab and Blum fails to teach or suggest each of the features recited by independent claim 41. Thus, claim 41 is patentable over Swab and Blum. Claims 42-56 depend from and add features to independent claim 41, and are therefore also patentable for at least these same reasons. Accordingly, Applicant respectfully requests that the rejection of claims 41-56 under 35 U.S.C. § 103(a) be reconsidered and withdrawn.

B. Independent Claim 57

Independent claim 57 recites, *inter alia*, "disposing a plurality of electronic components on the capacitive switch; and coupling the capacitive touch switch to a partial enclosure." The Examiner acknowledges that Swab fails to teach these features. (Office Action, p. 6.) Instead, the Examiner asserts that "Blum teaches [a] power switch for applying and removing power to either the lenses or to the electronics." (*Id.*) As similarly discussed with respect to claim 41, this does not meet the recited feature. Although Blum discloses "the opening and the closing of the frame may act as a power switch" (Blum at [0063]), Blum does not disclose or suggest *coupling* the capacitive touch switch *to a partial enclosure*, as that term is used in the specification and recited by independent claim 57. Further, the Examiner also fails to indicate how Blum teaches disposing a plurality of electronic components on the capacitive switch.

For at least these reasons, the combination of Swab and Blum fails to teach or suggest each of the features recited by independent claim 57. Thus, claim 57 is patentable over Swab and Blum. Claims 58-61 depend from and add features to independent claim 57, and are therefore also patentable for at least these same reasons.

Accordingly, Applicant respectfully requests that the rejection of claims 57-61 under 35 U.S.C. § 103(a) be reconsidered and withdrawn.

Conclusion

All of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicant therefore respectfully requests that the Examiner reconsider all presently outstanding rejections and that they be withdrawn. Applicant believes that a full and complete reply has been made to the outstanding Office Action and, as such, the present application is in condition for allowance. If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at the number provided.

Prompt and favorable consideration of this Reply is respectfully requested.

Respectfully submitted,

STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C.



Jason A. Fitzsimmons
Attorney for Applicant
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Date: August 23, 2013

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1735274_1

Electronic Acknowledgement Receipt

EFS ID:	16675248
Application Number:	13372240
International Application Number:	
Confirmation Number:	8374
Title of Invention:	ELECTRONIC FRAMES COMPRISING ELECTRICAL CONDUCTORS
First Named Inventor/Applicant Name:	Charles Willey
Customer Number:	115626
Filer:	Jason Alan Fitzsimmons/Aran Mottley
Filer Authorized By:	Jason Alan Fitzsimmons
Attorney Docket Number:	3373.0600001
Receipt Date:	23-AUG-2013
Filing Date:	13-FEB-2012
Time Stamp:	17:07:24
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		33730600001-OAR.pdf	1160060 b30624f32e00e3e183bb254a42a1dcbc710dd15c	yes	11

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Transmittal Letter	1	1
	Amendment/Req. Reconsideration-After Non-Final Reject	2	2
	Claims	3	7
	Applicant Arguments/Remarks Made in an Amendment	8	11
Warnings:			
Information:			
	Total Files Size (in bytes):	1160060	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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Sterne Kessler Goldstein Fox
ATTORNEYS AT LAW

August 23, 2013

Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

Confirmation No. 8374
Art Unit 2872

Re: U.S. Utility Patent Application
Appl. No. 13/372,240; Filing Date: February 13, 2012
For: **Electronic Frames Comprising Electrical Conductors**
Inventor: Charles WILLEY
Our Ref: 3373.0600001

Commissioner:

Transmitted herewith for appropriate action is the following document:

1. Reply Under 37 C.F.R. §1.111.

The above-listed document is filed electronically through EFS-Web.

In the event that extensions of time are necessary to prevent abandonment of this patent application, then such extensions of time are hereby petitioned.

The U.S. Patent and Trademark Office is hereby authorized to charge any fee deficiency, or credit any overpayment, to our Deposit Account No. 19-0036.

Respectfully submitted,

STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C.

Jason A. Fitzsimmons
Attorney for Applicant
Registration No. 65,367

JAF/cj
Enclosures

1735312_1

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 13/372,240	Filing Date 02/13/2012	☐ To be Mailed

ENTITY: ☒ LARGE ☐ SMALL ☐ MICRO

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT **08/23/2013**

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	* 21	Minus	** 21	= 0	X $80 =	0
Independent (37 CFR 1.16(h))	* 2	Minus	***3	= 0	X $420 =	0
☐ Application Size Fee (37 CFR 1.16(s))						
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
					TOTAL ADD'L FEE	0

AMENDMENT

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =	
☐ Application Size Fee (37 CFR 1.16(s))						
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
					TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

LIE
/TRACIE ROBERTSON/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**
If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
13/372,240	02/13/2012	Charles Willey	3373.0600001

CONFIRMATION NO. 8374

115626
Sterne, Kessler, Goldstein & Fox P.L.L.C.
1100 New York Avenue NW
Washington, DC 20005

POA ACCEPTANCE LETTER

OC000000062493380

Date Mailed: 07/15/2013

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 07/08/2013.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

/sleutchit/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
13/372,240	02/13/2012	Charles Willey	91904-831532

CONFIRMATION NO. 8374

POWER OF ATTORNEY NOTICE

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OC000000062493360

Date Mailed: 07/15/2013

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 07/08/2013.

- The Power of Attorney to you in this application has been revoked by the assignee who has intervened as provided by 37 CFR 3.71. Future correspondence will be mailed to the new address of record(37 CFR 1.33).

/sleutchit/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

PTO/SB/80 (11-08)
Approved for use through 11/30/2011. OMB 0651-0035
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

POWER OF ATTORNEY TO PROSECUTE APPLICATIONS BEFORE THE USPTO

I hereby revoke all previous powers of attorney given in the application identified in the attached statement under 37 CFR 3.73(b).

I hereby appoint:

[X] Practitioners associated with the Customer Number: **115626**

OR

[ ] Practitioner(s) named below (if more than ten patent practitioners are to be named, then a customer number must be used):

Name	Registration Number	Name	Registration Number

as attorney(s) or agent(s) to represent the undersigned before the United States Patent and Trademark Office (USPTO) in connection with any and all patent applications assigned only to the undersigned according to the USPTO assignment records or assignment documents attached to this form in accordance with 37 CFR 3.73(b).

Please change the correspondence address for the application identified in the attached statement under 37 CFR 3.73(b) to:

[X] The address associated with Customer Number: **115626**

OR

[ ] Firm or Individual Name			
Address			
City		State	Zip
Country			
Telephone		Email	

Assignee Name and Address:
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Roanoke, VA 24019
U.S.A.

A copy of this form, together with a statement under 37 CFR 3.73(b) (Form PTO/SB/96 or equivalent) is required to be filed in each application in which this form is used. The statement under 37 CFR 3.73(b) may be completed by one of the practitioners appointed in this form if the appointed practitioner is authorized to act on behalf of the assignee, and must identify the application in which this Power of Attorney is to be filed.

SIGNATURE of Assignee of Record

The individual whose signature and title is supplied below is authorized to act on behalf of the assignee

Signature		Date	6/10/13
Name	Ann-Kelley Winn	Telephone	(540) 685-2103
Title	General Counsel		

This collection of information is required by 37 CFR 1.31, 1.32 and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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PTO/SB/96 (07-09)
Approved for use through 07/31/2012. OMB 0651-0031
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STATEMENT UNDER 37 CFR 3.73(b)

Atty. Docket No. 3373.0600001

Applicant/Patent Owner: Charles WILLEY

Application No./Patent No.: 13/372,240 Filed/Issue Date: February 13, 2012

Titled: ELECTRONIC FRAMES COMPRISING ELECTRICAL CONDUCTORS

PixelOptics Inc., a Corporation

(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.

states that it is:

1. [X] the assignee of the entire right, title, and interest in;

2. [ ] an assignee of less than the entire right, title, and interest in (The extent (by percentage) of its ownership interest is _____ %); or

3. [ ] the assignee of an undivided interest in the entirety of (a complete assignment from one of the joint inventors was made)

the patent application/patent identified above, by virtue of either:

A. [ ] An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel _____, Frame _____, or for which a copy therefore is attached.

OR

B. [X] A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: Charles WILLEY To: PixelOptics Inc.

The document was recorded in the United States Patent and Trademark Office at

Reel 029138, Frame 0100, or for which a copy thereof is attached.

2. From: Charles WILLEY To: PixelOptics Inc.

The document was recorded in the United States Patent and Trademark Office at

Reel 029128, Frame 0794, or for which a copy thereof is attached.

3. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at

Reel _____, Frame _____, or for which a copy thereof is attached.

[ ] Additional documents in the chain of title are listed on a supplemental sheet(s).

[X] As required by 37 CFR 3.73(b)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (*i.e.*, a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

Signature Date

John P. McGroarty, Reg. No. 41,186 Attorney for Applicant

Printed or Typed Name Title

This collection of information is required by 37 CFR 3.73(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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Electronic Acknowledgement Receipt

EFS ID:	16239837
Application Number:	13372240
International Application Number:	
Confirmation Number:	8374
Title of Invention:	ELECTRONIC FRAMES COMPRISING ELECTRICAL CONDUCTORS
First Named Inventor/Applicant Name:	Charles Willey
Customer Number:	20350
Filer:	John P. McGroarty/Barbera Dooley
Filer Authorized By:	John P. McGroarty
Attorney Docket Number:	91904-831532
Receipt Date:	08-JUL-2013
Filing Date:	13-FEB-2012
Time Stamp:	14:14:00
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		3373_0600001_Poa.pdf	356436 c2d84cc62572a0ac0f9502362459577244164f4a8	yes	2

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Power of Attorney	1	1
	Assignee showing of ownership per 37 CFR 3.73.	2	2
Warnings:			
Information:			
	Total Files Size (in bytes):	356436	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES PATENT AND TRADEMARK OFFICE

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/372,240	02/13/2012	Charles Willey	91904-831532	8374

20350 7590 05/23/2013

KILPATRICK TOWNSEND & STOCKTON LLP
TWO EMBARCADERO CENTER
EIGHTH FLOOR
SAN FRANCISCO, CA 94111-3834

EXAMINER	
CHOUDHURY, MUSTAK	
ART UNIT	**PAPER NUMBER**
2872	

NOTIFICATION DATE	DELIVERY MODE
05/23/2013	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ipefiling@kilpatricktownsend.com
jlhice@kilpatrick.foundationip.com
mcollins@kilpatricktownsend.com

Office Action Summary	Application No. 13/372,240	Applicant(s) WILLEY, CHARLES	
	Examiner MUSTAK CHOUDHURY	Art Unit 2872	AIA (First Inventor to File) Status No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 February 2012*.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

5)☒ Claim(s) *41-61* is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6)☐ Claim(s) _____ is/are allowed.

7)☒ Claim(s) *41-61* is/are rejected.

8)☐ Claim(s) _____ is/are objected to.

9)☐ Claim(s) _____ are subject to restriction and/or election requirement.

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☒ The drawing(s) filed on *13 February 2012* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a)☐ All b)☐ Some * c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Interim copies:

a)☐ All b)☐ Some c)☐ None of the: Interim copies of the priority documents have been received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *See Continuation Sheet*.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

4) ☐ Other: _____.

Continuation of Attachment(s) 2). Information Disclosure Statement(s) (PTO/SB/08), Paper No(s)/Mail Date :03/23/2012; 12/14/2012; 02/05/2013; 02/20/2013.

DETAILED ACTION

Information Disclosure Statement

1. The information disclosure statements (IDSs) submitted on 03/23/2012, 12/14/2012, 02/05/2013 and 02/20/2013 have been considered by the examiner.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 41-61 are rejected under 35 U.S.C. 103(a) as being unpatentable over Swab et al. (US PUB 2005/0239502 A1, herein after "Swab") in view of Blum et al. (US PUB 2009/0201460 A1, herein after "Blum")

Regarding claim 41, Swab teaches (fig. 1 and 2a) a first device (12), comprising: a lens housing (24) adapted to support a first lens and a second lens; a first temple (19) movably coupled to the lens housing (24); a second temple (20) movably coupled to the lens housing (24); an electronics module (18) disposed at least partially within the first temple (19); and a first electrical conductor (40) coupled to the first temple (paragraph 35, lines 1-5); wherein a first conductive path is provided from the first temple (19) to the lens housing (24) at least in part by the first electrical conductor (40); and wherein the

first electrical conductor is configured to couple the electronics module to the first temple (paragraph 39).

Swab does not specifically teach the first electrical conductor is configured to couple the electronics module to the first temple. Blum teaches a conductor may be housed in each temple of a frame where each temple provides a single power terminal connection to the electronics (paragraph 63, lines 23-26). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to include first electrical conductor is configured to couple the electronics module to the first temple as taught by Blum in the device of Swab, since it would have provided the predictable result of charging both batteries simultaneously by having circuitry and/or conducting material traversing the entire length of the spectacle frame.

Regarding claim 42, Swab teaches (fig. 2a) wherein the first electrical conductor is configured to constrain the electronics module (paragraph 39, lines 7-9).

Regarding claim 43, Swab teaches (fig. 2a) wherein the first electrical conductor is integrally coupled to the first temple (paragraph 45, lines 5-11).

Regarding claim 44, Swab teaches (fig. 2a) wherein the first electrical conductor is insert molded with the first temple (paragraph 39, lines 7-9).

Regarding claim 45, Swab teaches wherein the first electrical conductor comprises a lug (paragraph 45, line 9).

Regarding claim 46, Swab teaches further comprising: a second electrical conductor coupled to the first temple; wherein a second conductive path is provided from the first temple to the lens housing at least in part by the second electrical conductor; and wherein the second electrical conductor is configured to constrain the electronics module (paragraph 39).

Regarding claim 47, Swab teaches wherein the electronics module comprises any two of: a power source (paragraph 45, lines 4-7), a controller, and a sensor (paragraph 44, lines 20-23).

Regarding claim 48, the combination of Swab and Blum teaches, wherein the sensor (paragraph 44, line 2 as taught by Swab) comprises a touch switch (paragraph 14, line 7 as taught by Blum).

Regarding claim 49, the combination of Swab and Blum teaches wherein the first electrical conductor is electrically coupled (fig. 2a, 40; paragraph 45, lines 4-7 as taught by Swab) to a slip ring (fig. 8, element 950, 951; paragraph 54, lines 7-9 as taught by Blum).

Regarding claim 50, the combination of Swab and Blum teaches further comprising a hinge (fig. 2d; paragraph 38, lines 4-6 as taught by Swab), wherein the slip ring is disposed substantially within the hinge (fig. 10B; paragraph 57, lines 1-7 as taught by Blum).

Regarding claim 51, Swab teaches wherein the electronics module is configured to be removably coupled to the first temple (fig. 2d; paragraph 35, line 21-24).

Regarding claim 52, Swab teaches wherein the electronics module comprises an opening; wherein the first electrical conductor has a first portion that extends a first distance of at least approximately 1 cm into the electronic module through the opening, and wherein the first electrical conductor has a second portion that extends a second distance of at least approximately 1 cm outside of the electronics module away from the opening (figs. 2b-2f; paragraph 35, lines 10-17 “one-eighth inch audio connector”, paragraph 38).

Regarding claim 53, Swab teaches wherein the first distance that the first portion of the first electrical conductor extends into the electronics module is at least approximately 2 cm, and wherein the second distance that the second portion of the first electrical conductor extends away from the opening is at least approximately 2 cm (figs. 2b-2f; paragraph 35, lines 10-17, paragraph 38).

Regarding claim 54, Swab teaches (fig. 2a) wherein the first electrical conductor (40) comprises a single structural element (paragraph 39, lines 8-9).

Regarding claim 55, Swab teaches (fig. 2a) wherein the first electrical conductor (40) is configured to maintain the first conductive path as the first temple (19) is moved relative to the lens housing (24) (paragraph 37, lines 1-4).

Regarding claim 56, the combination of Swab and Kokonaski teaches further comprising a first lens (612) and a second lens (612) coupled to the lens housing (611) (paragraph 81, lines 6-11 as taught by Kokonaski); wherein the first lens has a first electrical contact; and wherein the first conductive path is electrically coupled to the first electrical contact (paragraph 37, lines 1-4 as taught by Swab).

Regarding claim 57, Swab teaches (fig. 1) teaches a first method (paragraph 45), comprising: providing a capacitive touch switch (50) (paragraph 36, lines 6-8);

Swab does not teach disposing a plurality of electronic components on the capacitive switch; and coupling the capacitive touch switch to a partial enclosure. Blum teaches power switch for applying and removing power to either the lenses or to the electronics (paragraph 63, lines 16-19). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the power switch as taught by Blum in the device of Swab, since it would have provided the predictable result of

applying and removing power to either the lenses or to the electronics or both which may either be built into the lenses or the frame front or both.

Regarding claim 58, Swab teaches further comprising the step of disposing the enclosure substantially within a temple of an eyeglass frame (fig.1, 50; paragraph 36, lines 6-8).

Regarding claim 59, Swab teaches (fig. 1) wherein the eye glass frame comprises electro-active eyeglass frames; wherein the eyeglass frame comprises a first conductive path; and wherein the first method further comprises the step of electrically coupling at least one of the electronic components to the first conductive path (paragraph 45).

Regarding claim 60, Swab teaches further comprising the step of applying a conformal coating to the plurality of electronic components (fig. 8; paragraph 46).

Regarding claim 61, Swab teaches wherein the capacitive touch switch and the enclosure are configured to be pressure fitted (paragraph 36, lines 6-8).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MUSTAK CHOUDHURY whose telephone number is

(571)272-5247. The examiner can normally be reached on Monday-Friday, 8:00AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ricky Mack can be reached on 571-272-2333. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Mustak Choudhury/
Examiner, Art Unit 2872

May 14, 2013

/Scott J Sugarman/
Primary Examiner, Art Unit 2872

Notice of References Cited	Application/Control No. 13/372,240	Applicant(s)/Patent Under Reexamination WILLEY, CHARLES	
	Examiner MUSTAK CHOUDHURY	Art Unit 2872	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-2005/0239502	10-2005	Swab et al.	455/556.1
*	B	US-2009/0201460	08-2009	Blum et al.	351/158
	C	US-			
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13372240	WILLEY, CHARLES
	Examiner	Art Unit
	MUSTAK CHOUDHURY	2872

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	05/13/2013								
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Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13372240	WILLEY, CHARLES
	Examiner	**Art Unit**
	MUSTAK CHOUDHURY	2872

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
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	61	✓								

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	2	("20110058141").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/05/14 12:13
L2	2	("2005/0239502").URPN.	USPAT	OR	ON	2013/05/14 13:35
L3	0	("2009/0201460").URPN.	USPAT	OR	ON	2013/05/14 13:38
S1	1	(13/372240).APP.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/05/09 11:18
S2	1336	(351/158).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/05/09 14:52
S3	1406	(351/158,159.03).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/05/09 15:01
S4	46	S3 and eye near glass$3 near frame	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	ON	2013/05/09 15:03
S5	4	("2005/0248722").URPN.	USPAT	OR	ON	2013/05/09 15:08
S6	297	("1026272" | "1370806" | "20010038491" | "20020087330" | "20020098877" | "20020118825" | "20020143912" | "20020159023" | "20020169539" | "20020176330" | "20020197961" | "20030003969" | "20030022690" | "20030067585" | "20030068057" | "20030073460" | "20030162510" | "20040000733" | "20040029552" |	US-PGPUB; USPAT; USOCR	OR	ON	2013/05/09 15:09

"20040044427" | "20040048569" |
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"2999136" | "3104290" | "3119903" |
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S9	39	(("2930857") or ("2007121061") or ("2008273166") or ("2008273166") or ("20050237485") or ("6115177") or ("5742379") or ("6719425") or ("4418990") or ("20050225723") or ("2010080999") or ("5463428") or ("2008316420") or ("5764338") or ("2009081542")).PN. or (49/991951).APP.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	OR	OFF	2013/05/09 16:14
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S44	19	(charles near willey).in.	USPAT	OR	ON	2013/05/10 08:43

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PTO/SB/08A&B (07-09)

Substitute for form 1449/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				**Application Number**	13/372,240
				Filing Date	February 13, 2012
				First Named Inventor	Charles Willey
				Art Unit	~~TBA~~ 2872
(Use as many sheets as necessary)				Examiner Name	~~TBA~~ M.Choudhury
Sheet	1	of	1	Attorney Docket Number	91904-831532(011310US)

U.S. PATENT DOCUMENTS					
Examiner Initials*	Cite No.[1]	Document Number Number Kind Code[2] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
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Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3]	Number[4]	Kind Code[5] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]
/M.C./	BA	WO	01/35159		5/17/01	PPG Industries Ohio, Inc.		☐

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Examiner Initials *	Cite No.[1]	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T[6]
/M.C./	CA	Copy of the International Search Report corresponding to the related PCT/US2012/051202 application.	☐

Examiner Signature	/Mustak Choudhury/ (05/14/2013)	Date Considered	05/14/2013

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CONFIRMATION NO. 8374

SERIAL NUMBER	FILING or 371(c) DATE RULE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
13/372,240	02/13/2012	351	2872	91904-831532

APPLICANTS
Charles Willey, Roanoke, VA;

**** CONTINUING DATA ***************************
This appln claims benefit of 61/441,817 02/11/2011

**** FOREIGN APPLICATIONS ***************************

**** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ****
02/24/2012

Foreign Priority claimed	☐ Yes ☑ No	☐ Met after Allowance	STATE OR COUNTRY	SHEETS DRAWINGS	TOTAL CLAIMS	INDEPENDENT CLAIMS
35 USC 119(a-d) conditions met	☐ Yes ☑ No					
Verified and Acknowledged	/MUSTAK CHOUDHURY/ Examiner's Signature	Initials	VA	30	21	2

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UNITED STATES

TITLE

ELECTRONIC FRAMES COMPRISING ELECTRICAL CONDUCTORS

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1440	FEES: Authority has been given in Paper No._____ to charge/credit DEPOSIT ACCOUNT No._____ for following:	☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other _____ ☐ Credit

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(Use as many sheets as necessary)				Examiner Name	~~TBA~~ M.Choudhury
Sheet	1	of	1	Attorney Docket Number	91904-831532(011310US)

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/M.C./	AA	US-2011/0058141	3/2011	Cozzani, Laura Maria	

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	CA		☐

Examiner Signature	/Mustak Choudhury/ (05/14/2013)	Date Considered	05/14/2013

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(Use as many sheets as necessary)				Examiner Name	~~TBA~~ M.Choudhury
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/M.C./	AA	WO	01/02895		01/11/2001	E-Vision, LLC		☐

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/M.C./	AB	Copy of the International Preliminary Report on Patentability corresponding to the PCT/US2011/042882 application	☐

Examiner Signature	/Mustak Choudhury/ (05/14/2013)	Date Considered	05/14/2013

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Substitute for form 1449/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet 1 of 5

Complete if Known	
Application Number	13/372,240
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Art Unit	~~XXX~~ TBA 2872
Examiner Name	~~XXX~~ TBA M. Choudhury
Attorney Docket Number	91904-831532(011310US)

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/M.C./	AA	US-4,418,990	12/6/83	Gerber	
/M.C./	AB	US-5,742,379	4/21/98	Reifer	
/M.C./	AC	US-6,115,177	9/5/00	Vossler	
/M.C./	AD	US- 6,719,425	4/13/04	Conner	
/M.C./	AE	US-2001/0007493	7/2001	Masunaga et al.	
/M.C./	AF	US-2001/0043266	11/22/01	Robinson et al.	
/M.C./	AG	US-2002/0140899	10-2002	Blum et al.	
/M.C./	AH	US-2004/000733	1/1/04	Swab et al.	
/M.C./	AI	US-2005/0225723	10/13/05	Pilu	
/M.C./	AJ	US-2005/0237485	10/27/2005	Blum et al.	
/M.C./	AK	US-2005/0242771	11/3/2005	Blum et al.	
/M.C./	AL	US-2005/0264752	12-01-2005	Howell et al.	
/M.C./	AM	US-2005/078274	4/14/05	Howell et al.	
/M.C./	AN	US-2005/270479	12/8/05	Canavan et al.	
/M.C./	BA	US-2005/270481	12/8/05	Blum et al.	
/M.C./	BB	US-2006/023158	2/2/06	Howell et al.	
/M.C./	BC	US-2006/092340	5/4/06	Blum et al.	
/M.C./	BD	US-2006/203186	9/14/06	Ifergan	
/M.C./	BE	US-2007/0296918	12-2007	Blum et al.	
/M.C./	BF	US-2007/121061	5/31/07	Young	
/M.C./	BG	US-2007/258039	11/8/07	Duston et al.	
/M.C./	BH	US-2008/0106695	05-08-2008	Kokonaski et al.	
/M.C./	CA	US-2008/273166	11/6/08	Kokonaski	
/M.C./	CB	US-2008/316420	10/25/08	Agazarova Mazal	
/M.C./	CC	US-2010/0177277	7/15/10	Kokonaski et al.	
/M.C./	CD	US-2010/0201938	8/12/10	Jackson et al.	
/M.C./	CE	US-2010/0309426	12/9/2010	Howell et al.	
/M.C./	CF	US-2930857	3/29/60	Hollingsworth	
/M.C./	CG	US-4,152,846	5/8/79	Witt	
/M.C./	CH	US-4,283,127	8/11/81	Rosenwinket et al.	

Examiner Signature	/Mustak Choudhury/ (05/14/2013)	Date Considered	05/14/2013

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. [1] Applicant's unique citation designation number (optional). [2] See Kind Codes of U.S. Patent Documents at www.uspto.gov or MPEP 901.04. [3] Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). [4] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [5] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. [6] Applicant is to place a check mark here if English language Translation is attached.

64038089 v1

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /M.C./

PTO/SB/08A&B (07-09)

Substitute for form 1449/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				**Application Number**	13/372,240
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				First Named Inventor	Charles Willey
				Art Unit	TBA
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Sheet	2	of	5	Attorney Docket Number	91904-831532(011310US)

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number / Number Kind Code[2] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
/M.C./	CI	US-4,756,605	07-12-1988	Okada etal.	
/M.C./	CJ	US-4,875,030	10/17/89	Chiu	
/M.C./	CK	US-4,907,860	3/13/90	Noble	
/M.C./	CL	US-4,967,268	10/30/90	Lipton et al.	
/M.C./	CM	US-4,991,258	2/12/91	Drlik	
/M.C./	CN	US-4,991,951	02-12-1991	Mizuno et al.	
/M.C./	DA	US-5,182,585	1/26/93	Stoner	
/M.C./	DB	US-5,463,428	10/31/95	Lipton et al.	
/M.C./	DC	US-5,657,107	8/12/97	Wagner et al.	
/M.C./	DD	US-5,760,869	6/2/98	Mitamura	
/M.C./	DE	US-5,764,338	6/9/98	Carol Anne Mack	
/M.C./	DF	US-5,835,185	11/10/98	Kallman et al.	
/M.C./	DG	US-6,097,450	8/1/00	Humphrey	
/M.C./	DH	US-6,336,250	1/8/02	Takeda et al.	
/M.C./	DI	US-6,582,075	6/24/03	Swab et al.	
/M.C./	DJ	US-6,595,634	07-22-2003	Pilat, Jr.	
/M.C./	DK	US-6,626,532	09-30-2003	Nishioka et al.	
/M.C./	DL	US-6,866,386	03-2005	Chen, Joy	
/M.C./	DM	US-7,009,757	3/7/06	Nishioka et al.	
/M.C./	DN	US-7,063,420	06-20-2006	Lerner et al.	
/M.C./	EA	US-7,104,645	09-12-2006	Pilat, Jr.	
/M.C./	EB	US-7,140,727	12-28-2006	Pilat, Jr. et al.	
/M.C./	EC	US-7,425,066	09-16-2008	Blum e tal.	
/M.C./	ED	US-7,784,935	8/31/10	Jackson et al.	
/M.C./	EE	US-7,813,048	10/12/2010	Lynch et al.	

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]

Examiner Signature	/Mustak Choudhury/ (05/14/2013)	Date Considered	05/14/2013

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64038089 v1

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PTO/SB/08A&B (07-09)

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				Art Unit	TBA
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Sheet	3	of	5	Attorney Docket Number	91904-831532(011310US)

		Country Code[3]	Number[4]	Kind Code[5] (if known)				
/M.C./	FA	WO	2009/081542		7/2/09	Panasonic Corp.		☐
/M.C./	FB	GB	1563929		4/2/80	American Cyanamid Co		
/M.C./	FC	WO	2010/062504		6/3/2010	CJoahrneson & Johnson Vision		
/M.C./	GA	DE	2304134		8/30/73	Gould Inc.		
/M.C./	GB	WO	2008/002388		1/3/08	PixelOptics Inc.		
/M.C./	GC	GB	2170613		08-06-1986	Olympus Optical Co., Ltd.		
/M.C./	GD	WO	2007/142520		12-13-2007	Varibel BV.		
/M.C./	GE	EP	1916561		04-30-2008	Varibel BV.		
/M.C./	GF	EP	1727393		11-29-2006	Varibel BV.		
/M.C./	GG	WO	99/21400		04-29-1999	Technische Universiteit Delft		
/M.C./	GH	WO	2004/028203		04-01-2004	Stichting Voor De Technische Wetenschappen		
/M.C./	GI	WO	2008/046858		04-24-2008	Essilor International		
/M.C./	GJ	JP	09294654		12-17-2009	Scalar Corp.		
/M.C./	GK	WO	2009/136667		11-12-2009	Scalar Corp.		
/M.C./	GL	WO	2010/080999		7/15/10	PixelOptics, Inc.		
/M.C./	GM	EP	1647854		4/19/06	Sunshine Optical Company		
/M.C./	GN	WO	2009/098719		8/13/09	Laura Maria Cozzani		
/M.C./	GO	EP	2233964		9/29/10	Panasonic Corp.		
/M.C./	GP	WO	2009/126946		10/15/09	PixelOptics, Inc.		
/M.C./	GQ	EP	0061002		9/29/82	Desil SPA Occhialeria		
/M.C./	GR	JP	2008/083299		4/10/08	Biito KK		

NON PATENT LITERATURE DOCUMENTS			
Examiner Initials *	Cite No.[1]	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T[6]

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64038089 v1

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(Use as many sheets as necessary)				Examiner Name	TBA
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/M.C./	HA	US provisional patent application no. 61/361,110, filed on July 2, 2010	☐
/M.C./	HB	US provisional patent application no. 61/376,719, filed on August 25, 2010	☐
/M.C./	HC	US provisional patent application no. 61/415,391, filed on November 19, 2010	☐
/M.C./	HD	US non-provisional patent application no. 12/684,490, filed on January 8, 2010	☐
/M.C./	HE	U.S. non-provisional application no. 13/175,633 filed on July 1, 2011	☐
/M.C./	HF	U.S. non-provisional application no. 13/175,634 filed on July 1, 2011	☐
/M.C./	HG	U.S. provisional patent application no. 61/362,877 filed July 9, 2010	☐
/M.C./	HH	US non-provisional patent application no. 13/179,219, filed on July 8, 2011	☐
/M.C./	IA	U.S. provisional patent application no. 61/481,353 filed on May 2, 2011	☐
/M.C./	IB	U.S. provisional patent application no. 61/441,817 filed on February 11, 2011	
/M.C./	IC	International Search Report corresponding to the PCT/US2011/042883 application.	☐

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PTO/SB/08A&B (07-09)

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/M.C./	ID	International Search Report corresponding to the PCT/US2011/042882 application.	
/M.C./	IE	International Search Report and Written Opinion in corresponding PCTIUS2008/058056 application.	
/M.C./	IF	Partial International Search Report in corresponding PCT/US2010/020498 application.	
/M.C./	IG	European Search Report in related EP07852880.9 application.	
/M.C./	IH	"Hearing Mojo: Varibel Hearing-Aid Glasses Integrate Eight Directional Microphones," February 27, 2009, pages 1-4 *URL-http://hearingmojo.com/b/og-mt/blog-mt/2006/04/varibel_hearingaid_glasses_dou.html*	
/M.C./	JA	International Search Report corresponding to the PCT/US2011/061505 application	
/M.C./	JB	International Search Report corresponding to the PCT/US2011/061495 application	
/M.C./	JC	International Search Report corresponding to the PCT/US2011/043591 application	

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64038089 v1

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Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13372240	WILLEY, CHARLES
	Examiner	Art Unit
	MUSTAK CHOUDHURY	2872

CPC- SEARCHED		
Symbol	Date	Examiner

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351	158, 159.03	05/09/2013	MC

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(Use as many sheets as necessary)				Examiner Name	TBA
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FOREIGN PATENT DOCUMENTS							
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	AA	WO	01/02895		01/11/2001	E-Vision, LLC		☐

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	AB	Copy of the International Preliminary Report on Patentability corresponding to the PCT/US2011/042882 application	☐

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60/150,564	25 August 1999 (25.08.1999)	US
60/161,363	26 October 1999 (26.10.1999)	US
09/602,013	23 June 2000 (23.06.2000)	US

(71) Applicant: E-VISION, L.L.C. [US/US]; Suite B, 3904 Franklin Road, Roanoke, VA 24014 (US).

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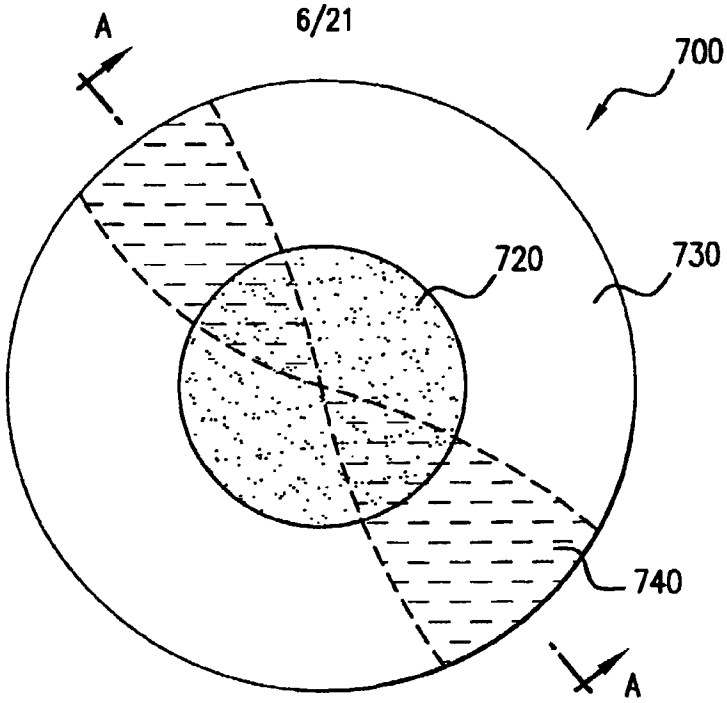
(74) Agents: WELLS, William, K. et al.; Kenyon & Kenyon, Suite 700, 1500 K Street, N.W., Washington, DC 20005 (US).

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[Continued on next page]

(54) Title: SYSTEM, APPARATUS, AND METHOD FOR CORRECTING VISION USING AN ELECTRO-ACTIVE LENS



(57) Abstract: An electro-active spectale lens (700) is disclosed. The disclosed lens includes a first lens optic. The disclosed lens also includes a first electro-active zone (720) positioned in a cooperative relationship with the first lens optic. In certain embodiments, the electro-active lens includes a range finder positioned in a cooperative relationship with the electro-active lens.

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System, Apparatus, and Method for Correcting Vision Using an Electro-Active Lens

Field of the Invention

The present invention relates to the field of vision correction, and, more particularly, to a system, apparatus, and method for correcting vision using an electro-active lens.

Brief Description of the Drawings

The invention will be more readily understood through the following detailed description, with reference to the accompanying drawings, in which:

FIG. 1 is a perspective view of an embodiment of an electro-active phoropter/refractor system 100;

FIG. 2 is a diagrammatic view of an embodiment of another electro-active phoropter/refractor system 200;

FIG. 3 is a flow diagram of a conventional dispensing practice sequence 300;

FIG. 4 is a flow diagram of an embodiment of dispensing method 400;

FIG. 5 is a perspective view of an embodiment of electro-active eyewear 500;

FIG. 6 is a flow diagram of an embodiment of prescription method 600;

FIG. 7 is a front view of an embodiment of a hybrid electro-active spectacle lens 700;

FIG. 8 is a section view of an embodiment of hybrid electro-active spectacle lens 700 taken along section line A-A of Fig. 7;

FIG. 9 is a section view of an embodiment of an electro-active lens 900, taken along section line Z-Z of Fig. 5;

FIG. 10 is a perspective view of an embodiment of an electro-active lens system 1000;

FIG. 11 is a section view of an embodiment of a diffractive electro-active lens 1100 taken along section line Z-Z of Fig. 5;

FIG. 12 is a front view of an embodiment of an electro-active lens 1200;

FIG. 13 is a section view of an embodiment of the electro-active lens 1200 of Fig. 12 taken along section line Q-Q;

FIG. 14 is a perspective view of an embodiment of a tracking system 1400;

FIG. 15 is a perspective view of an embodiment of an electro-active lens system 1500;

FIG. 16 is a perspective view of an embodiment of an electro-active lens system 1600;

FIG. 17 is a perspective view of an embodiment of an electro-active lens 1700;

FIG. 18 is a perspective view of an embodiment of an electro-active lens 1800;

FIG. 19 is a perspective view of an embodiment of an electro-active layer 1900;

FIG. 20 is a perspective view of an embodiment of an electro-active lens 2000;

FIG. 21 is a perspective view of an embodiment of electro-active eyewear 2100;

FIG. 22 is a front view of an embodiment of an electro-active lens 2200;

FIG. 23 is a front view of an embodiment of an electro-active lens 2300;

FIG. 24 is a front view of an embodiment of an electro-active lens 2400;

FIG. 25 is a section view of an embodiment of an electro-active lens 2500 taken along section line Z-Z of Fig. 5;

FIG. 26 is a section view of an embodiment of an electro-active lens 2600 taken along section line Z-Z of Fig. 5;

FIG. 27 is a flow diagram of an embodiment of dispensing method 2700; and

FIG. 28 is a perspective view of an embodiment of an electro-active lens 2800.

Detailed Description

In 1998, there were approximately 92 million eye examinations performed in the United States alone. The vast majority of these examinations involved a thorough check for eye pathology both internal and external, analysis of muscle balance and binocularity, measurement of the cornea and, in many cases, the pupil, and finally a refractive examination, which was both objective and subjective.

Refractive examinations are performed to understand / diagnose the magnitude and type of the refractive error of one's eye. The types of refractive error that are currently able to be diagnosed & measured, are myopia, hyperopia, astigmatism, and presbyopia. Current refractors (phoropters) attempt to correct one's vision to 20/20 distance and near and, in some cases, 20/15 distance vision can be achieved; however, this is by far the exception.

It should be pointed out that the theoretical limit to which the retina of one's eye can process and define vision is approximately 20/10. This is far better than the level of vision which is currently obtained by way of both today's refractors (phoropters) and conventional spectacle lenses. What is missing from these conventional devices is the ability to detect, quantify and correct for non-conventional refractive error, such as aberrations, irregular astigmatism, or ocular layer irregularities. These aberrations, irregular astigmatism, and/or ocular layer irregularities may be as a result of one's visual system or as a result of aberrations caused by conventional eyeglasses, or a combination of both.

Therefore, it would be extremely beneficial to have a means for detecting, quantifying, and correcting one's vision as close to 20/10 or better as possible.

Furthermore, it would be beneficial to do this in a very efficient and user friendly manner.

The present invention utilizes a novel approach in detecting, quantifying and correcting one's vision. The approach involves several innovative embodiments utilizing an electro-active lens. Furthermore, the invention utilizes a novel approach towards the selection, dispensing, activating, and programming of electro-active eyewear.

For example, in one inventive embodiment, a novel electro-active phoropter/refractor is utilized. This electro-active phoropter/refractor utilizes far fewer lens components than today's phoropters and is a fraction of the overall size and/or weight of today's phoropters. In fact, this exemplary inventive embodiment consists of only a pair of electro-active lenses housed in a frame mounting that provides, either through its own structural design and/or by way of a network of conductive wires, electrical power needed to enable the electro-active lenses to function properly.

To assist with understanding certain embodiments of the invention, explanations of various terms are now provided. In some situations, these explanations are not necessarily intended to be limiting, but, should be read in light of the examples, descriptions, and claims provided herein.

An "electro-active zone" can include or be included in an electro-active structure, layer, and/or region. An "electro-active region" can be a portion and/or the entirety of an electro-active layer. An electro-active region can be adjacent to another electro-active region. An electro-active region can be attached to another electro-active region, either directly, or indirectly with, for example, an insulator between each electro-active region. An electro-active layer can be attached to another electro-active layer, either directly, or indirectly with, for example, an insulator between each electro-active layer. "Attaching" can include bonding, depositing, adhering, and other well-known attachment methods. A "controller" can include or be included in a processor, a microprocessor, an integrated circuit, an IC,

a computer chip, and/or a chip. A "refractor" can include a controller. An "auto-refractor" can include a wave front analyzer. "Near distance refractive error" can include presbyopia and any other refractive error needed to be corrected for one to see clearly at near distance. "Intermediate distance refractive error" can include the degree of presbyopia needed to be corrected an intermediate distance and any other refractive error needed to be corrected for one to see clearly at intermediate distance. "Far distance refractive error" can include any refractive error needed to be corrected for one to see clearly at far distance. "Near distance" can be from about 6 inches to about 24 inches, and more preferably from about 14 inches to about 18 inches. "Intermediate distance" can be from about 24 inches to about 5 feet. "Far distance" can be any distance between about 5 feet and infinity, and more preferably, infinity. "Conventional refractive error" can include myopia, hyperopia, astigmatism, and/or presbyopia. "Non-conventional refractive error" can include irregular astigmatism, aberrations of the ocular system, and any other refractive error not included in conventional refractive error. "Optical refractive error" can include any aberrations associated with a lens optic.

In certain embodiments, a "spectacle" can include one lens. In other embodiments, a "spectacle" can include more than one lens. A "multi-focal" lens can include bifocal, trifocal, quadrafocal, and/or progressive addition lens. A "finished" lens blank can include a lens blank that has finished optical surface on both sides. A "semi-finished" lens blank can include a lens blank that has, on one side only, a finished optical surface, and on the other side, a non-optically finished surface, the lens needing further modifications, such as, for example, grinding and/or polishing, to make it into a useable lens. "Surfacing" can include grinding and/or polishing off excess material to finish a non-finished surface of a semi-finished lens blank.

FIG. 1 is a perspective view of an embodiment of electro-active phoropter/refractor system 100. Frames 110 contain electro-active lens 120, which

are connected via a network of conductive wires 130 to an electro-active lens controller 140 and to an electrical power source 150.

In certain embodiments, the temples (not shown in Fig. 1) of frames 110 contain batteries or power sources such as, for example, a micro-fuel cell. In other inventive embodiments, the temple or temples of frame 110 possess the needed electrical components so that a power cord is plugged directly into an electrical outlet and/or the electro-active refractor's controller/programmer 160.

Still in other inventive embodiments, the electro-active lenses 120 are mounted in a housing assembly which is suspended so one could simply position one's face properly in order to look through the electro-active lenses while being refracted.

While the first inventive embodiment utilizes only a pair of electro-active lenses, in certain other inventive embodiments, multiple electro-active lenses are used. Still in other inventive embodiments, a combination of conventional lenses and electro-active lenses are utilized.

FIG. 2 is a diagrammatic view of an exemplary embodiment of an electro-active refractor system 200 that includes housing assembly 210 that contains at least one electro-active lens 220 and several conventional lenses, specifically, diffractive lens 230, prismatic lens 240, astigmatic lens 250, and spherical lens 260. A network of conductive wires 270 connects the electro-active lens 220 to a power source 275 and to a controller 280, that provides a prescription display 290.

In each inventive embodiment where multiple electro-active lenses and/or a combination of conventional and electro-active lenses are utilized, the lenses can be used to test one's vision in a random and/or non-random one-at-a-time sequence. In other inventive embodiments, two or more lenses are added together giving a total corrective power in front of each eye as needed.

The electro-active lenses, which are utilized in both the electro-active phoropter and the electro-active eyewear, are comprised of either a hybrid and/or non-hybrid construction. In a hybrid construction, a conventional lens optic is

combined with an electro-active zone. In a non-hybrid construction, no conventional lens optic is used.

As discussed above, the invention differs from today's conventional dispensing practice sequence 300, which is shown as a flow diagram in **FIG. 3**. As shown at steps 310 and 320, traditionally an eye examination involving a conventional refractor is followed by obtaining one's prescription and taking that prescription to a dispenser. Then, as shown at steps 330 and 340, at the dispenser one's frames and lens are selected. As shown at step 350 and 360, the lenses are fabricated, edged, and assembled into the frames. Finally, at step 370, the new prescription eyeglasses are dispensed and received.

As shown in the flow diagram of **FIG. 4**, in an exemplary embodiment of one inventive dispensing method 400, at step 410 the electro-active eyewear is selected by or for the wearer. At step 420, the frames are fitted to the wearer. With the wearer wearing the electro-active eyewear, at step 430, the electronics are controlled by the electro-active phoropter/refractor control system which in most cases is operated by an eyecare professional and/or technician. However, in certain inventive embodiments, the patient or wearer can actually operate the control system and thus, control the prescription of their own electro-active lenses. In other inventive embodiments, both the patient/wearer and the eyecare professional and/or technician work with the controller together.

At step 440, the control system, whether operated by the eyecare professional, technician, and/or the patient/wearer, is utilized to select both objectively or subjectively the best correcting prescription for the patient/wearer. Upon selecting the proper prescription to correct the patient/wearer's vision to it's optimal correction, the eyecare professional or technician then programs the patient's/wearer's electro-active eyewear.

In one inventive embodiment, the selected prescription is programmed into an electro-active eyewear controller, and/or one or more controller components, prior to the selected electro-active eyewear being disconnected from the electro-

active phoropter/refractor's controller. In other inventive embodiments the prescription is programmed into the selected electro-active eyewear at a later time.

In either case the electro-active eyewear is selected, fitted, programmed, and dispensed at step 450 in a totally different sequence than conventional eyeglasses are today. This sequence allows for improved manufacturing, refracting and dispensing efficiencies.

Via this inventive method, the patient/wearer literally can select their eyewear, wear them while the testing of their vision is taking place, and then have them programmed for the correct prescription. In most cases, but not all, this is done before the patient/wearer leaves the examination chair, thus, ensuring the total fabrication and programming accuracy of the patient's final prescription, as well as the accuracy of the eye refraction itself. Finally, in this inventive embodiment the patient can literally wear their electro-active eyeglasses when they get up out of the examination chair and proceed out of the eyecare professional's office.

It should be pointed out that other inventive embodiments allow for the electro-active phoropter/refractor to simply display or print out the patient or wearer's best corrected prescription which is then filled in much the same manner as in the past. Currently the process involves taking a written prescription to a dispensing location where electro-active eyewear (frames and lenses) are sold and dispensed.

Still in other inventive embodiments the prescription is sent electronically, for example, via the Internet, to a dispensing location where electro-active eyewear (frames and lenses) are sold.

In the case where the prescription is not filled at the point where the eye refraction is performed, in certain inventive embodiments an electro-active eyewear controller, and/or one or more controller components, is either programmed and installed into the electro-active eyewear, or directly programmed while installed in the electro-active eyewear, following the refraction. In the case where nothing is added to the electro-active eyewear, the electro-active eyewear controller, and/or one

or more controller components, is an intricate built-in part of the electro-active eyewear and does not need to be added at a later time.

FIG. 27 is a flow diagram of an embodiment of another inventive dispensing method 2700. At step 2710, the vision of the patient is refracted using any method. At step 2720, the prescription for the patient is obtained. At step 2730, the electro-active eyewear is selected. At step 2740, the electro-active eyewear is programmed with the wearer's prescription. At step 2750, the electro-active eyewear is dispensed.

FIG. 5 is a perspective view of another inventive embodiment of the electro-active eyewear 500. In this illustrative example, frames 510 contain generic electro-active lenses 520 and 522 that are electrically coupled by connecting wires 530 to electro-active eyewear controller 540 and power source 550. Section line Z-Z divides generic electro-active lens 520.

Controller 540 acts as the "brains" of the electro-active eyewear 500, and can contain at least one processor component, at least one memory component for storing instructions and/or data for a specific prescription, and at least one input/output component, such as a port. Controller 540 can perform computational tasks such as reading from and writing into memory, calculating voltages to be applied to individual grid elements based on desired refractive indices, and/or acting as a local interface between the patient/user's eyewear and the associated refractor/phoropter equipment.

In one inventive embodiment, controller 540 is pre-programmed by the eyecare specialist or technician to meet the patient's convergence and accommodative needs. In this embodiment, this pre-programming is done on controller 540 while controller 540 is outside the patient's eyewear, and controller 540 is then inserted into the eyewear after the examination. In one inventive embodiment, controller 540 is a "read-only" type, supplying the voltage to grid elements to obtain the necessary array of refractive indices to correct the vision for a specific distance. As the patient's prescription changes, a new controller 540 must

be programmed and inserted into the eyewear by the specialist. This controller would be of a class of ASIC's, or application specific integrated circuits, and its memory and processing commands permanently imprinted.

In another inventive embodiment, the electro-active eyewear controller may be originally programmed by the eyecare specialist or technician when first dispensed, and later the same controller, or a component thereof, can be reprogrammed to provide a different correction, as the patient's needs change. This electro-active eyewear controller may be extracted from the eyewear, placed in the refractor's controller/programmer (shown in Figs. 1 and 2) and reprogrammed during the examination, or reprogrammed, in situ, by the refractor without removal from the electro-active eyewear. The electro-active eyewear controller in this case could, for example, be of a class of FPGA's, or field programmable gate array architecture. In this inventive embodiment the electro-active eyewear controller may be permanently built into the eyewear and require only an interface link to the refractor which issues the reprogramming commands to the FPGA. Part of this link would include external AC power to the electro-active eyewear controller provided by an AC adapter embedded in the refractor/phoropter or in its controller/ programmer unit.

In another inventive embodiment, the electro-active eyewear acts as the refractor, and the external equipment operated by the eyecare specialist or technician consists of merely a digital and/or analog interface to the electro-active eyewear's controller. Thus, the electro-active eyewear controller can also serve as the controller for the refractor/phoropter. In this embodiment, the necessary processing electronics are available to alter the array of grid voltages to the electro-active eyewear and reprogram the electro-active eyewear controller with this data after the optimal correction for the user is empirically determined. In this case, the patient reviews the eye charts through his/her own electro-active eyewear during the examination and may be unaware that as he/she is selecting the best corrective

prescription, the controller in their electro-active eyewear is simultaneously being reprogrammed electronically.

Another innovative embodiment utilizes an electronic auto-refractor that can be used as a first step and/or in combination with the electro-active refractors (shown in Figs. 1 and 2) such as by way of example, but not limited to Humphrey's Auto-refractor & Nikon's Auto-refractor which have been developed or modified to provide feed back which is compatible and programmed for use with the invention's electro-active lenses. This innovative embodiment is used to measure one's refractive error, while the patient or wearer is wearing his or her electro-active spectacles. This feedback is fed automatically or manually into a controller and/or programmer, which then calibrates, programs or reprograms the controller of the user/wearer's electro-active spectacles. In this innovative embodiment, one's electro-active spectacles can be re-calibrated as needed without requiring full eye examination or eye refraction.

In certain other inventive embodiments, one's vision correction is corrected, by way of one's electro-active lenses, to 20/20. This is obtained in most cases by correcting one's conventional refractive error (myopia, hyperopia, astigmatism, and / or presbyopia). In certain other inventive embodiments, non-conventional refractive error such as aberrations, irregular astigmatism, and/or ocular layer irregularities of the eye are measured and corrected, as well as conventional refractive error (myopia, hyperopia, astigmatism and / or presbyopia). In the inventive embodiments whereby aberrations, irregular astigmatism, and/or ocular layer irregularities of the eye are corrected in addition to conventional refractive error, one's vision can be corrected in many cases to better than 20/20, such as to 20/15, to better than 20/15, to 20/10, and/or to better than 20/10.

This advantageous error correction is accomplished by utilizing the electro-active lenses in the eyewear effectively as an adaptive optic. Adaptive optics have been demonstrated and in use for many years to correct for atmospheric distortion in ground-based astronomical telescopes, as well as for laser transmission through the

atmosphere for communications and military applications. In these cases, segmented or "rubber" mirrors are usually employed to make small corrections to the wave front of the image or laser lightwave. These mirrors are manipulated by mechanical actuators in most cases.

Adaptive optics, as applied to vision, is based on active probing of the ocular system with a light beam, such as an eye-safe laser, and measures the wavefront distortion of either the retinal reflection or the image created on the retina. This form of wavefront analysis assumes a plane or spherical probe wave and measures the distortion imparted on this wavefront by the ocular system. By comparing the initial wavefront with the distorted one, a skilled examiner can determine what abnormalities exist in the ocular system and prescribe an appropriate corrective prescription. There are several competing designs for wavefront analyzers, however, the adaption of the electro-active lenses described here for use as either a transmissive or reflective spatial light modulator to perform such wavefront analysis is included within the invention. Examples of wavefront analyzers are provided in U.S. Patent Nos. 5,777,719 (Williams) and 5,949,521 (Williams), each of which is herein incorporated by reference in its entirety.

In certain embodiments of the present invention, however, small corrections or adjustments are made to the electro-active lenses so that an image lightwave is imparted by a grid array of electrically driven pixels whose index of refraction can be altered, accelerating or slowing down the light passing through them by the alterable index. In this way, the electro-active lens becomes an adaptive optic, which can compensate for the inherent spatial imperfection in the optics of the eye itself in order to obtain a nearly aberration-free image on the retina.

In certain inventive embodiments, because the electro-active lens is fully two-dimensional, fixed spatial aberrations caused by the eye's optical system can be compensated for by incorporating the small index of refraction corrections on top of the gross vision correction prescription needs of the patient/user. In this way, vision can be corrected to a level of better than what could be achieved with common

convergence and accommodation corrections, and, in many cases, could result in vision better than 20/20.

In order to achieve this better than 20/20 correction, the patient's ocular aberrations can be measured by, for example, a modified auto refractor utilizing a wavefront sensor or analyzer designed specifically for eye aberration measurements. Once the ocular aberrations and other types of non-conventional refractive error have been determined in both magnitude and spatially, the controller in the eyewear can be programmed to incorporate the 2-D spatially-dependent index of refraction changes to compensate for these aberrations and other types of non-conventional refractive error in addition to the overall myopia, hyperopia, presbyopia, and/or astigmatism correction. Thus, embodiments of the electro-active lens of the present invention can electro-actively correct for aberrations of the patient's ocular system or created by the lens optic.

Thus, for example, a certain power correction of -3.50 diopters may be required in a certain electro-active divergent lens to correct a wearer's myopia. In this case, an array of different voltages, $V_1...V_N$, is applied to the M elements in the grid array to generate an array of different indices of refraction, $N_1...N_M$, which give the electro-active lens a power of -3.50 diopters. However, certain elements in the grid array may require up to plus or minus 0.50 units change in their index $N_1...N_M$ to correct for ocular aberrations and/or non-conventional refractive error. The small voltage deviations corresponding to these changes is applied to the appropriate grid element, in addition to the base myopia-correcting voltages.

In order to detect, quantify, and/or correct as much as possible for non-conventional refractive error such as irregular astigmatism, ocular refractive irregularities, such as for example, the tear layer on the front of the cornea, the front, or back of the cornea, aqueous irregularities, the front or back of the lenticular lens, vitreous irregularities, or for other aberrations caused by the ocular refractive system

itself, the electro-active refractor/phoropter is used according to an embodiment of the inventive prescription method 600 of **FIG. 6**.

At step 610, either a conventional refractor, an electro-active refractor having both conventional and electro-active lenses, or an electro-active refractor having only electro-active lenses, or an auto-refractor, is utilized to measure one's refractive error using conventional lens powers such as minus power (for myopes), plus power (for hyperopes), cylindrical power and axis (for astigmatism) and prism power when needed. Utilizing this approach, one will get what is known today as the patient's BVA (best visual acuity) by way of conventional corrective refractive error. However, certain embodiments of the invention allow for improving one's vision beyond what today's conventional refractor/phoropters will achieve.

Therefore, step 610 provides for further refinement of one's prescription in a non-conventional inventive way. In step 610, the prescription, which accomplishes this end point, is programmed into the electro-active refractor. The patient is properly positioned to look through the electro-active lenses having a multi-grid electro-active structure into a modified and compatible autorefractor or a wavefront analyzer, which automatically measures precisely the refractive error. This refractive error measurement detects and quantifies as much non-conventional refractive errors as possible. This measurement is taken through a small, approximately 4.29 mm, targeted area of each electro-active lens, while automatically computing the necessary prescription to achieve the best focus on the fovea along the line-of-sight while the patient is looking through the targeted area of the electro-active lens. Once this measurement is made this non-conventional correction is either stored in the controller/programmer memory for future use or it is then programmed into the controller that controls the electro-active lenses. This, of course, is repeated for both eyes.

At step 620, the patient or wearer now may at their option elect to use a control unit which will allow them to further refine the conventional refractive error correction, the non-conventional refractive error correction, or a combination of

both, and thus the final prescription, to their liking. Alternatively, or in addition, the eyecare professional may refine it, until in some cases no further refinement is performed. At this point, an improved BVA for the patient, better than any available via conventional techniques, will be achieved.

At step 630, any further refined prescription is then programmed into the controller, which controls the electro-active lenses' prescription. At step 640, the programmed electro-active spectacles are dispensed.

While the preceding steps 610 through 640 present an embodiment of one inventive method, depending upon the eyecare professional's judgement or approach, numerous different but similar approaches could be used to detect, quantify, and/or correct one's vision using solely electro-active refractors/phoropters or in combination with wavefront analyzers. Any method, no matter in what sequence, that utilizes an electro-active refractor/phoropter to detect, quantify, and/or correct one's vision, whether in conjunction with a wavefront analyzer or not, is considered part of the invention. For example, in certain inventive embodiments, steps 610 through 640 may be performed in either a modified way or even a different sequence. Furthermore, in embodiments of certain other inventive methods, the targeted area of the lens referred to in step 610 is within the range of about 3.0 millimeters in diameter to about 8.0 millimeters in diameter. Still in other inventive embodiments, the targeted area can be anywhere from about 2.0 millimeters in diameter up to the area of the entire lens.

Although this discussion has thus far concentrated on refraction using various forms of electro-active lenses alone or in combination with wavefront analyzers to perform the eye examination of the future, there is another possibility that new emerging technology may allow simply for objective measurements, thus potentially eliminating the need for a patient's communicated response or interaction. Many of the inventive embodiments described and/or claimed herein are intended to work with any type of measuring system, whether objective, subjective, or a combination of both.

Turning now to the electro-active lens itself, as discussed above, an embodiment of the present invention concerns an electro-active refractor/phoropter that has a novel electro-active lens, that can either be of a hybrid or of a non-hybrid construction. By hybrid construction it is meant a combination of a conventional single vision or a multifocal lens optic, with at least one electro-active zone located on the front surface, back surface, and/or in between the front and back surfaces, the zone consisting of an electro-active material having the necessary electro-active means to change focus electrically. In certain embodiments of the invention, the electro-active zone is specifically placed either inside the lens or on the back concave surface of the lens to protect it from scratches and other normal wear. In the embodiment where the electro-active zone is included as part of the front convex surface, in most cases a scratch resistant coating is applied. The combination of the conventional single vision lens or a conventional multifocal lens and the electro-active zone gives the total lens power of the hybrid lens design. By non-hybrid it is meant a lens which is electro-active whereby mostly 100% of its refractive power is generated solely by its electro-active nature.

FIG. 7 is a front view, and **FIG. 8** is a section view taken along line A-A, of an embodiment of an exemplary hybrid electro-active spectacle lens 700. In this illustrative example, lens 700 includes a lens optic 710. Attached to lens optic 710 is an electro-active layer 720, that can have one or more electro-active regions that occupy all or a portion of electro-active layer 720. Also attached to lens optic 710 and at least partially surrounding electro-active layer 720 is framing layer 730. Lens optic 710 includes an astigmatic power correction region 740 having an astigmatic axis A-A rotated, in this specific example only, approximately 45 degrees clockwise from horizontal. Covering electro-active layer 720 and framing layer 730 is an optional cover layer 750.

As will be discussed further, electro-active layer 720 can include a liquid crystal and/or a polymer gel. Electro-active layer 720 can also include an alignment layer, a metallic layer, a conducting layer, and/or an insulating layer.

In an alternative embodiment, astigmatic correction region 740 is eliminated so that lens optic 710 corrects for sphere power only. In another alternative embodiment, lens optic 710 can correct for either far distance, near distance, and/or both, and any sort of conventional refractive error, including spheric, cylindric, prismatic, and/or aspheric errors. Electro-active layer 720 can also correct for near distance, and/or for non-conventional refractive error such as aberrations. In other embodiments, electro-active layer 720 can correct any sort of conventional or non-conventional refractive error and lens optic 710 can correct for conventional refractive error.

It has been discovered that an electro-active lens having a hybrid construction approach has certain distinct advantages over that of a non-hybrid lens. These advantages are lower electrical power needs, smaller battery size, longer battery life expectancy, less complex electrical circuitry, fewer conductors, fewer insulators, lower manufacturing costs, increased optical transparency, and increased structural integrity. However, it must be noted that non-hybrid electro-active lenses have their own set of advantages, including reduced thickness and mass manufacturing.

It also has been discovered that both the non-hybrid, and in some embodiments, the full field hybrid and partial field hybrid approach, will allow for mass manufacturing of a very limited number of SKUs (Stock Keeping Units) when, for example, the electro-active structural design utilized is that of a multi-grid electro-active structure. In this case, it would only be necessary when mass manufacturing to focus primarily on a limited number of differentiated features such as curvature and size for the wearer's anatomical compatibility.

To understand the significance of this improvement, one must understand the number of traditional lens blanks needed to address most prescriptions. About 95% of corrective prescriptions include a sphere power correction within a range of -6.00 diopters to +6.00 diopters, in 0.25 diopter increments. Based on this range, there are about 49 commonly prescribed sphere powers. Of those prescriptions that include

an astigmatism correction, about 95% fall within the range of -4.00 diopters to + 4.00 diopters, in 0.25 diopter increments. Based on this range, there are about 33 commonly prescribed astigmatic (or cylinder) powers. Because astigmatism has an axis component, however, there are about 360 degrees of astigmatic axis orientations, which are typically prescribed in 1 degree increments. Thus, there are 360 different astigmatic axis prescriptions.

Moreover, many prescriptions include a bifocal component to correct for presbyopia. Of those prescriptions that have a presbyopic correction, about 95% fall within the range of +1.00 to +3.00 diopters, in 0.25 diopter increments, thereby resulting in about 9 commonly prescribed presbyopic powers.

Because some embodiments of the invention can provide for spherical, cylindrical, axis, and presbyopic corrections, one non-hybrid electro-active lens can serve the 5,239,080 (= 49 x 33 x 360 x 9) different prescriptions. Thus, one non-hybrid electro-active lens can eliminate the need to mass manufacture and/or stock numerous lens blank SKUs, and of possibly greater importance, can eliminate the need to grind and polish each lens blank to a particular patient's prescription.

To account for the various lens curvatures that may be needed to accommodate anatomical issues such as face shape, eyelash length, etc., somewhat more than one non-hybrid electro-active lens SKU could be mass manufactured and/or stocked. Nevertheless, the number of SKU's could be reduced from millions to about five or less.

In the case of the hybrid electro-active lens, it has been discovered that by correcting for conventional refractive error with the lens optic and utilizing a mostly centered electro-active layer, it is possible to also reduce the number of SKU's needed. Referring to FIG. 7, lens 700 can be rotated as needed to place astigmatic axis A-A in the needed position. Thus, the number of hybrid lens blanks needed can be reduced by a factor of 360. Moreover, the electro-active zone of the hybrid lens can provide the presbyopic correction, thereby reducing by a factor of 9 the number of lens blanks needed. Thus, a hybrid electro-active lens embodiment can reduce

from more than 5 million to 1619 (= 49 x 33) the number of lens blanks needed. Because it may be reasonably possible to mass manufacture and/or stock this number of hybrid lens blank SKUs, the need for grinding and polishing may be eliminated.

Nevertheless, grinding and polishing semi-finished hybrid lens blanks into finished lens blanks remains a possibility. **FIG. 28** is a perspective view of an embodiment of a semi-finished lens blank 2800. In this embodiment, semi-finished lens blank 2800 has a lens optic 2810 with a finished surface 2820, an unfinished surface 2830, and a partial field electro-active layer 2840. In another embodiment, semi-finished lens blank 2800 can have a full field electro-active layer. Moreover, the electro-active structure of semi-finished lens blank 2800 can be multi-grid or single interconnect. Further, semi-finished lens blank 2800 can have refractive and/or diffractive characteristics.

In either the hybrid or the non-hybrid embodiment of the electro-active lens, a significant number of needed correcting prescriptions can be created and customized by the electro-active lens which can be adjusted and controlled by a controller that has been customized and/or programmed for the patient's specific prescription needs. Thus, the millions of prescriptions and numerous lens styles, single vision lens blanks, as well as the numerous multifocal semi-finished lens blanks may be no longer needed. In fact, most lens and frame manufacturing and distribution, as we know it may be revolutionized.

It should be noted that the invention includes both non-hybrid electro-active lenses, as well as full and partial field specific hybrid electro-active lenses that are either pre-manufactured electronic eyewear (frame and/or lenses) or customized electronic eyewear at the time of delivery to the patient or customer. In the case of the eyewear being pre-fabricated and assembled, both the frames and the lenses are pre-made with the lenses already edged and put into the eyeglass frames. Also considered to be part of the invention is the programmable and re-programmable controller as well as the mass production of frames and lenses having the necessary

electric components which can be prefabricated and sent to the eyecare professional's site or some other site for either the installation of, for example, a programmed controller, and/or one or more controller components, for the patient's prescription.

In certain cases the controller, and/or one or more controller components, can be part of the pre-manufactured frame and electro-active lens assembly and then programmed at either the eyecare professional's site or some other site. The controller, and/or one or more controller components, can be in the form, for example, of a chip or a thin film and can be housed in the frame, on the frame, in the lens, or on the lens of the eyeglasses. The controller, and/or one or more controller components, can be re-programmable or not re-programmable based upon the business strategy to be implemented. In the case where the controller, and/or one or more controller components, is re-programmable, this will allow for the repeated updating of one's prescriptions as long as the patient or customer is happy with his or her eyeglass frames as well as the cosmetic appearance and functionality of the electro-active lenses.

In the case of the latter, the non-hybrid and hybrid electro-active lens embodiments just discussed, the lenses must be structurally sound enough in order to protect the eye from injury from a foreign object. In the United States, most eyewear lenses must pass a FDA required impact test. In order to meet these requirements, it is important that a support structure is built into or on the lens. In the case of the hybrid type, this is accomplished, for example, utilizing either a prescription or non-prescription single vision or multifocal lens optic as a structural base. For example, the structural base for the hybrid type can be made out of polycarbonate. In the case of the non-hybrid lens, in certain embodiments, the electro-active material selected and thickness accounts for this needed structure. In other embodiments, the non-prescription carrier base or substrate onto which the electro-active material is positioned accounts for this needed protection.

When utilizing electro-active zones in spectacle lenses in certain hybrid designs, it can be essential to maintain proper distance correction when a power interruption to the lenses occurs. In the case of a battery or wiring failure, in some situations it could be disastrous if the wearer was driving an automobile or piloting an airplane and their distance correction was lost. To prevent such occurrences, the inventive design of the electro-active spectacle lenses can provide for the distance correction to be maintained when the electro-active zones is in the OFF position (the inactivated or unpowered state). In an embodiment of this invention, this can be accomplished by providing the distance correction with a conventional fixed focal length optic, whether it be a refractive or a diffractive hybrid type. Any additional add power, therefore, is provided by the electro-active zone(s). Thus, a fail-safe electro-active system occurs, because the conventional lens optic will preserve the wearer's distance correction.

FIG. 9 is a side view of an exemplary embodiment of another electro-active lens 900 having a lens optic 910 that is index matched to an electro-active layer 920. In this illustrative example, the diverging lens optic 910, having an index of refraction, n_1, provides distance correction. Attached to lens optic 910 is the electro-active layer 920, which can have an unactivated state, and a number of activated states. When electro-active layer 920 is in its unactivated state, it has an index of refraction n_2, which approximately matches the index of refraction, n_1, of lens optic 910. More accurately, when unactivated, n_2 is within 0.05 refractive units of n_1. Surrounding electro-active layer 920 is framing layer 930, which has an index of refraction, n_3, that also approximately matches the index of refraction, n_1, of lens optic 910 within 0.05 refractive units of n_1.

FIG. 10 is a perspective view of an exemplary embodiment of another electro-active lens system 1000. In this illustrative example, electro-active lens 1010 includes a lens optic 1040 and an electro-active layer 1050. A rangefinder transmitter 1020 is positioned on electro-active layer 1050. Also, a rangefinder detector/receiver 1030 is positioned on electro-active layer 1050. In an alternative

embodiment, either transmitter 1020 or receiver 1030 can be positioned in electro-active layer 1050. In other alternative embodiments, either transmitter 1020 or receiver 1030 can be positioned in or on lens optic 1040. In other embodiments either transmitter 1020 or receive 1030 can be positioned on outer covering layer 1060. Further, in other embodiments, 1020 and 1030 can be positioned on any combination of the preceding.

FIG. 11 is a side view of an exemplary embodiment of a diffractive electro-active lens 1100. In this illustrative example, lens optic 1110 provides distance correction. Etched on one surface of lens optic 1110 is diffractive pattern 1120, having an index of refraction, n_1. Attached to lens optic 1110 and covering diffractive pattern 1120 is electro-active layer 1130, which has an index of refraction, n_2, that approximates n_1, when electro-active layer 1130 is in its unactivated state. Also attached to lens optic 1110 is framing layer 1140, which is constructed of material mostly identical to lens optic 1110, and which at least partially surrounds electro-active layer 1120. A covering 1150 is attached over electro-active layer 1130 and framing layer 1140. The framing layer 1140 can also be an extension of lens optic 1110, in which can no actual layer is added, however, lens optic 1110 is fabricated so as to frame or circumscribe electro-active layer 1130.

FIG. 12 is a front view, and **FIG. 13** a side view, of an exemplary embodiment of an electro-active lens 1200 having a multi-focal optic 1210 attached to an electro-active framing layer 1220. In this illustrative example, multi-focal optic 1210 is of a progressive addition lens design. Moreover, in this illustrative example, multi-focal optic 1210 includes a first optical refraction focus zone 1212 and a second progressive addition optical refraction focus zone 1214. Attached to multi-focal optic 1210 is electro-active framing layer 1220 having an electro-active region 1222 that is positioned over second optical refraction focus zone 1214. A cover layer 1230 is attached to electro-active framing layer 1220. It should be noted that the framing layer can be either electro-active or non-electro-active. When the framing layer is electro-active, insulating material is utilized to insulate the activated

region from the non-activated region.

In most inventive cases, but not all, in order to program the electro-active eyewear to correct one's vision to its optimum, thus, correcting for non-conventional refractive error it is necessary to track the line-of-sight of each eye by way of tracking the eye movements of the patient or wearer.

FIG. 14 is a perspective view of an exemplary embodiment of a tracking system 1400. Frames 1410 contain electro-active lens 1420. Attached to the backside of electro-active lens 1420 (that side closest to the wearer's eyes, also referred to as the proximal side), are a tracking signal sources 1430, such as light emitting diodes. Also attached to the backside of electro-active lens 1420 are tracking signal receivers 1440, such as light reflection sensors. Receivers 1440, and possibly sources 1430, are connected to a controller (not shown) that includes in its memory instructions to enable tracking. Utilizing this approach it is possible to locate very precisely the eye movements up, down, right, left and any variation thereof. This is needed as certain types, but not all, of non-conventional refractive error needs to be corrected and isolated within one's line-of-sight (for example, in the case of a specific corneal irregularity or bump that moves as the eye moves).

In various alternative embodiments, sources 1430 and/or receivers 1440 can be attached to the backside of frames 1410, embedded in the backside of frames 1410, and/or embedded in the backside of lenses 1420.

An important portion of any spectacle lens, including the electro-active spectacle lens, is the portion used to produce the sharpest image quality within the user's field of view. While a healthy person can see approximately 90 degrees to either side, the sharpest visual acuity is located within a smaller field of view, corresponding to the portion of the retina with the best visual acuity. This region of the retina is known as the fovea, and is approximately a circular region measuring 0.40mm in diameter on the retina. Additionally, the eye images the scene through the entire pupil diameter, so the pupil diameter will also affect the size of the most critical portion of the spectacle lens. The resulting critical region of the spectacle

lens is simply the sum of the diameter of the eye's pupil diameter added to the projection of the fovea's field of view onto the spectacle lens.

The typical range for the eye's pupil diameter is from 3.0 to 5.5 mm, with a most common value of 4.0 mm. The average fovea diameter is approximately 0.4 mm.

The typical range for the size of the fovea's projected dimension onto the spectacle lens is affected by such parameters as the length of the eye, the distance from the eye to the spectacle lens, etc.

The tracking system of this specific inventive embodiment then locates the regions of the electro-active lens that correlate to the eye movements relative to the fovial region of the patient's retina. This is important as the invention's software is programmed to always correct for the non-conventional refractive error that is correctable as the eye moves. Thus, it is necessary in most, but not all, inventive embodiments that correct for non-conventional refractive error to electro-actively alter the area of the lens that the line-of-sight is passing through as the eyes fixate their target or gaze. In other words, in this specific inventive embodiment the vast majority of the electro-active lens corrects for conventional refractive error and as the eye moves the targeted electro-active area focus moves as well by way of the tracking system and software to correct for the non-conventional refractive error taking into account the angle in which the line-of-sight intersects different sections of the lens and factoring this into the final prescription for that specific area.

In most, but not all, inventive embodiments, the tracking system and enabling software is utilized to correct one's vision to its maximum, while looking or gazing at distant objects. When looking at near points the tracking system, if used, is utilized to both calculate the range of near point focus in order to correct for one's accommodative and convergence near or intermediate range focusing needs. This of course is programmed into the electro-active eyewear controller, and/or one or more controller components, as part of the patient or wearers' prescription. In still other inventive embodiments a range finder and/or tracking system is

incorporated either into the lenses and/or frames.

It should be pointed out that in other inventive embodiments such as those that correct for certain types of non-conventional refractive error, such as, for example, irregular astigmatism, in most but not all cases, the electro-active lenses do not need to track the patient or wearer's eye. In this case the overall electro-active lens is programmed to correct for this, as well as the other conventional refractive error of the patient.

Also, since aberrations are directly related to the viewing distance, it has been discovered that they can be corrected in relation to the viewing distance. That is, once the aberration or aberrations have been measured, it is possible to correct for these aberrations in the electro-active layer by way of segregating the electro-active regions so as to electro-actively correct for aberrations for specific distances such as distance vision, intermediate vision, and/or near vision. For example, the electro-active lens can be segregated into a far vision, intermediate vision, and near vision corrective zones, each the software controlling each zone causing the zone to correct for those aberrations that impact the corresponding viewing distance. Therefore in this specific inventive embodiment, where the electro-active layer is segregated for different distances whereby each segregated region corrects for specific aberrations of a specific distance, it is possible to correct for non-refractive error without a tracking mechanism.

Finally, it should be pointed out that in another inventive embodiment, it is possible to accomplish the correction of the non-conventional refractive error, such as that caused by aberrations, without physically separating the electro-active regions and without tracking. In this embodiment, using the viewing distance as an input, the software adjusts the focus of a given electro-active area to account for the correction needed for an aberration that would otherwise impact the vision at the given viewing distance.

Furthermore, it has been discovered that either a hybrid or non-hybrid electro-active lens can be designed to have a full field or a partial field effect. By

full field effect it is meant that the electro-active layer or layers cover the vast majority of the lens region within an eyeglass frame. In the case of a full field, the entire electro-active area can be adjusted to the desired power. Also, a full field electro-active lens can be adjusted to provide a partial field. However, a partial field electro-active specific lens design can not be adjusted to a full field due to the circuitry needed to make it partial field specific. In the case of a full field lens adjusted to become a partial field lens, a partial section of the electro-active lens can be adjusted to the desired power.

FIG. 15 is a perspective view of an exemplary embodiment of another electro-active lens system 1500. Frames 1510 contain electro-active lenses 1520, which have a partial field 1530.

For purposes of comparison, **FIG. 16** is a perspective view of an exemplary embodiment of yet another electro-active lens system 1600. In this illustrative example, frames 1610 contain electro-active lenses 1620, which have a full field 1630.

In certain inventive embodiments the multifocal electro-active optic is pre-manufactured and in some cases, due to the significantly reduced number of SKU's required, even inventoried at the dispensing location as a finished multifocal electro-active lens blank. This inventive embodiment allows for the dispensing site to simply fit and edge the inventoried multifocal electro-active lens blanks into the electronic enabling frames. While in most cases this invention could be of a partial field specific type electro-active lens, it should be understood this would work for full field electro-active lenses, as well.

In one hybrid embodiment of the invention, a conventional single vision lens optic being of aspheric design or non-aspheric design having a toric surface for correction of astigmatism and a spherical surface is utilized to provide the distance power needs. If astigmatic correction is needed the appropriate power single vision lens optic would be selected and rotated to the proper astigmatic axis location. Once this is done the single vision lens optic could be edged for the eye wire frame style

and size. The electro-active layer could then be applied on the single vision lens optic or the electro-active layer can be applied prior to edging and the total lens unit can be edged later. It should be pointed out that, for edging whereby the electro-active layer is affixed to a lens optic, either a single vision or multifocal electro-active optic, prior to edging, an electro-active material such as a polymer gel may be advantageous over a liquid crystal material.

The electro-active layer can be applied to compatible lens optics by way of different technologies known in the art. Compatible lens optics are optics whose curves and surfaces will accept the electro-active layer properly from the stand point of bonding, aesthetics, and/or proper final lens power. For example, adhesives can be utilized applying the adhesive directly to the lens optic and then laying down the electro-active layer. Also, the electro-active layer can be manufactured so it is attached to a release film in which case it can be removed and reattached adhesively to the lens optic. Also, it can be attached to two-way film carrier of which the carrier itself is attached adhesively to the lens optic. Furthermore, it can be applied utilizing a SurfaceCasting technique in which case the electro-active layer is created in-situ.

In previously mentioned hybrid embodiment, **FIG. 12**, a combination of a static and non-static approach is used to satisfy one's mid and near point vision needs, a multifocal progressive lens 1210 having the proper needed distance correction and having, for example, approximately +1.00 diopter of full near add power is utilized in lieu of the single vision lens optic. In utilizing this embodiment the electro-active layer 1220 can be placed on either side of the multifocal progressive lens optic, as well as buried inside the lens optic. This electro-active layer is utilized to provide for additional add power.

When utilizing a lower add power in the lens optic than required by the overall multifocal lens, the final add power is the total additive power of the low multifocal add and the additional required near power generated by way of the electro-active layer. For example only; if a multifocal progressive addition lens

optic had an add power of +1.00 and the electro-active layer created a near power of +1.00 the total near power for the hybrid electro-active lens would be +2.00D. Utilizing this approach, it is possible to significantly reduce unwanted perceived distortions from multi-focal lenses, specifically progressive addition lenses.

In certain hybrid electro-active embodiments whereby a multifocal progressive addition lens optic is utilized, the electro-active layer is utilized to subtract out unwanted astigmatism. This is accomplished by neutralizing or substantially reducing the unwanted astigmatism through an electro-actively created neutralizing power compensation solely in the areas of the lens where the unwanted astigmatism exists.

In certain inventive embodiments decentration of the partial field is needed. When applying a decentered partial field electro-active layer it is necessary to align the electro-active layer in such a way to accommodate the proper astigmatic axis location of the single vision lens optic so as to allow for correcting one's astigmatism, should it exist, as well as locating the electronic variable power field in the proper location for one's eyes. Also, it is necessary with the partial field design to align the partial field location to allow for proper decentration placement with regards to the patient's pupillary needs. It has been further discovered that unlike conventional lenses where the static bifocal, multifocal or progressive regions are always placed to always be below one's distance-viewing gaze, the use of an electro-active lens allows for certain manufacturing freedom not available to conventional multifocal lenses. Therefore, some embodiments of the invention, the electro-active region is located where one would typically find the distance, intermediate, and near vision regions of a conventional non-electro-active multi-focal lens. For example, the electro-active region can be placed above the 180 meridian of the lens optic, thereby allowing the multifocal near vision zone to be occasionally provided above the 180 meridian of the lens optic. Providing the near vision zone above the 180 meridian of the lens optic can be especially useful for those spectacle wearers working at close distances to an object directly in front or overhead of the wearer,

such as working with a computer monitor, or nailing picture frames overhead.

In the case of a non-hybrid electro-active lens or both the hybrid full field lens and for example, a 35mm diameter hybrid partial field lens, the electro-active layer, as stated before, can be applied directly to either the single vision lens optic, or pre-manufactured with a lens optic creating electro-active finished multifocal lens blanks, or the multifocal progressive lens optic, prior to edging the lens for the shape of the frame's lens mounting. This allows for pre-assembly of electro-active lens blanks, as well as being able to inventory stock finished, but not edged electro-active lens blanks, thus allowing for just in time eyeglass fabrication at any channel of distribution, including the doctor or optician's offices. This will allow all optical dispensaries to be able to offer fast service with minimal needs for expensive fabrication equipment. This benefits manufacturers, retailers, and their patients, the consumers.

Considering the size of the partial field, it has been shown, for example, in one inventive embodiment that the partial field specific region could be a 35mm diameter centered or decentered round design. It should be pointed out that the diameter size can vary depending upon the needs. In certain inventive embodiments 22mm, 28mm, 30mm, & 36mm round diameters are utilized.

The size of the partial field can depend on the structure of the electro-active layer and/or the electro-active field. At least two such structures are contemplated as within the scope of the present invention, namely, a single-interconnect electro-active structure and a multi-grid electro-active structure.

FIG. 17 is a perspective view of an embodiment of an electro-active lens 1700 having a single interconnect structure. Lens 1700 includes a lens optic 1710 and an electro-active layer 1720. Within electro-active layer 1720, an insulator 1730 separates an activated partial field 1740 from a framed non-activated field (or region) 1750. A single wire interconnect 1760 connects the activated field to a power supply and/or controller. Note that in most, if not all, embodiments, a single-interconnect structure has a single pair of electrical conductors coupling it to a

power source.

FIG. 18 is a perspective view of an embodiment of an electro-active lens 1800 having a multi-grid structure. Lens 1800 includes a lens optic 1810 and an electro-active layer 1820. Within electro-active layer 1820, an insulator 1830 separates an activated partial field 1840 from a framed non-activated field (or region) 1850. A plurality of wire interconnects 1860 connect the activated field to a power supply and/or controller.

When utilizing the smaller diameters for the partial field, it has been discovered that the electro-active thickness differential from edge to center of the partial field specific region when utilizing a single interconnect electro-active structure can be minimized. This has a very positive role in minimizing the electrical power needs, as well as number of electro-active layers required, especially for the single interconnect structure. This is not always the case for the partial field specific region whereby it utilizes a multi-grid electro-active structure. When utilizing a single interconnect electro-active structure, in many inventive embodiments, but not all, multiple single interconnect electro-active structures are layered within or on the lens so as to allow for multiple electro-active layers creating for example, a total combined electro-active power of +2.50D. In this inventive example only, five +0.50D single interconnect layers could be placed one on top of each other separated only in most cases, by insulating layers. In this way, the proper electrical power can create the necessary refractive index change for each layer by way of minimizing the electrical needs of one thick single interconnect layer which in some cases would be impractical to energize properly.

It should be further pointed out in the invention, certain embodiments having multiple single interconnect electro-active layers can be energized in a preprogrammed sequence to allow one to have the ability to focus over a range of distances. For example, two +0.50D single interconnect electro-active layers could be energized, creating a +1.00 intermediate focus to allow for a +2.00D presbyope to see at finger tip distance and then two additional +0.50D single interconnect electro-

active layers could be energized to give the +2.00D presbyope the ability to read as close as 16 inches. It should be understood that the exact number of electro-active layers, as well as the power of each layer, can vary depending upon the optical design, as well as the total power needed to cover a specific range of near and intermediate vision distances for a specific presbyope.

Furthermore, in certain other inventive embodiments, a combination of either one or more single interconnect electro-active layers are present in the lens in combination with a multi-grid electro-active structural layer. Once again, this gives one the ability of focusing for a range of intermediate and near distances assuming the proper programming. Finally, in other inventive embodiments, only a multi-grid electro-active structure is utilized either in a hybrid or non-hybrid lens. Either way, the multi-grid electro-active structure in combination with a properly programmed electro-active eyewear controller, and/or one or more controller components, would allow for the ability to focus over a broad range of intermediate and near distances.

Also, semi-finished electro-active lens blanks that would allow for surfacing are also within the scope of the invention. In this case, either a decentered, centered, partial field electro-active layer incorporated with the blank, or a full field electro-active layer is incorporated with the blank and then surfaced to the correct prescription needed.

In certain embodiments the variable power electro-active field is located over the entire lens and adjusts as a constant spherical power change over the entire surface of the lens to accommodate one's working near vision focusing needs. In other embodiments the variable power field adjusts over the entire lens as a constant spherical power change while at the same time creating an aspherical peripheral power effect in order to reduce distortion and aberrations. In some of the embodiments mentioned above, the distance power is corrected by way of either the single vision, multifocal finished lens blanks, or the multifocal progressive lens optic. The electro-active optical layer corrects mainly for the working distance focusing needs. It should be noted this is not always the case. It is possible, in some

cases, to utilize either a single vision, multifocal finished lens optic, or multifocal progressive lens optic for distance spherical power only and correct near vision working power and astigmatism through the electro-active layer or utilize either the single vision or multifocal lens optic to correct astigmatism only and correct the sphere power and near vision working power through the electro-active layer. Also, it is possible to utilize a plano, single vision, multifocal finished lens optic, or progressive multifocal lens optic and correct the distance sphere and astigmatism needs by way of the electro-active layer.

It should be pointed out that with the invention, the power correction needed, whether prismatic, spherical or aspheric power as well as total distance power needs, mid range power needs and near point power needs, can be accomplished by way of any number of additive power components. These include the utilization of a single vision or finished multifocal lens optic providing all the distance spherical power needs, some of the distance spherical power needs, all of the astigmatic power needs, some of the astigmatic power needs, all of the prismatic power needs, some of the prismatic power needs, or any combination of the above when combined with the electro-active layer, will provide for one's total focusing needs.

It has been discovered that the electro-active layer allows for the utilization of adaptive optic correction-like techniques to maximize one's vision through his or her electro-active lenses either prior or after final fabrication. This can be accomplished by way of allowing the patient or intended wearer to look through the electro-active lens or lenses and adjusting them manually, or by way of a special designed automatic refractor that almost instantly will measure conventional and/or non-conventional refractive error and will correct any remaining refractive error be it spherical, astigmatic, aberrations, etc. This technique will allow for the wearer to achieve 20/10 or better vision in many cases.

Furthermore, it should be pointed out that in certain embodiments a Fresnell power lens layer is utilized along with the single vision or multifocal or multifocal lens blank or optic as well as the electro-active layer. For example: the Fresnell

layer is utilized to provide spherical power and thereby reduce lens thickness, the single vision lens optic to correct astigmatism, and the electro-active layer to correct for mid and near distance focusing needs.

As discussed above, in another embodiment a diffractive optic is utilized along with the single vision lens optic and the electro-active layer. In this approach the diffractive optic, which provides for additional focusing correction, further reduces the need for the electric power, circuitry, and thickness of the electro-active layer. Once again, the combination of any two or more of the following can be utilized in an additive manner to provide the total additive power needed for one's spectacle correction power needs. These being a Fresnell layer, conventional or non-conventional single vision or multifocal lens optic, diffractive optic layer, and electro-active layer or layers. Furthermore it is possible through an etching process to impart a shape and or effect of a diffractive or Fresnel layer into the electro-active material so as to create a non-hybrid or hybrid electro-active optic having a diffractive or Fresnel component. Also, it is possible using the electro-active lens to create not only conventional lens power, but also prismatic power.

It has also been discovered that utilizing either an approximate 22mm or a 35mm diameter round centered hybrid partial field specific electro-active lens design or an adjustable decentered hybrid electro-active partial field specific design being approximately 30mm in diameter it is possible to minimize the electrical power circuitry needs, battery life, and battery size, reducing manufacturing costs and improving optical transparency of the final electro-active spectacle lens.

In one inventive embodiment, the decentered partial field specific electro-active lens is located so that the optical center of this field is located approximately 5mm below the optical center of the single vision lens, while at the same time having the near working distance electro-active partial field being decentered nasally or temporally to satisfy the patient's correct near to intermediate working range pupillary distance. It should be noted that such a design approach is not limited to a circular design but could be virtually any shape that allowed the proper electro-

active visual field area needed for one's vision needs. For example, the design could be oval, rectangular, square shaped, octagonal, partially curved, etc. What is important is the proper placement of the viewing area for either the hybrid partial field specific designs or hybrid full field designs that have the ability to achieve partial fields as well as non-hybrid full field designs that also have the ability to achieve partial fields.

Further it has been discovered that the electro-active layer in many cases (but not all) is utilized having an uneven thickness. That is, the metallic and conductive surrounding layers are not parallel and the gel polymer thickness varies to create a convergent or divergent lens shape. It is possible to employ such a non-uniform thickness electro-active layer in a non-hybrid embodiment or in a hybrid mode with a single vision or multifocal lens optic. This presents a wide variety of adjustable lens powers through various combinations of these fixed and electrically adjustable lenses. In some inventive embodiments, the single interconnect electro-active layer utilizes non-parallel sides creating a non-uniform thickness of the electro-active structure. However, in most inventive embodiments, but not all, the multi-grid electro-active structure utilizes a parallel structure, which creates a uniform thickness of the electro-active structure.

To illustrate some of the possibilities, a convergent single vision lens optic may be bonded to a convergent electro-active lens to create a hybrid lens assembly. Depending upon the electro-active lens material used, the electrical voltage may either increase or reduce the refractive index. Adjusting the voltage up to reduce the index of refraction would change the final lens assembly power to give less plus power, as shown in the first row of Table 1 for different combinations of fixed and electro-active lens power. If adjusting the applied voltage up increases the index of refraction of the electro-active lens optic, the final hybrid lens assembly power changes as shown in Table 2 for different combinations of fixed and electro-active lens power. It should be noted that, in this embodiment of the invention, only a single applied voltage difference is required across the electro-active layer.

S.V. or M.F. Lens Optic (Distance Vision)	Electro-Active Lens Power	Voltage Change	Index of Refractive Change	Final Hybrid Lens Assembly Power
+	+	-	-	Less Plus
+	-	-	-	More Plus
-	+	-	-	More Minus
-	-	-	-	Less Minus

Table 1

S.V. or M.F. Lens Optic (Distance Vision)	Electro-Active Lens Power	Voltage Change	Index of Refractive Change	Final Hybrid Lens Assembly Power
+	+	-	-	More Plus
+	-	-	-	Less Plus
-	+	-	-	Less Minus
-	-	-	-	More Minus

Table 2

A possible manufacturing process for such a hybrid assembly follows. In one example, the electro-active polymer gel layer can be injection-molded, cast, stamped, machined, diamond turned, and/or polished into a net lens optic shape. The thin metallic layer is deposited onto both sides of the injection molded or cast polymer gel layer by, for example, sputtering or vacuum deposition. In another exemplary embodiment, the deposited thin metallic layer is placed on both the lens optic and the other side of the injection-molded or cast electro-active material layer. A conductive layer may not be necessary, but if it is, it may also be vacuum deposited or sputtered onto the metallic layer.

Unlike conventional bifocal, multifocal or progressive lenses where the near vision power segments need to be positioned differently for different multifocal designs the invention can always be placed in one common location. For unlike different static power zones utilized by the conventional approach, where the eye

moves and the head tilts to utilize such zone or zones, the present invention allows one to either look straight ahead or slightly up or down, and the entire electro-active partial or full field adjusts to correct for the necessary near working distance. This reduces eye fatigue and head and eye movements. Furthermore, when one needs to look to the distance the adjustable electro-active layer adjusts to the correct power needed to clearly see the distant object. In most cases, this would cause the electro-active adjustable near working distance field to become of plano power, thus converting or adjusting the hybrid electro-active lens back to a distance vision correction lens or low power multifocal progressive lens correcting distance power. However, this is not always the case.

In some cases it may be advantageous to reduce the thickness of the single vision lens optic. For example, the central thickness of a plus lens, or the edge thickness of a minus lens, can be reduced by way of some appropriate distance power compensation in the electro-active adjustable layer. This would apply to a full field or mostly full field hybrid electro-active spectacle lens or in all cases of a non-hybrid electro-active spectacle lens.

Once again, it should be pointed out that the adjustable electro-active layer does not have to be located in a limited area but could cover the entire single vision or multifocal lens optic, whatever size area or shape is required of either one. The exact overall size, shape, and location of the electro-active layer is constrained only due to performance and aesthetics.

It has also been discovered and is part of the invention that by utilizing the proper front convex and back concave curves of the single vision or multifocal lens blank or optic it is possible to further reduce the complexity of electronics needed for the invention. By way of properly selecting the front convex base curves of the single vision or multifocal lens blank or optic it is possible to minimize the number of connecting electrodes needed to activate the electro-active layer. In some embodiments, only two electrodes are required as the entire electro-active field area is adjusted by a set amount of electrical power.

This occurs due to the change of refractive index of the electro-active material, which creates, depending upon the placement of the electro-active layer, a different power front, back, or middle electro-active layer. Thus the appropriate curvature relationship of the front and back curves of each layer influences the needed power adjustment of the electro-active hybrid or non-hybrid lens. In most, but not all, hybrid designs especially those not utilizing a diffractive or Fresnel component it is important that the electro-active layer does not have its front & back curves parallel to that of the single vision or multifocal semifinished blank or single vision or multifocal finished lens blank it is attached to. One exception to this is a hybrid design utilizing a multi-grid structure.

It should be pointed out that one embodiment is of a hybrid electro-active lens utilizing less than a full field approach and a minimum of two electrodes. Other embodiments utilize a multi-grid electro-active layer approach to create the electro-active layer in which case multiple electrodes and electrical circuitry will be required. When utilizing a multi-grid electro-active structure, it has been discovered that for the boundaries of the grids that have been electrically activated to be cosmetically acceptable (mostly invisible), it may be necessary to produce a refractive index differential between adjacent grids of zero to .02 units of refractive index difference. Depending upon cosmetic demands, the range of refractive index differential could be from 0.01 to 0.05 units of refractive index differential but in most inventive embodiments the difference is limited, by way of a controller to a maximum of 0.02 or 0.03 units of refractive index difference between adjacent areas.

It is also possible to utilize one or more electro-active layers having different electro-active structures such as a single-interconnect structure and/or a multi-grid structure, which can react as needed once energized to create the desired additive end focusing power. For example only, one could correct for distance power of a full field by way of the anterior (electro-active layer, distal with respect to the wearer's eyes) and utilize the posterior (i.e. proximal) electro-active layer to focus for near vision range utilizing a partial field specific approach generated by the

posterior layer. It should become readily apparent that utilizing this multi electro-active layer approach will allow for increased flexibility while keeping the layers extremely thin and reducing the complexity of each individual layer. Furthermore, this approach allows for sequencing the individual layers in as much as one can energize them all at one time, to generate a simultaneous variable additive focusing power effect. This variable focusing effect can be produced in a time lapsed sequence, so as to correct for mid-range focusing needs and near vision range focusing needs as one looks from far to near and then create the reverse effect as one looks from near to far.

The multi electro-active layer approach also allows for faster electro-active focusing power response time. This happens due to a combination of factors, one being the reduced electro-active material thickness needed for each layer of multi electro-active layered lens. Also, because a multi electro-active layer lens allows for breaking up the complexity of a master electro-active layer into two or more less complex individual layers which are asked to do less individually than the master electro-active layer.

The following describes the materials and construction of the electro-active lens, its electrical wiring circuitry, the electrical power source, the electrical switching technique, software required for focal length adjustment, and object distance ranging.

FIG. 19 is a perspective view of an exemplary embodiment of an electro-active layer 1900. Attached to both sides of an electro-active material 1910 are metallic layers 1920. Attached to the opposite side of each metallic layer 1920 are conductive layers 1930.

The electro-active layer discussed above is a multilayer construction consisting of either a polymer gel or liquid crystal as the electro-active material. However, in certain inventive cases both a polymer gel electro-active layer and a liquid crystal electro-active layer are utilized within the same lens. For example: the liquid crystal layer may be utilized to create an electronic tint or sunglass effect and

the polymer gel layer may be utilized to add or subtract power. Both the polymer gel and liquid crystal has the property that its optical index of refraction can be changed by an applied electric voltage. The electro-active material is covered by two nearly transparent metallic layers on either side, and a conductive layer is deposited on each metallic layer to provide good electrical connection to these layers. When a voltage is applied across the two conductive layers, an electric field is created between them and through the electro-active material, changing the refractive index. In most cases, the liquid crystal and in some cases the gels are housed in a sealed encapsulating envelope of a material selected from silicones, polymethacrylate, styrene, proline, ceramic, glass, nylon, mylar and others.

FIG. 20 is a perspective view of an embodiment of an electro-active lens 2000 having a multi-grid structure. Lens 2000 includes an electro-active material 2010 that can, in some embodiments, define a plurality of pixels, each of which can be separated by a material having electrical insulating properties. Thus, electro-active material 2010 can define a number of adjacent zones, each zone containing one or more pixels.

Attached to one side of electro-active material 2010 is a metallic layer 2020, which has a grid array of metallic electrodes 2030 separated by a material (not shown) having electrical insulating properties. Attached to the opposite side (not shown) of electro-active material 2010 is a symmetrically identical metallic layer 2020. Thus, each electro-active pixel is matched to a pair of electrodes 2030 to define a grid element pair.

Attached to metallic layer 2020 is a conductive layer 2040 having a plurality of interconnect vias 2050 each separated by a material (not shown) having electrical insulating properties. Each interconnect via 2050 electrically couples one grid element pair to a power supply and/or controller. In an alternative embodiment, some and/or all of interconnect vias 2050 can connect more than one grid element pair to a power supply and/or controller.

It should be noted that in some embodiments, metallic layer 2020 is eliminated. In other embodiments, metallic layer 2020 is replaced by an alignment layer.

In certain inventive embodiments the front (distal) surface, intermediate surface, and/or back surface can be made of a material comprising a conventional photochromatic component. This photochromatic component may or may not be utilized with an electronic produced tint feature associated as part of the electro-active lens. In the event that it is utilized it would provide an additive tint in a complimentary manner. It should be pointed out, however, in many inventive embodiments the photochromatic material is used solely with the electro-active lens without an electronic tint component. The photochromatic material can be included in an electro-active lens layer by way of the layer composition or added later to the electro-active layer or added as part of an outer layer either on the front or the back of the lens. Furthermore, the electro-active lenses of the invention can be hard-coated front, back, or both can be coated with an anti-reflection coating as desired.

This construction is referred to as a sub-assembly and it can be electrically controlled to create either a prismatic power, sphere power, astigmatic power correction, aspheric correction, or aberration correction of the wearer. Furthermore, the subassembly can be controlled to mimic that of a Fresnell or diffractive surface. In one embodiment, if more than one type of correction is needed, two or more sub-assemblies can be juxtaposed, separated by an electrically insulating layer. The insulating layer may be comprised of silicone oxide. In another embodiment, the same subassembly is utilized to create multiple power corrections. Either of the two sub-assembly embodiments just discussed can be made of two different structures. This first structural embodiment allows that each of the layers, the electro-active layer, conductor, and metal, are contiguous, that is, continuous layers of material, thus forming a single-interconnect structure. The second structural embodiment (as shown in Figure 20) utilizes metallic layers in the form of a grid or array, with each sub-array area electrically insulated from its neighbors. In this embodiment showing

a multi-grid electro-active structure, the conductive layers are etched to provide separate electrical contacts or electrodes to each sub-array or grid element. In this manner, separate and distinct voltages may be applied across each grid element pair in the layer, creating regions of different index of refraction in the electro-active material layer. The details of design, including layer thickness, index of refraction, voltages, candidate electro-active materials, layer structure, number of layers or components, arrangement of layers or components, curvature of each layer and/or components is left for the optical designer to decide.

It should be noted that either the multi-grid electro-active structure or the single interconnect electro-active structures can be utilized as either a partial lens field or a full lens field. However, when a partial field specific electro-active layer is utilized, in most cases, an electro-active material having a closely matching refractive index as that of the partial field specific electro-active non-activated layer (the framing layer) is utilized laterally adjacent to and separated from the partial field specific electro-active region by an insulator. This is done to enhance the cosmetic nature of the electro-active lens by way of keeping the appearance of the entire electro-active layer appearing as one, in the unactivated state. Also, it should be pointed out that in certain embodiments, the framing layer is of a non-electro-active material.

The polymer material can be of a wide variety of polymers where the electro-active constituent is at least 30% by weight of the formulation. Such electro-active polymer materials are well known and commercially available. Examples of this material include liquid crystal polymers such as polyester, polyether, polyamide, (PCB) penta cyano biphenyl and others. Polymer gels may also contain a thermoset matrix material to enhance the processability of the gel, improve its adhesion to the encapsulating conductive layers, and improve the optical clarity of the gel. By way of examples only this matrix may be a cross-linked acrylate, methacrylate, polyurethane, a vinyl polymer cross-linked with a difunctional or multifunctional acrylate, methacrylate or vinyl derivative.

The thickness of the gel layer can be, for example, between about 3 microns to about 100 microns, but may be as thick as one millimeter, or as another example, between about 4 microns to about 20 microns. The gel layer can have a modulus of, for example, about 100 pounds per inch to about 800 pounds per inch, or as another example, 200 to 600 pounds per inch. The metallic layer can have a thickness of, for example, about 10^{-4} microns to about 10^{-2} microns, and as another example, from about 0.8×10^{-3} microns to about 1.2×10^{-3} microns. The conductive layer can have a thickness of, for example, on the order of 0.05 microns to about 0.2 microns, and as another example, from about 0.8 microns to about 0.12 microns, and as yet another example, about 0.1 microns.

The metallic layer is used to provide good contact between the conductive layer and the electro-active material. Those skilled in the art will readily recognize the appropriate metal materials that could be used. For example, one could use gold or silver.

In one embodiment, the refractive index of the electro-active material may vary, for example, between about 1.2 units and about 1.9 units, and as another example, between about 1.45 units and about 1.75 units, with the change in index of refraction of at least 0.02 units per volt. The rate of change in the index with voltage, the actual index of refraction of the electro-active material, and its compatibility with the matrix material will determine the percentage composition of the electro-active polymer into the matrix, but should result in a change of index of refraction of the final composition of no less than 0.02 units per volt at a base voltage of about 2.5 volts but no greater than 25 volts.

As previously discussed with the inventive embodiment utilizing a hybrid design, the sections of the electro-active layer assembly are attached to a conventional lens optic with an appropriate adhesive or bonding technique which is transparent to visible light. This bonding assembly can be by way of release paper or film having the electro-active layer pre-assembled and attached ready for bonding to the conventional lens optic. It could be produced and applied to the awaiting lens

optic surface in-situ. Also, it could be applied pre-applied to the surface of a lens wafer, which is then adhesively bonded to the awaiting lens optic. It could be applied to a semi-finished lens blank which is later surfaced or edged for the appropriate size, shape as well as the appropriate total power needs. Finally, it could be casted onto a preformed lens optic utilizing SurfaceCasting techniques. This creates the electrically modifiable power of the invention. The electro-active layer may occupy the entire lens area or only a portion of it.

The index of refraction of the electro-active layers can be correctly altered only for the area needed to focus. For example, in the hybrid partial field design previously discussed, the partial field area would be activated and altered within this area. Therefore, in this embodiment the index of refraction is altered in only a specific partial region of the lens. In another embodiment, that of a hybrid full field design, the index of refraction is altered across the entire surface. Similarly, the index of refraction is altered across the entire area in the non-hybrid design. As discussed earlier, it has been discovered that in order to maintain an acceptable optical cosmetic appearance the refractive index differential between adjacent areas of an electro-active optic should be limited to a maximum of 0.02 units to 0.05 units of refractive index differential, preferably 0.02 units to 0.03 units.

It is envisioned within the invention that in some cases the user would utilize a partial field and then want to switch the electro-active layer to a full field. In this case, the embodiment would be designed structurally for a full field embodiment; however, the controller would be programmed to allow for switching the power needs from a full field to a partial field and back again or vice versa.

In order to create the electric field necessary to stimulate the electro-active lens, voltage is delivered to the optical assemblies. This is provided by bundles of small diameter wires, which are contained in the edges of the frames of the spectacles. The wires run from a power source described below into the an electro-active eyewear controller, and/or one or more controller components, and to the frame edge surrounding each spectacle lens, where state-of-the-art wire bonding

techniques used in semiconductor manufacturing link the wires to each grid element in the optical assembly. In the single wire interconnect structured embodiment, meaning one wire per conductive layer, only one voltage per spectacle lens is required and only two wires would be necessary for each lens. The voltage would be applied to one conductive layer, while its partner on the opposing side of the gel layer is held at ground potential. In another embodiment, an alternating current (AC) voltage is applied across opposing conductive layers. These two connections are easily made at or near the frame edge of each spectacle lens.

If a grid array of voltages is used, each grid sub-area in the array is addressed with a distinct voltage, and conductors connect each wire lead in the frame to a grid element on the lens. An optically transparent conducting material such as indium oxide, tin oxide, or indium tin oxide (ITO) may be used to form the conductive layer of the electro-active assembly which is used to connect the wires in the frame edges to each grid element in the electro-active lens. This method can be used regardless of whether the electro-active area occupies the entire lens region or only a portion of it .

To provide electric power to the optical assemblies, a source of electricity, such as a battery, is included in the design. The voltages to create the electric field are small, hence, the temples of the frames are designed to allow for the insertion and extraction of miniature bulk batteries which provide this power. The batteries are connected to the wire bundles through a multiplexing connection also contained in the frame temples. In another embodiment, conformal thin film batteries are attached to the surface of the frame temples with an adhesive that allows them to be removed and replaced when their charge is dissipated. An alternative would be to provide an AC adapter with an attachment to the frame-mounted batteries to allow in situ charging of either the bulk or conformal thin-film batteries when not in use.

An alternate energy source is also possible whereby a miniature fuel cell could be included in the spectacle frames to provide greater energy storage than

batteries. The fuel cell could be recharged with a small fuel canister that injects fuel into a reservoir in the spectacle frames.

It has been discovered that it is possible to minimize the electrical power needs by way of utilizing an inventive hybrid multi-grid structure approach which comprises in most cases but not all, a partial field specific region. It should be pointed out, while one can utilize a hybrid partial field multi-grid structure, a hybrid full field multi-grid structure can be utilized as well.

In another inventive approach, whereby non-conventional refractive error such as aberrations are corrected, a tracking system is built into the eyewear, such as discussed above, and the proper enabling software and programming of the electro-active eyewear controller, and/or one or more controller components, housed in the electro-active eyewear is provided. This inventive embodiment both tracks one's line of sight, by way of tracking one's eyes, and applies the necessary electrical energy to the specific area of the electro-active lens being looked through. In other words, as the eyes move a targeted electrically energized area would move across the lens corresponding to one's line of sight directed through the electro-active lens. This would be manifested in several different lens designs. For example, the user could have a fixed power lens, an electro-active lens, or a hybrid of both types to correct for conventional (sphere, cylinder, and prism) refractive error. In this example, the non-conventional refractive error would be corrected by way of the electro-active layer being of a multi-grid structure whereby, as the eye moves the corresponding activated region of the electro-active lens would move with the eye. In other words, the eye's line-of-sight corresponding to the eye's movement, as it intersects the lens would move across the lens in relationship to the eye's movements.

In the above inventive example it should be pointed out that the multi-grid electro-active structure, which is incorporated into or on the hybrid electro-active lens can be of a partial field or a full field design.

It should be pointed out utilizing this inventive embodiment one can minimize the electrical needs by way of only electrically energizing the limited area being directly viewed through. Therefore, the smaller area being energized the less electrical power consumed for a given prescription at any one time. The non directly viewed area would, in most cases but not all, not be energized or activated and therefore, would correct for conventional refractive error that would get one to 20/20 vision correcting for example, myopia, hyperopia, astigmatism, and presbyopia. The targeted and tracked area in this inventive embodiment would correct for as much non-conventional refractive error as possible, that being irregular astigmatism, aberrations, and ocular surface or layer irregularities. In other inventive embodiments the targeted and tracked area could correct for also some conventional error, as well. In several of the previous mentioned embodiments, this targeted and tracked area can be automatically located with the assistance of the controller, and/or one or more controller components, by way of either a range finder located in the eyewear tracking the eye movements, with a eye tracking system located in the eyewear or both a tracking system and a range finder system.

Although only a partial electro-active region is utilized in certain designs, the entire surface is covered with the electro-active material to avoid a circular line visible to the user in the lens in the nonactivated state. In some inventive embodiments, a transparent insulator is utilized to keep the electrical activation limited to the central area being activated and the unactivated peripheral electro-active material is utilized to keep the edge of the active region invisible.

In another embodiment, thin film solar cell arrays can be attached to the surface of the frames, and voltage is supplied to the wires and the optical grid by photoelectric effect using sunlight or ambient room lighting. In one inventive embodiment, solar arrays are used for primary power, with the miniature batteries discussed earlier included as back up power. When electrical power is not needed the batteries can be charged from the solar cells during these times in this

embodiment. An alternative allows for an AC adapter and attachment to batteries with this design.

In order to provide a variable focal length to the user, the electro-active lenses are switchable. At least two switch positions are provided, however, more are provided if needed. In the simplest embodiment, the electro-active lenses are either on or off. In the off position, no current flows through the wires, no voltage is applied to the grid assemblies, and only the fixed lens power is utilized. This would be the case in a user requiring a far field distance correction, for example, assuming of course, the hybrid electro-active lens utilizes either a single vision or multifocal lens blank or optic which corrects for distance vision as part of its construction. To provide near vision correction for reading, the switch would be on, providing a predetermined voltage or array of voltages to the lenses, creating a positive add power in the electro-active assemblies. If a mid-field correction is desired, a third switch position can be included. The switch could be microprocessor controlled, or manually user controlled. In fact, there could be several additional positions included. In another embodiment, the switch is analog not digital, and provides continuous variance of the focal length of the lens by adjusting a knob or lever much like a volume control on a radio.

It may be the case that no fixed lens power is part of the design, and all vision correction is accomplished via the electro-active lens. In this embodiment, a voltage or array of voltages is supplied to the lens at all times if both a distance and near vision correction is needed by the user. If only a distance correction or reading accommodation is needed by the user, the electro-active lens would be on when correction is needed and off when no correction is needed. However, this is not always the case. In certain embodiments depending upon the lens design, turning off or down the voltage will automatically increase the power of the distance and or near vision zones.

In one exemplary embodiment, the switch itself is located on the spectacle lens frames and is connected to a controller, for example, an Application Specific

Integrated Circuit, contained in the spectacle frames. This controller responds to different positions of the switch by regulating the voltages supplied from the power source. As such, this controller makes up the multiplexer discussed above, which distributes various voltages to the connecting wires. The controller may also be of an advanced design in the form of a thin film and be mounted like the battery or solar cells conformably along the surface of the frames.

In one exemplary embodiment, this controller, and/or one or more controller components, is fabricated and/or programmed with knowledge of the user's vision correction requirements, and allows the user to easily switch between different arrays of pre-determined voltages tailored for his or her individual vision requirements. This electro-active eyewear controller, and/or one or more controller components, is easily removable and/or programmable by the vision care specialist or technician and replaced and/or reprogrammed with a new "prescription" controller when the user's vision correction requirements change.

One aspect of the controller-based switch is that it can change the voltage applied to an electro-active lens in less than a microsecond. If the electro-active layer is manufactured from a fast-switching material, it is possible that the rapid change in focal length of the lenses may be disruptive to the wearer's vision. A gentler transition from one focal length to another may be desirable. As an additional feature of this invention, a "lag time" can be programmed into the controller that would slow the transition. Conversely, a "lead time" could be programmed into the controller that would speed the transition. Similarly, the transition could be anticipated by a predictive algorithm.

In any event, the time constant of the transition can be set so that it is proportional and/or responsive to the refractive change needed to accommodate the wearer's vision. For example, small changes in focusing power could be switched rapidly; while a large change in focusing power, such as a wearer quickly moving his gaze from a distant object to read printed material, could be set to occur over a

longer time period, say 10-100 milliseconds. This time constant could be adjustable, according to the comfort of the wearer.

In any event, it is not necessary for the switch to be on the spectacles themselves. In another exemplary embodiment, the switch is in a separate module, possibly in a pocket in the user's clothing, and is activated manually. This switch could be connected to the spectacles with a thin wire or optical fiber. Another version of the switch contains a small microwave or radio-frequency short-range transmitter which sends a signal regarding switch position to a tiny receiver antenna mounted conformably on the spectacle frames. In both of these switch configurations, the user has direct but discreet control over the focal length variation of his or her spectacles.

In yet another exemplary embodiment, the switch is automatically controlled by a range finding device located, for example, in the frame, on the frame, in the lens, and/or on the lens of the spectacles, and pointing forward toward the object to be perceived.

FIG. 21 is a perspective view of another inventive embodiment of electro-active eyewear 2100. In this illustrative example, frames 2110 contain electro-active lenses 2120 that are connected by connecting wires 2130 to controller 2140 (integrated circuit) and power source 2150. A range finder transmitter 2160 is attached to an electro-active lens 2120 and a range finder receiver 2170 is attached to the other electro-active lens 2120. In various alternative embodiments, transmitter 2160 and/or receiver 2170 can be attached to any electro-active lens 2120, attached to frame 2110, embedded in lens 2120, and/or embedded in frame 2110. Further, range finder transmitter 2160 and/or receiver 2170 can be controlled by controller 2140 and/or a separate controller (not shown). Similarly, signals received by receiver 2170 can be processed by controller 2140 and/or a separate controller (not shown).

In any event, this range finder is an active seeker and can utilize various sources such as: lasers, light emitting diodes, radio-frequency waves, microwaves, or

ultrasonic impulses to locate the object and determine its distance. In one embodiment, a vertical cavity surface-emitting laser (VCSEL) is used as the light transmitter. The small size and flat profile of these devices make them attractive for this application. In another embodiment, an organic light emitting diode, or OLED, is used as the light source for the rangefinder. The advantage of this device is that OLEDs can often be fabricated in a way that they are mostly transparent. Thus, an OLED might be a preferable rangefinder design if cosmetics is a concern, since it could be incorporated into the lens or frames without being noticeable.

An appropriate sensor to receive the reflected signal off the object is placed in one or more positions on the front of the lens frames and connected to a tiny controller to compute the range. This range is sent via a wire or optical fiber to the switching controller located in the lens frames or a wireless remote carried on oneself and analyzed to determine the correct switch setting for that object distance. In some cases, the ranging controller and switching controller may be integrated together.

In another exemplary embodiment, the switch can be controlled by a small but rapid movement of the user's head. This would be accomplished by including a tiny micro-gyroscope or micro-accelerometer in the temple on the lens frames. A small, rapid shake or twist of the head would trigger the micro-gyro or micro-accelerometer and cause the switch to rotate through its allowed position settings, changing the focus of the electro-active lens to the desired correction.

Yet another exemplary embodiment uses a combination of microgyroscope with a manual switch. In this embodiment, the microgyroscope is utilized for mostly reading and visual functions below the 180 so as to react to one's head tilt. Thus, when one's head tilts, the microgyroscope sends a signal to the controller indicating the degree of head tilt, which is then converted into increased focusing power, depending on the severity of the tilt. The manual switch, which can be remote, is used for overriding the microgyroscope for certain visual functions at or above the 180, such as working on a computer.

In still another exemplary embodiment, a combination of a rangefinder and a microgyroscope is utilized. The microgyroscope is utilized for near vision, and other vision functions below the 180, and the rangefinder is used for viewing distances which are above the 180 and are of a viewing distance of, for example, four feet or less.

As an alternative to the manual switch or range finder design to adjust the focusing power of the electro-active assembly, another exemplary embodiment utilizes an eye-tracker to measure inter-pupillary distance. As the eyes focus on distant or near objects, this distance changes as the pupils converge or diverge. At least two light-emitting diodes and at least two adjacent photo-sensors to detect reflected light from the diodes off the eye are placed on the inside frame near the nose bridge. This system can sense the position of the edge of the pupil of each eye and convert the position to inter-pupillary distance to calculate the distance of the object from the user's eye plane. In certain embodiments three or even four light emitting diodes and photo sensors are used to track eye movements.

In addition to vision correction, the electro-active layer can also be used to give a spectacle lens an electro-chromic tint. By applying an appropriate voltage to an appropriate gel polymer or liquid crystal layer, a tint or sunglass effect can be imparted to the lens, which alternates the light transmission somewhat through the lens. This reduced light intensity gives a "sunglass" effect to the lens for the comfort of the user in bright, outdoor environment. Liquid crystal compositions and gel polymers with high polarizability in response to an applied electric field are most attractive for this application.

In some inventive embodiments, this invention may be used in locations where temperature variations may be sizeable enough to affect the index of refraction of the electro-active layer. Then, a correction factor to all of the supplied voltages to the grid assemblies would have to be applied to compensate for this effect. A miniature thermistor, thermocouple, or other temperature sensor mounted in or on the lens and/or frame and connected to the power source senses changes in

temperature. The controller converts these readings into voltage changes needed to compensate for the change in refractive index of the electro-active material.

However, in certain embodiments electronic circuitry is actually built into or on the lens surface for the purpose of increasing the temperature of the electro-active layer or layers. This is done to further reduce the refractive index of the electro-active layers thus maximizing lens power changes. Increased temperature can be utilized either with or without voltage increases thus giving additional flexibility in being able to control and change the lens power by way of refractive index changes. When temperature is utilized it is desirable to be able to measure, get feed back and control the temperature which has been deliberately applied.

In the case of either a partial or full field grid array of individually addressed electro-active regions, many conductors may be necessary to multiplex specific voltages from the controller to each grid element. For ease of engineering these interconnects, the invention locates the controller in the front section of the spectacle frames, for example, in the nose bridge area. Thus, the power source, which is located in the temples, will be connected to the controller by only two conductors through the temple-front frame hinge. The conductors linking the controller to the lenses can be totally contained within the front section of the frame.

In some embodiments of the invention, the spectacles may have one or both spectacle frame temples, parts of which are easily removable. Each temple will consist of two parts: a short one which remains connected to the hinge and front frame section and a longer one which plugs into this piece. The unpluggable part of the temples each contain an electrical power source (battery, fuel cell, etc.) and can be simply removed and reconnected to the fixed portion of the temples. These removable temples are rechargeable, for example, by placing in a portable A.C. charging unit which charges by direct current flow, by magnetic induction, or by any other common recharging method. In this manner, fully charged replacement temples may be connected to the spectacles to provide continuous, long-term activation of the lenses and ranging system. In fact, several replacement temples

may be carried by the user in pocket or purse for this purpose.

In many cases, the wearer will require spherical correction for distance, near, and/or intermediate vision. This allows a variation of the fully interconnected grid array lens, which takes advantage of the spherical symmetry of the required corrective optic. In this case a special geometrically shaped grid consisting of concentric rings of electro-active regions may comprise either the partial region or full field lens. The rings may be circular or non circular such as, for example, elliptical. This configuration serves to reduce substantially the number of required electro-active regions that must be separately addressed by conductor connections with different voltages, greatly simplifying the interconnect circuitry. This design allows for the correction of astigmatism by employing a hybrid lens design. In this case, the conventional optic may provide cylindrical and/or astigmatic correction, and the concentric ring electro-active layer may provide the spherical distance and/or near vision correction.

This concentric ring, or toroidal zone, embodiment allows for great flexibility in adapting the electro-active focusing to the wearer's needs. Because of the circular zone symmetry, many more thinner zones can be fabricated without increasing the wiring and interconnect complexity. For example, an electro-active lens made from an array of 4000 square pixels will require wiring to address all 4000 zones; a need to cover a circular partial region area of 35 millimeters diameter will yield a pixel pitch of about 0.5 millimeters. On the other hand, an adaptive optic made from a pattern of concentric rings of the same 0.5 millimeter pitch (or ring thickness) will require only 35 toroidal zones, greatly reducing the wiring complexity. Conversely, the pixel pitch (and resolution) can be decreased to only 0.1 millimeters and only increase the number of zones (and interconnects) to 175. The greater resolution of the zones may translate into greater comfort for the wearer, since the radial change in refractive index from zone to zone is smoother and more gradual. Of course, this design restricts one to only vision corrections which are spherical in nature.

It has been further discovered that the concentric ring design can tailor the thickness of the toroidal rings so as to place the greatest resolution at the radius where it is needed. For example, if the design calls for phase-wrapping, i.e., taking advantage of the periodicity of light waves to achieve greater focusing power with materials of limited refractive index variation, one can design an array with narrower rings at the periphery and wider rings at the center of the circular partial region of the electro-active area. This judicious use of each toroidal pixel yields the greatest focusing power obtainable for the number of zones utilized while minimizing the aliasing effect present in low resolution systems that employ phase-wrapping.

In another embodiment of this invention, it may be desired to smooth the sharp transition from the far-field focus region to the near vision focus region in hybrid lenses employing a partial electro-active area. This occurs, of course, at the circular boundary of the electro-active region. In order to accomplish this, the invention would be programmed to have regions of less power for near vision in the periphery of the electro-active region. For example, consider a hybrid concentric ring design with a 35 mm diameter electro-active region, where the fixed focal length lens provides a distance correction, and the electro-active region provides a +2.50 add power presbyopic correction. Instead of maintaining this power all the way out to the periphery of the electro-active region, several toroidal regions or "bands", each containing several addressable electro-active concentric ring zones, would be programmed to have decreasing power at larger diameters. For example, during activation one embodiment might have a central 26 mm diameter circle of +2.50 add power, with a toroidal band extending from 26 to 29 mm diameter with +2.00 add power, another toroidal band extending from 29 to 32 mm diameter with +1.5 add power, surrounded by a toroidal band extending from 32 to 35 mm diameter with +1.0 add power. This design may be useful in providing some users with a more pleasant wearing experience.

When utilizing an ophthalmic spectacle lens one generally utilizes the top approximately one-half of the lens for far distance viewing. Approximately 2 to 3

mm above the mid-line and 6 to 7 mm below the mid-line for intermediate distance viewing and from 7 – 10 mm below the mid-line for near distance viewing.

Aberrations created in the eye appear different for distances from the eye and need to be corrected differently. An object's distance that is being viewed is directly related to the specific aberration correction needed. Therefore, an aberration created from the eye's optical system will need approximately the same correction for all far distances, approximately the same correction for all intermediate distances, and approximately the same correction for all near point distances. Therefore, the invention allows for the electro-active adjustment of the lens to correct certain aberrations of the eye, in three or four sections of the lens (distance section, intermediate section and near section), as opposed to trying to adjust the electro-active lens grid-by-grid as the eye and the eye's line of sight moves across the lens.

FIG. 22 is a front view of an embodiment of an electro-active lens 2200. Within lens 2200 are defined various regions proving different refractive corrections. Below mid-line B-B, several near distance corrective regions 2210 and 2220 each having a different corrective power, are surrounded by a single intermediate distance corrective region 2230. Although only two near distance corrective regions 2210 and 2220 are shown, any number of near distance corrective regions can be provided. Similarly, any number of intermediate distance corrective regions can be provided. Above mid-line B-B, a far distance corrective region 2240 are provided. Regions 2210, 2220, and 2230 can be activated in a programmed sequence manner, to save power for example, or in a static on-off manner similar to a conventional tri-focal. When looking from far to near, or from near to far, lens 2200 can help the wearer's eye focus, by smoothing the transition between the various focal lengths of the various regions. Thereby, the phenomenon of "image jump" is relieved or greatly reduced. This improvement is also provided in the embodiments shown in **FIGS. 23 and 24**, below.

FIG. 23 is a front view of an embodiment of another electro-active lens 2300. Within lens 2300 are defined various regions proving different refractive

corrections. Below mid-line C-C, a single near distance corrective region 2310 is surrounded by a single intermediate distance corrective region 2320. Above mid-line C-C, is located a single far distance corrective region 2330.

FIG. 24 is a front view of an embodiment of an embodiment of another electro-active lens 2400. Within lens 2400 are defined various regions providing different refractive corrections. A single near distance corrective region 2410 is surrounded by a single intermediate distance corrective region 2420, which is surrounded by a single far distance corrective region 2430.

FIG. 25 is a side view of an embodiment of another electro-active lens 2500. Lens 2500 includes a conventional lens optic 2510 to which several full field electro-active regions 2520, 2530, 2540, and 2550 are attached, each separated from the adjacent regions by insulating layers 2525, 2535, and 2545.

FIG. 26 is a side view of an embodiment of another electro-active lens 2600. Lens 2600 includes a conventional lens optic 2610 to which several partial field electro-active regions 2620, 2630, 2640, and 2650 are attached, each separated from the adjacent regions by insulating layers 2625, 2635, and 2645. Framing region 2660 surrounds electro-active regions 2620, 2630, 2640, and 2650.

Returning to the discussion of diffractive electro-active lenses, an electro-active lens for correcting refractive error can be fabricated using an electro-active layer adjacent to a glass, polymer, or plastic substrate lens which is imprinted or etched with a diffractive pattern. The surface of the substrate lens which has the diffractive imprint is directly in contact with the electro-active material. Thus, one surface of the electro-active layer is also a diffractive pattern which is the mirror image of that on the lens substrate surface.

The assembly acts as a hybrid lens, such that the substrate lens always provides a fixed corrective power, typically for distance correction. The index of refraction of the electro-active layer in its unactivated state is nearly identical to that of the substrate lens; this difference should be 0.05 index units or less. Thus, when the electro-active lens is unactivated, the substrate lens and electro-active layer have

the same index, and the diffractive pattern is powerless, and provides no correction (0.00 diopter). In this state, the power of the substrate lens is the only corrective power.

When the electro-active layer is activated, its index changes, and the refractive power of the diffraction pattern becomes additive to the substrate lens. For example, if the substrate lens has a power of −3.50 diopter, and the electro-active diffractive layer has a power when activated of +2.00 diopter, the total power of the electro-active lens assembly is −1.50 diopter. In this way, the electro-active lens allows for near vision or reading. In other embodiments, the electro-active layer in the activated state may be index matched to the lens optic.

Electro-active layers that use liquid crystals are birefringent. That is, they display two different focal lengths in their unactivated state when exposed to unpolarized light. This birefringence gives rise to double or fuzzy images on the retina. There are two approaches to solving this problem. The first requires at least two electro-active layers to be used. One is fabricated with the electro-active molecules aligned longitudinally in the layer, while the other is fabricated with latitudinally oriented molecules in its layer; thus, the molecular alignment in the two layers is orthogonal to each other. In this manner, both polarizations of light are focused equally by both of the layers, and all light is focused at the same focal length.

This can be accomplished by simply stacking the two orthogonally-aligned electro-active layers or by an alternative design in which the center layer of the lens is a double-sided plate, i.e., with identical diffraction patterns etched on both sides. Electro-active material is then placed in a layer on both sides of the center plate, assuring that their alignments are orthogonal. Then a cover superstrate is placed over each electro-active layer to contain it. This provides a simpler design than superimposing two distinct electro-active/diffractive layers on top of each other.

A different alternative requires one to add a cholesteric liquid crystal to the electro-active material to give it a large chiral component. It has been found that a

certain level of chiral concentration eliminates the in-plane polarization sensitivity, and obviates the need for two electro-active layers of purely nematic liquid crystal as a component in the electro-active material.

Turning now to the materials used for the electro-active layer, examples of material classes and specific electro-active materials that can be used for the electro-active layer and lens of the present invention are listed below. Other than the liquid crystal materials listed below in class I, we generally refer to each of these classes of materials as polymer gels.

I) Liquid crystals

This class includes any liquid crystal film that forms nematic, smectic, or cholesteric phases that possess a long-range orientational order that can be controlled with an electric field. Examples of nematic liquid crystals are: pentyl-cyano-biphenyl (5CB), (n-octyloxy)-4-cyanobiphenyl (8OCB). Other examples of liquid crystals are the n = 3, 4, 5, 6, 7, 8, 9, of the compound 4-cyano-4-n-alkylbiphenyls, 4-n-pentyloxy-biphenyl, 4-cyano-4"-n-alkyl-p-terphenyls, and commercial mixtures such as E7, E36, E46, and the ZLI-series made by BDH (British Drug House)- Merck.

II) Electro-optic polymers

This class includes any transparent optical polymeric material such as those disclosed in "Physical Properties of Polymers Handbook" by J. E. Mark, American Institute of Physics, Woodburry, New York, 1996, containing molecules having unsymmetrical polarized conjugated *p* electrons between a donor and an acceptor group (referred to as a chromophore) such as those disclosed in "Organic Nonlinear Optical Materials" by Ch. Bosshard et al., Gordon and Breach Publishers, Amsterdam, 1995. Examples of polymers are as follows: polystyrene, polycarbonate, polymethylmethacrylate, polyvinylcarbazole, polyimide, polysilane. Examples of chromophores are: paranitroaniline (PNA), disperse red 1 (DR 1), 3-

methyl-4-methoxy-4'-nitrostilbene, diethylaminonitrostilbene (DANS), diethyl-thio-barbituric acid.

Electro-optic polymers can be produced by: a) following a guest/host approach, b) by covalent incorporation of the chromophore into the polymer (pendant and main-chain), and/or c) by lattice hardening approaches such as cross-linking.

III) Polymer liquid crystals

This class includes polymer liquid crystals (PLCs), which are also sometimes referred to as liquid crystalline polymers, low molecular mass liquid crystals, self-reinforcing polymers, in situ-composites, and/or molecular composites. PLCs are copolymers that contain simultaneously relatively rigid and flexible sequences such as those disclosed in "Liquid Crystalline Polymers: From Structures to Applications" by W. Brostow, edited by A. A. Collyer, Elsevier, New-York-London, 1992, Chapter 1. Examples of PLCs are: polymethacrylate comprising 4-cyanophenyl benzoate side group and other similar compounds.

IV) Polymer dispersed liquid crystals

This class includes polymer dispersed liquid crystals (PDLCs), which consist of dispersions of liquid crystal droplets in a polymer matrix. These materials can be made in several ways: (i) by nematic curvilinear aligned phases (NCAP), by thermally induced phase separation (TIPS), solvent-induced phase separation (SIPS), and polymerization-induced phase separation (PIPS). Examples of PDLCs are: mixtures of liquid crystal E7 (BDH-Merck) and NOA65 (Norland products, Inc. NJ); mixtures of E44 (BDH-Merck) and polymethylmethacrylate (PMMA); mixtures of E49 (BDH-Merck) and PMMA; mixture of the monomer dipentaerythrol hydroxy penta acrylate, liquid crystal E7, N-vinylpyrrolidone, N-phenylglycine, and the dye Rose Bengal.

V) Polymer stabilized liquid crystals

This class includes polymer-stabilized liquid crystals (PSLCs), which are materials that consist of a liquid crystal in a polymer network in which the polymer constitutes less than 10% by weight of the liquid crystal. A photopolymerizable monomer is mixed together with a liquid crystal and an UV polymerization initiator. After the liquid crystal is aligned, the polymerization of the monomer is initiated typically by UV exposure and the resulting polymer creates a network that stabilizes the liquid crystal. For examples of PSLCs, see, for instance: C. M. Hudson et al. Optical Studies of Anisotropic Networks in Polymer-Stabilized Liquid Crystals, Journal of the Society for Information Display, vol. 5/3, 1-5, (1997), G. P. Wiederrecht et al, Photorefractivity in Polymer-Stabilized Nematic Liquid Crystals, J. of Am. Chem. Soc., 120, 3231-3236 (1998).

VI) Self-assembled nonlinear supramolecular structures

This class includes electro-optic asymmetric organic films, which can be fabricated using the following approaches: Langmuir-Blodgett films, alternating polyelectrolyte deposition (polyanion/polycation) from aqueous solutions, molecular beam epitaxy methods, sequential synthesis by covalent coupling reactions (for example: organotrichlorosilane-based self-assembled multilayer deposition). These techniques usually lead to thin films having a thickness of less than about 1 mm.

Still other advantages and embodiments of the invention will become readily apparent to those skilled in this art from the above-recited detailed description. Accordingly, the drawings, descriptions, and examples provided herein are to be regarded as exemplary and illustrative in nature, and not as restrictive. For example, electro-active eyewear can be provided that has one hybrid lens and one non-hybrid lens. Similarly, electro-active eyewear can be provided that has one full field electro-active lens and one partial field electro-active lens. Likewise, electro-active

eyewear can be provided that has one lens that employs a single interconnect electro-active structure and another that employs a multi-grid electro-active structure.

What Is Claimed Is:

1. An electro-active spectacle lens comprising:

a first lens optic having astigmatic correction;

a first electro-active zone positioned in a cooperative relationship with said first lens optic.

2. The electro-active lens of claim 1, wherein said first electro-active zone is included in an electro-active layer.

3. The electro-active lens of claim 1, wherein said first electro-active zone is included in an electro-active region.

4. The electro-active lens of claim 1, wherein said first electro-active zone is included in an electro-active structure.

5. The electro-active lens of claim 1, wherein said astigmatic correction includes astigmatic power correction.

6. The electro-active lens of claim 1, wherein said astigmatic correction includes astigmatic axis correction.

7. The electro-active lens of claim 1, wherein said electro-active lens is adapted to correct refractive error to about 20/20.

8. The electro-active lens of claim 1, wherein said electro-active lens is adapted to correct refractive error to better than 20/20.

9. The electro-active lens of claim 1, wherein said electro-active lens is adapted to correct refractive error to about 20/15.

10. The electro-active lens of claim 1, wherein said electro-active lens is adapted to correct refractive error to better than 20/15.

11. The electro-active lens of claim 1, wherein said electro-active lens is adapted to correct refractive error to about 20/10.

12. The electro-active lens of claim 1, wherein said electro-active lens is adapted to correct refractive error to better than 20/10.

13. The electro-active lens of claim 1, wherein said first electro-active zone is a single interconnect structure.

14. The electro-active lens of claim 1, wherein said first electro-active zone is a pixelated structure.

15. The electro-active lens of claim 1, wherein said first electro-active zone is a hybrid structure.

16. The electro-active lens of claim 1, wherein said first electro-active zone is a non-hybrid structure.

17. The electro-active lens of claim 1, wherein said first electro-active zone encompasses a portion of a layer.

18. The electro-active lens of claim 1, wherein said first electro-active zone encompasses all of a layer.

19. The electro-active lens of claim 1, wherein said first electro-active zone is

embedded within said first lens optic.

20. The electro-active lens of claim 1, wherein said first electro-active zone is attached to said first lens optic.

21. The electro-active lens of claim 1, wherein said first electro-active zone is bonded to said first lens optic.

22. The electro-active lens of claim 1, wherein said first electro-active zone is attached to a coating attached to said first lens optic.

23. The electro-active lens of claim 1, wherein said first electro-active zone is deposited on said first lens optic.

24. The electro-active lens of claim 1, wherein said first lens optic has a front convex surface, and said first electro-active zone is attached to said front convex surface.

25. The electro-active lens of claim 1, wherein said first lens optic has a concave surface, and said first electro-active zone is attached to said concave surface.

26. The electro-active lens of claim 1, wherein said first lens optic has a surface, said first electro-active zone is attached to said surface, and a scratch resistant coating is attached to said first electro-active zone.

27. The electro-active lens of claim 1, wherein said first electro-active zone is adapted to correct conventional refractive error.

28. The electro-active lens of claim 1, wherein said first electro-active zone is

adapted to correct non-conventional refractive error.

29. The electro-active lens of claim 1, wherein said first electro-active zone is adapted to correct presbyopia.

30. The electro-active lens of claim 1, wherein said first electro-active zone is adapted to correct near vision refractive error.

31. The electro-active lens of claim 1, wherein said first lens optic is a plano lens.

32. The electro-active lens of claim 1, wherein said first lens optic is a single vision corrective optic.

33. The electro-active lens of claim 1, wherein said first lens optic is a multifocal corrective optic.

34. The electro-active lens of claim 1, wherein said first lens optic is a progressive multifocal corrective optic.

35. The electro-active lens of claim 1, wherein said first lens optic provides astigmatic power and axis correction.

36. The electro-active lens of claim 1, wherein said first electro-active zone is centered with respect to said first lens optic.

37. The electro-active lens of claim 1, wherein said first electro-active zone is decentered with respect to said first lens optic.

38. The electro-active lens of claim 1, wherein said first electro-active zone has an optical center that is decentered with respect to an optical center of said first lens optic.

39. The electro-active lens of claim 1, wherein said first electro-active zone has a diameter of about 10 millimeters to about 40 millimeters.

40. The electro-active lens of claim 1, wherein said first electro-active zone has a diameter of about 20 millimeters to about 35 millimeters.

41. The electro-active lens of claim 1, wherein said first electro-active zone has an uneven thickness.

42. The electro-active lens of claim 1, wherein said first electro-active zone has a thickness that varies to create a lens shape.

43. The electro-active lens of claim 1, wherein said first electro-active zone has a thickness that varies to create a convergent lens shape.

44. The electro-active lens of claim 1, wherein said first electro-active zone has a thickness that varies to create a divergent lens shape.

45. The electro-active lens of claim 1, wherein said first electro-active zone includes a polymer gel.

46. The electro-active lens of claim 1, wherein said first electro-active zone includes a metallic layer.

47. The electro-active lens of claim 1, wherein said first electro-active zone

includes a conductive layer.

48. The electro-active lens of claim 1, further comprising a second electro-active zone positioned in a cooperative relationship with said first lens optic.

49. The electro-active lens of claim 1, further comprising a polymer gel second electro-active zone positioned in a cooperative relationship with said first lens optic.

50. The electro-active lens of claim 1, further comprising a liquid crystal second electro-active zone positioned in a cooperative relationship with said first lens optic.

51. The electro-active lens of claim 1, further comprising a tint effect second electro-active zone positioned in a cooperative relationship with said first lens optic.

52. The electro-active lens of claim 1, further comprising a sunglass effect second electro-active zone positioned in a cooperative relationship with said first lens optic.

53. The electro-active lens of claim 1, further comprising a photochromatic second electro-active zone positioned in a cooperative relationship with said first lens optic.

54. The electro-active lens of claim 1, further comprising a anti-reflective second electro-active zone positioned in a cooperative relationship with said first lens optic.

55. The electro-active lens of claim 1, further comprising a protective layer positioned in a cooperative relationship with said first lens optic.

56. The electro-active lens of claim 1, further comprising a second electro-active zone positioned in a cooperative relationship with said first electro-active zone.

57. The electro-active lens of claim 1, further comprising a second electro-active zone positioned in a cooperative relationship with said first electro-active zone and separated from said first electro-active zone by an insulator.

58. The electro-active lens of claim 1, further comprising a second electro-active zone positioned concentrically with said first electro-active zone.

59. The electro-active lens of claim 1, further comprising a second electro-active zone positioned proximally to said first electro-active zone with respect to a wearer's eye.

60. The electro-active lens of claim 1, further comprising a second electro-active zone positioned distally to said first electro-active zone with respect to a wearer's line of eye.

61. The electro-active lens of claim 1, further comprising a second electro-active zone positioned adjacent to said first electro-active zone.

62. The electro-active lens of claim 1, further comprising a second electro-active zone positioned adjacent to said first electro-active zone with respect to a wearer's line of eye.

63. The electro-active lens of claim 1, further comprising a second lens optic positioned in a cooperative relationship with said first lens optic.

64. The electro-active lens of claim 1, further comprising a second lens optic positioned in a cooperative relationship with said first electro-active zone.

65. The electro-active lens of claim 1, further comprising a second lens optic positioned in a cooperative relationship with said first lens optic, said electro-active zone positioned between said second lens optic and said first lens optic.

66. The electro-active lens of claim 1, further comprising a Fresnell layer positioned in a cooperative relationship with said first lens optic.

67. The electro-active lens of claim 1, further comprising an etched Fresnell layer positioned in a cooperative relationship with said first lens optic.

68. The electro-active lens of claim 1, further comprising a diffractive layer positioned in a cooperative relationship with said first lens optic.

69. The electro-active lens of claim 1, further comprising an etched diffractive layer positioned in a cooperative relationship with said first lens optic.

70. The electro-active lens of claim 1, further comprising a diffractive zone etched into said first lens optic.

71. The electro-active lens of claim 1, further comprising a prismatic layer positioned in a cooperative relationship with said first lens optic.

72. The electro-active lens of claim 1, further comprising a prismatic zone within said first lens optic.

73. The electro-active lens of claim 1, further comprising a diffractive second lens optic positioned in a cooperative relationship with said first lens optic.

74. The electro-active lens of claim 1, further comprising an energy source connected to said electro-active zone.

75. The electro-active lens of claim 1, further comprising a controller connected to said electro-active zone.

76. The electro-active lens of claim 1, further comprising a removable controller connected to said electro-active zone.

77. The electro-active lens of claim 1, further comprising a controller adapted to be coupled to said electro-active zone.

78. The electro-active lens of claim 1, further comprising a programmable controller connected to said electro-active zone.

79. The electro-active lens of claim 1, further comprising a programmable controller adapted to be coupled to said electro-active zone.

80. The electro-active lens of claim 1, further comprising a controller connected to said electro-active zone, said controller including a processor.

81. The electro-active lens of claim 1, further comprising a controller connected to said electro-active zone, said controller including a memory.

82. The electro-active lens of claim 1, further comprising a controller connected to said electro-active zone, said controller including an input/output mechanism.

83. The electro-active lens of claim 1, further comprising an eye-care-professional-operable controller connected to said electro-active zone.

84. The electro-active lens of claim 1, further comprising an eye-care-professional-adjustable controller connected to said electro-active zone.

85. The electro-active lens of claim 1, further comprising a wearer-operable controller connected to said electro-active zone.

86. The electro-active lens of claim 1, further comprising a wearer-adjustable controller connected to said electro-active zone.

87. The electro-active lens of claim 1, further comprising a controller connected to said electro-active zone, said controller adapted to change a voltage applied to said electro-active zone.

88. The electro-active lens of claim 1, further comprising a controller connected to said electro-active zone, said controller adapted to change a voltage applied to said electro-active zone in a variable manner allowing for the focus of vision from far to near and from near to far.

89. The electro-active lens of claim 1, further comprising a controller connected to said electro-active zone, said controller adjustable to change a voltage applied to said electro-active zone in a variable manner allowing for the

focus of vision from far to near and from near to far

90. The electro-active lens of claim 1, wherein said first electro-active zone includes an plurality of diffractive zones.

91. The electro-active lens of claim 1, wherein said first electro-active zone includes an array of electrically-driven pixels.

92. The electro-active lens of claim 1, wherein said first electro-active zone includes a grid array of electrically-driven pixels.

93. The electro-active lens of claim 1, wherein said first electro-active zone includes an array of electrically-driven pixels, each pixel having an electrically-alterable index of refraction.

94. The electro-active lens of claim 1, wherein said first electro-active zone is configured in a circular shape.

95. The electro-active lens of claim 1, wherein said first electro-active zone is configured in an ellipsoidal shape.

96. The electro-active lens of claim 1, wherein said first electro-active zone is configured in an annular shape.

97. The electro-active lens of claim 1, wherein said electro-active lens is mounted in a spectacle frame.

98. The electro-active lens of claim 1, wherein said electro-active lens is mounted in a phoropter.

99. The electro-active lens of claim 1, further comprising a controller connected to said electro-active zone, said controller connected to a line-of-sight tracker.

100. The electro-active lens of claim 1, further comprising a controller connected to said electro-active zone and to a line-of-sight tracker, wherein said controller is adapted to activate said electro-active zone in response to a line-of-sight of a wearer.

101. The electro-active lens of claim 1, further comprising a controller connected to said electro-active zone and to a line-of-sight tracker, wherein said controller is adapted to activate an area of said electro-active zone, said area corresponding to a line-of-sight of a wearer of the electro-active lens.

102. The electro-active lens of claim 1, wherein said first electro-active zone includes an array of electrically-driven pixels adapted to fail-safe if electricity is unavailable to said pixels.

103. The electro-active lens of claim 1, wherein said first electro-active zone includes a diffractive zone adapted to fail-safe if electricity is unavailable to said diffractive zone.

104. The electro-active lens of claim 1, wherein said first electro-active zone includes a diffractive zone adapted to fail-safe if electricity is unviable to said diffractive zone.

105. The electro-active lens of claim 1, further comprising a controller connected to said electro-active zone, said controller connected to a rangefinder.

106. An electro-active spectacle lens comprising:

a first lens optic having astigmatic correction;

a plurality of electro-active zones positioned in a cooperative relationship with said first lens optic.

107. The electro-active lens of claim 106, wherein each of said electro-active zones is separated from an adjacent electro-active zone by an insulator.

108. The electro-active lens of claim 106, wherein each of said electro-active zones includes a grid of pixels.

109. The electro-active lens of claim 106, further comprising a controller connected to said plurality of zones, said controller adapted to change a voltage applied to each of said plurality of zones.

110. The electro-active lens of claim 106, further comprising a controller connected to said plurality of zones, said controller adapted to change a voltage applied to less than all of said plurality of zones.

111. The electro-active lens of claim 106, further comprising a controller connected to said plurality of zones, said controller adapted to energize less than all of said plurality of zones.

112. The electro-active lens of claim 106, further comprising a controller connected to said plurality of zones, said controller adapted to energize each of said plurality of zones.

113. An electro-active lens comprising:

a first lens optic having a first index of refraction;

a first electro-active zone positioned in a cooperative relationship with said first lens optic, said first electro-active zone having a second index of refraction within about 0.00 refractive units to about 0.05 refractive units of said first index of refraction.

114. The electro-active lens of claim 113, wherein said first electro-active zone is included in an electro-active layer.

115. The electro-active lens of claim 113, wherein said first electro-active zone is included in an electro-active region.

116. The electro-active lens of claim 113, wherein said first electro-active zone is included in an electro-active structure.

117. An electro-active lens comprising:

a first lens optic;

a first electro-active zone positioned in a cooperative relationship with said first lens optic, said first electro-active zone having a first index of refraction;

a second electro-active zone positioned in a cooperative relationship with said first lens optic, said second electro-active zone having a second index of refraction within about 0.00 refractive units to about 0.05 refractive units of said first index of refraction.

118. The electro-active lens of claim 117, wherein said first electro-active zone is included in an electro-active layer.

119. The electro-active lens of claim 117, wherein said first electro-active zone is

included in an electro-active region.

120. The electro-active lens of claim 117, wherein said first electro-active zone is included in an electro-active structure.

121. The electro-active lens of claim 117, wherein said second index of refraction corresponds to an electrically inactivated state.

122. The electro-active lens of claim 117, wherein said second index of refraction corresponds to an electrically activated state.

123. The electro-active lens of claim 117, wherein said second index of refraction is within about 0.00 refractive units to about 0.03 refractive units of said first index of refraction.

124. The electro-active lens of claim 117, wherein said second index of refraction is within about 0.02 refractive units to about 0.04 refractive units of said first index of refraction.

125. The electro-active lens of claim 117, wherein said second index of refraction is within about 0.01 refractive units to about 0.03 refractive units of said first index of refraction.

126. The electro-active lens of claim 117, wherein said second index of refraction is within about 0.02 refractive units to about 0.03 refractive units of said first index of refraction.

127. An electro-active lens having a plurality of pixels, each pixel from said plurality of pixels having an adjustable index of refraction, adjustments to

said index of refraction limited to 0.05 refractive units with respect to a neighboring pixel's index of refraction.

128. An electro-active lens comprising:

a lens optic having a distance prescription correction; and

an electro-active zone positioned in a cooperative relationship with said lens optic.

129. An electro-active lens comprising:

a first lens optic;

a first electro-active zone positioned in a cooperative relationship with said first lens optic;

a range finder positioned in a cooperative relationship with said electro-active lens.

130. The electro-active lens of claim 129, wherein at least a part of said range-finder is located in or on said electro-active lens.

131. The electro-active lens of claim 129, wherein at least a part of said range-finder is located in said first lens optic.

132. The electro-active lens of claim 129, wherein at least a part of said range-finder is located on said first lens optic.

133. The electro-active lens of claim 129, wherein at least a part of said range-finder is located in said first electro-active zone.

134. The electro-active lens of claim 129, wherein at least a part of said range-finder is located on said first electro-active zone.

135. The electro-active lens of claim 129, wherein at least a part of said range-finder is located on a frame attached to said first lens optic.

136. The electro-active lens of claim 129, wherein at least a part of said range-finder is located in a frame attached to said first lens optic.

137. The electro-active lens of claim 129, wherein said range-finder includes a light source.

138. The electro-active lens of claim 129, wherein said range-finder includes a substantially transparent light source.

139. The electro-active lens of claim 129, wherein said range-finder includes an organic light-emitting diode light source.

140. The electro-active lens of claim 129, wherein said range-finder includes an inorganic light-emitting diode light source.

141. The electro-active lens of claim 129, wherein said range-finder includes a laser light source.

142. The electro-active lens of claim 129, wherein said range-finder includes a radio frequency transmitter.

143. The electro-active lens of claim 129, wherein said range-finder is coupled to a controller that is coupled to said first electro-active zone.

144. The electro-active lens of claim 129, wherein said range-finder includes a

sensor.

145. The electro-active lens of claim 129, wherein said range-finder includes a sensor adapted to receive a reflected signal originated by said range-finder.

146. An electro-active lens having an electro-actively adjustable focus and a range finder.

147. An electro-active lens comprising:

a first lens optic; and

a first electro-active zone including an electro-active polymer gel, said first zone positioned in a cooperative relationship with said first lens optic.

148. The electro-active lens of claim 147, wherein said polymer gel contains an electro-active constituent comprising at least 30% by weight of said polymer gel.

149. The electro-active lens of claim 147, wherein said polymer gel has a refractive index of about 1.2 units to about 1.9 units.

150. The electro-active lens of claim 147, wherein said polymer gel has a refractive index of about 1.45 units to about 1.75 units.

151. The electro-active lens of claim 147, wherein said polymer gel has a refractive index that changes with respect to voltage by at least 0.02 refractive units per volt.

152. The electro-active lens of claim 147, wherein said polymer gel has a

refractive index that changes with respect to voltage by at least 0.02 refractive units per volt for an applied voltage of about 2.5 volts to about 25 volts.

153. The electro-active lens of claim 147, wherein said polymer gel is an electro-optic polymer.

154. The electro-active lens of claim 147, wherein said polymer gel is a polymer liquid crystal.

155. The electro-active lens of claim 147, wherein said polymer gel is a polymer dispersed liquid crystal.

156. The electro-active lens of claim 147, wherein said polymer gel is a polymer stabilized liquid crystal.

157. The electro-active lens of claim 147, wherein said polymer gel is a self-assembled nonlinear supramolecular structure.

158. The electro-active lens of claim 147, wherein said polymer gel contains a liquid crystal polymer.

159. The electro-active lens of claim 147, wherein said polymer gel contains a thermoset matrix material.

160. The electro-active lens of claim 147, wherein said polymer gel contains a cross-linked acrylate.

161. The electro-active lens of claim 147, wherein said polymer gel contains a

methacrylate.

162. The electro-active lens of claim 147, wherein said polymer gel contains a polyurethane.

163. The electro-active lens of claim 147, wherein said polymer gel contains a vinyl polymer cross-linked with a difunctional acrylate.

164. The electro-active lens of claim 147, wherein said polymer gel contains a vinyl polymer cross-linked with a multifunctional acrylate.

165. The electro-active lens of claim 147, wherein said polymer gel contains a vinyl polymer cross-linked with a difunctional methacrylate.

166. The electro-active lens of claim 147, wherein said polymer gel contains a vinyl polymer cross-linked with a multifunctional methacrylate.

167. The electro-active lens of claim 147, wherein said polymer gel contains a vinyl polymer cross-linked with a difunctional vinyl derivative.

168. The electro-active lens of claim 147, wherein said polymer gel contains a vinyl polymer cross-linked with a multifunctional vinyl derivative.

169. The electro-active lens of claim 147, wherein said polymer gel is injection-molded onto said first lens optic.

170. The electro-active lens of claim 147, wherein said polymer gel is cast onto said first lens optic.

171. The electro-active lens of claim 147, wherein said polymer gel is bonded onto said first lens optic.

172. The electro-active lens of claim 147, further comprising an alignment layer attached to said polymer gel.

173. The electro-active lens of claim 147, further comprising a metallic layer attached to said polymer gel.

174. The electro-active lens of claim 147, further comprising a transparent metallic layer attached to said polymer gel.

175. The electro-active lens of claim 147, further comprising a metallic layer attached to said polymer gel, said metallic layer transparent to a wearer of said electro-active lens.

176. The electro-active lens of claim 147, further comprising a metallic layer attached to said polymer gel, said metallic layer having a thickness of about 10^{-4} microns to about 10^{-2} microns.

177. The electro-active lens of claim 147, further comprising a metallic layer attached to said polymer gel, said metallic layer having a thickness of about 10^{-3} microns.

178. The electro-active lens of claim 147, further comprising a gridlike metallic layer attached to said polymer gel.

179. The electro-active lens of claim 147, further comprising a metallic layer attached to said polymer gel, said metallic layer having an array of

electrodes.

180. The electro-active lens of claim 147, further comprising a metallic layer adjacent to said polymer gel.

181. The electro-active lens of claim 147, further comprising a metallic layer deposited onto a side of said polymer gel.

182. The electro-active lens of claim 147, further comprising a vacuum deposited metallic layer adjacent to said polymer gel.

183. The electro-active lens of claim 147, further comprising a sputtered metallic layer adjacent to said polymer gel.

184. The electro-active lens of claim 147, further comprising a conductive layer.

185. The electro-active lens of claim 147, further comprising a conductive layer having a thickness of about 0.05 microns to about 0.2 microns.

186. The electro-active lens of claim 147, further comprising a conductive layer having a thickness of about 0.1 microns.

187. The electro-active lens of claim 147, further comprising a conductive layer attached to a metallic layer.

188. The electro-active lens of claim 147, further comprising a transparent conductive layer.

189. The electro-active lens of claim 147, further comprising a transparent

conductive layer attached to a metallic layer.

190. The electro-active lens of claim 147, further comprising a conductive layer attached to a metallic layer, said conductive layer transparent to a wearer of said electro-active lens.

191. The electro-active lens of claim 147, further comprising a conductive layer attached to a metallic layer, said conductive layer having an array of electrical contacts.

192. The electro-active lens of claim 147, further comprising a conductive layer deposited by vacuum deposition onto a metallic layer.

193. The electro-active lens of claim 147, further comprising a conductive layer deposited by sputtering onto a metallic layer.

194. The electro-active lens of claim 147, further comprising an insulating layer attached to a conductive layer.

195. The electro-active lens of claim 147, further comprising a silicone oxide insulating layer attached to a conductive layer.

196. The electro-active lens of claim 147, further comprising a transparent insulating layer.

197. The electro-active lens of claim 147, further comprising a transparent insulating layer attached to a conductive layer.

198. The electro-active lens of claim 147, further comprising an insulating layer

attached to a conductive layer, said insulating layer transparent to a wearer of said electro-active lens.

199. The electro-active lens of claim 147, wherein said polymer gel is housed in a sealed encapsulating envelope.

200. The electro-active lens of claim 147, wherein said polymer gel has a varying thickness.

201. The electro-active lens of claim 147, wherein said polymer gel has a thickness between about 3 microns and about 1 millimeter.

202. The electro-active lens of claim 147, wherein said polymer gel has a thickness between about 3 microns and about 100 microns.

203. The electro-active lens of claim 147, wherein said polymer gel has a thickness between about 4 microns and about 20 microns.

204. The electro-active lens of claim 147, wherein said polymer gel has a modulus of between about 100 pounds per inch and about 800 pounds per inch.

205. The electro-active lens of claim 147, wherein said polymer gel has a modulus of between about 200 pounds per inch and about 600 pounds per inch.

206. An electro-active lens comprising:

a first lens optic;

a first layer positioned in a cooperative relationships with said first lens optic and having a first electro-active region that encompasses a portion of said first layer.

207. The electro-active lens of claim 206, wherein said first electro-active region is activated.

208. The electro-active lens of claim 206, wherein said portion is variable.

209. The electro-active lens of claim 206, wherein said portion is fixed.

210. The electro-active lens of claim 206, wherein said portion is variable in size.

211. The electro-active lens of claim 206, wherein said portion is variable in location.

212. The electro-active lens of claim 206, wherein said portion is time variable.

213. The electro-active lens of claim 206, wherein said first electro-active region has a variable corrective power.

214. The electro-active lens of claim 206, wherein said first electro-active region has an adjustable corrective power.

215. An electro-active lens comprising:

a first lens optic providing multi-focal optical refraction;

a first electro-active zone positioned in a cooperative relationship with said first lens optic.

216. An electro-active lens comprising:

a first lens optic; and

a near vision electro-active zone located intermittently above a 180

meridian of said first lens optic.

217. An optical lens comprising at least two electro-active zones separated by an insulating zone, each electro-active zone adapted to be independently activated.

218. An optical lens comprising at least two electro-active layers separated by an insulating layer, each electro-active layer adapted to be independently activated.

219. An optical lens comprising at least two electro-active regions separated by an insulating region, each electro-active region adapted to be independently activated.

220. An optical lens comprising a plurality of programmably controlled electro-active zones.

221. An optical lens comprising a plurality of programmably controlled electro-active regions.

222. An optical lens comprising a plurality of programmably controlled electro-active layers.

223. An electro-active lens comprising:

a first lens optic having a presbyopic correction region;

a first electro-active zone positioned in a cooperative relationship with said first lens optic and adapted to reduce unwanted astigmatism created by said presbyopic correction region.

224. The electro-active lens of claim 223, adapted to subtract unwanted astigmatism created by said presbyopic correction region.

225. The electro-active lens of claim 223, adapted to offset unwanted astigmatism created by said presbyopic correction region.

226. The electro-active lens of claim 223, adapted to neutralize unwanted astigmatism created by said presbyopic correction region.

227. The electro-active lens of claim 223, adapted to subtract, offset, or neutralize unwanted astigmatism created by said presbyopic correction region.

228. An electro-active lens comprising:

a first lens optic;

a first electro-active zone positioned in a cooperative relationship with said first lens optic and adapted to correct at least one aberration.

229. The electro-active lens of claim 228, wherein said aberration is an ocular aberration.

230. The electro-active lens of claim 228, wherein said aberration is an optical aberration.

231. An electro-active lens comprising:

a first lens optic;

a first electro-active zone positioned in a cooperative relationship with said first lens optic to correct a wearer's vision to better than 20/20.

232. The electro-active lens of claim 231, wherein said first electro-active zone cooperates with said first lens optic to correct a wearer's vision to about 20/15.

233. The electro-active lens of claim 231, wherein said first electro-active zone cooperates with said first lens optic to correct a wearer's vision to better than 20/15.

234. The electro-active lens of claim 231, wherein said first electro-active zone cooperates with said first lens optic to correct a wearer's vision to about 20/10.

235. The electro-active lens of claim 231, wherein said first electro-active zone cooperates with said first lens optic to correct a wearer's vision to better than 20/10.

236. An electro-active lens comprising:

a first lens optic;

a plurality of electro-active zones positioned in a cooperative relationship with said first lens optic;

a tracker adapted to alter a first electro-active zone from said plurality of electro-active zones.

237. The electro-active lens of claim 236, wherein said tracker measures a line-of-sight.

238. The electro-active lens of claim 236, wherein said tracker reacts to changes in a line-of-sight.

239. The electro-active lens of claim 236, wherein said tracker measures inter-pupillary distance.

240. The electro-active lens of claim 236, wherein said tracker reacts to changes in inter-pupillary distance.

241. The electro-active lens of claim 236, wherein said tracker is adapted to alter a second electro-active zone from said plurality of electro-active zones.

242. The electro-active lens of claim 236, wherein said tracker is adapted to alter a second electro-active zone from said plurality of electro-active zones in reaction to a wearer's line-of-sight.

243. The electro-active lens of claim 236, wherein said tracker includes two or more light emitting diodes.

244. The electro-active lens of claim 236, wherein said tracker includes two or more refraction sensors.

245. The electro-active lens of claim 236, wherein said tracker includes two or more refraction sensors located on a back side of a frame attached to said first lens optic.

246. The electro-active lens of claim 236, wherein said tracker includes two or more light emitting diodes and two or more refraction sensors.

247. An electro-active lens comprising:

a semi-finished lens blank; and

an electro-active zone positioned in a cooperative relationship with said semi-finished lens blank.

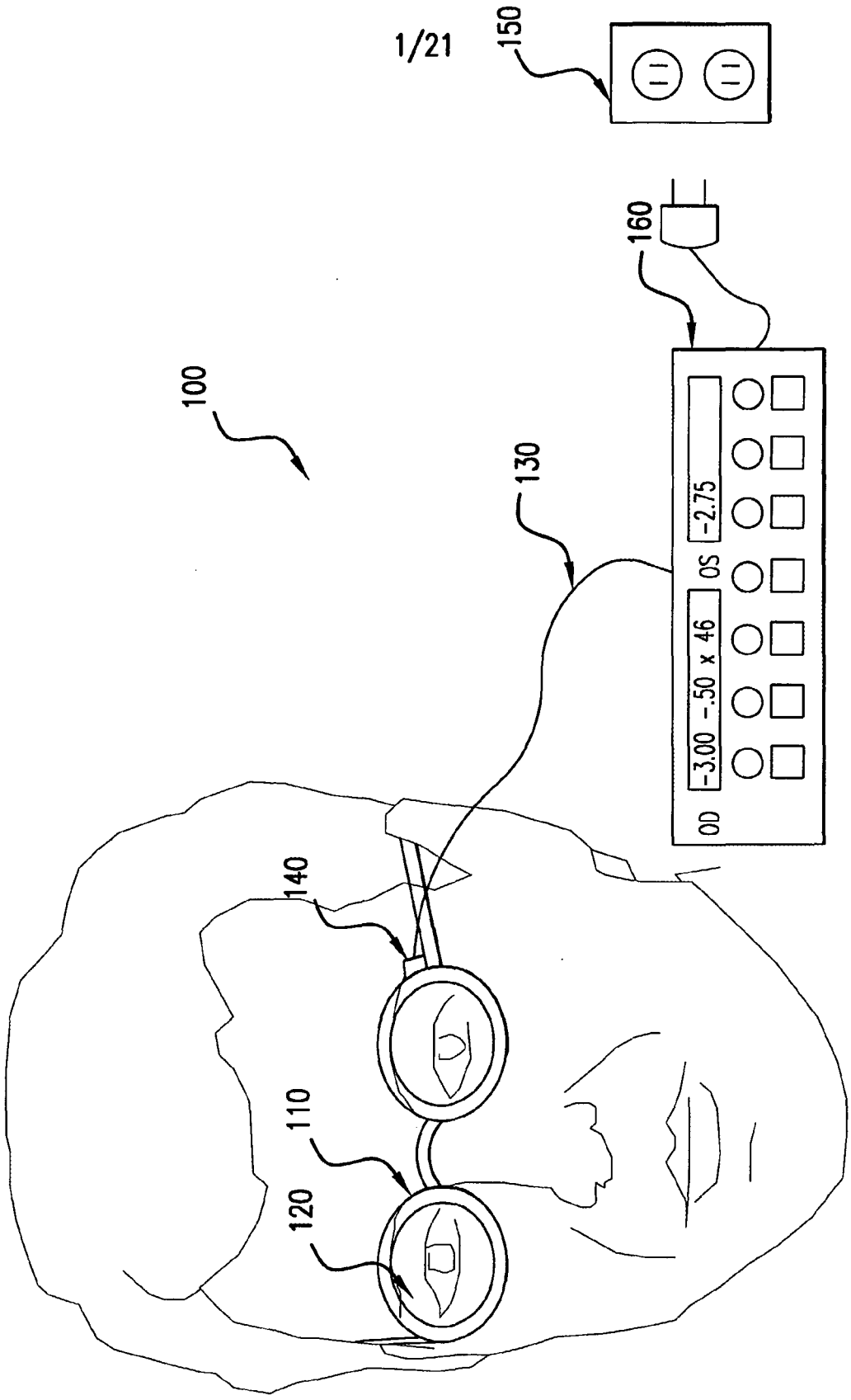


FIG.1

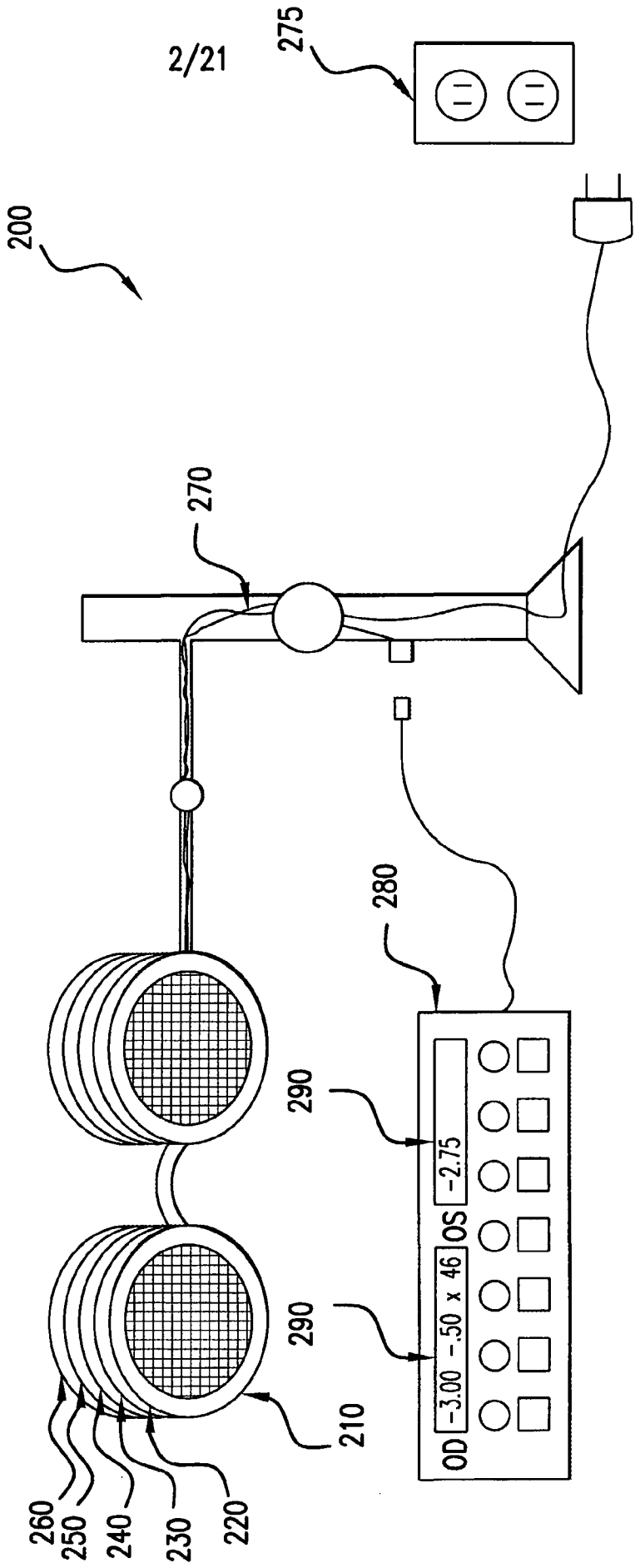

275
200
270
280
290
290
210
260
250
240
230
220
OD
-3.00
-.50
x 46
OS
-2.75

FIG.2

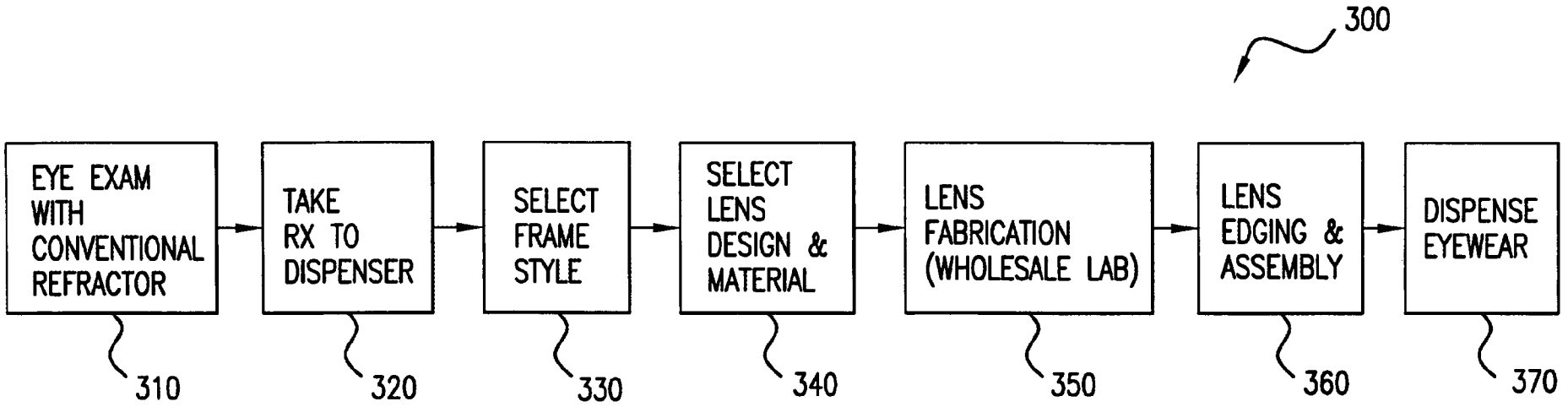
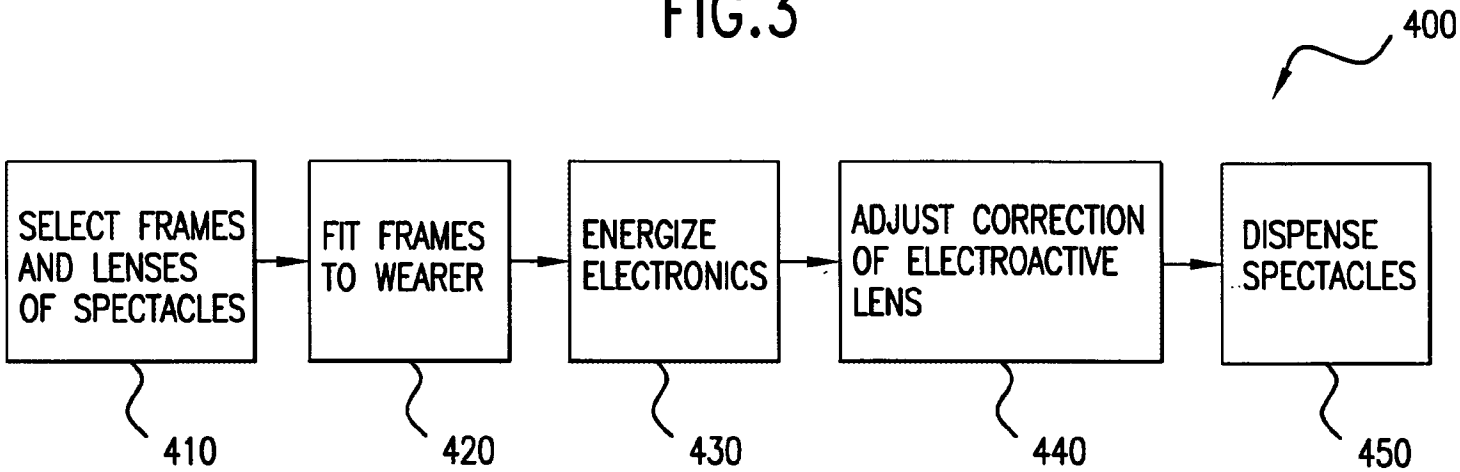


FIG.3



SUBSTITUTE SHEET (RULE 26)

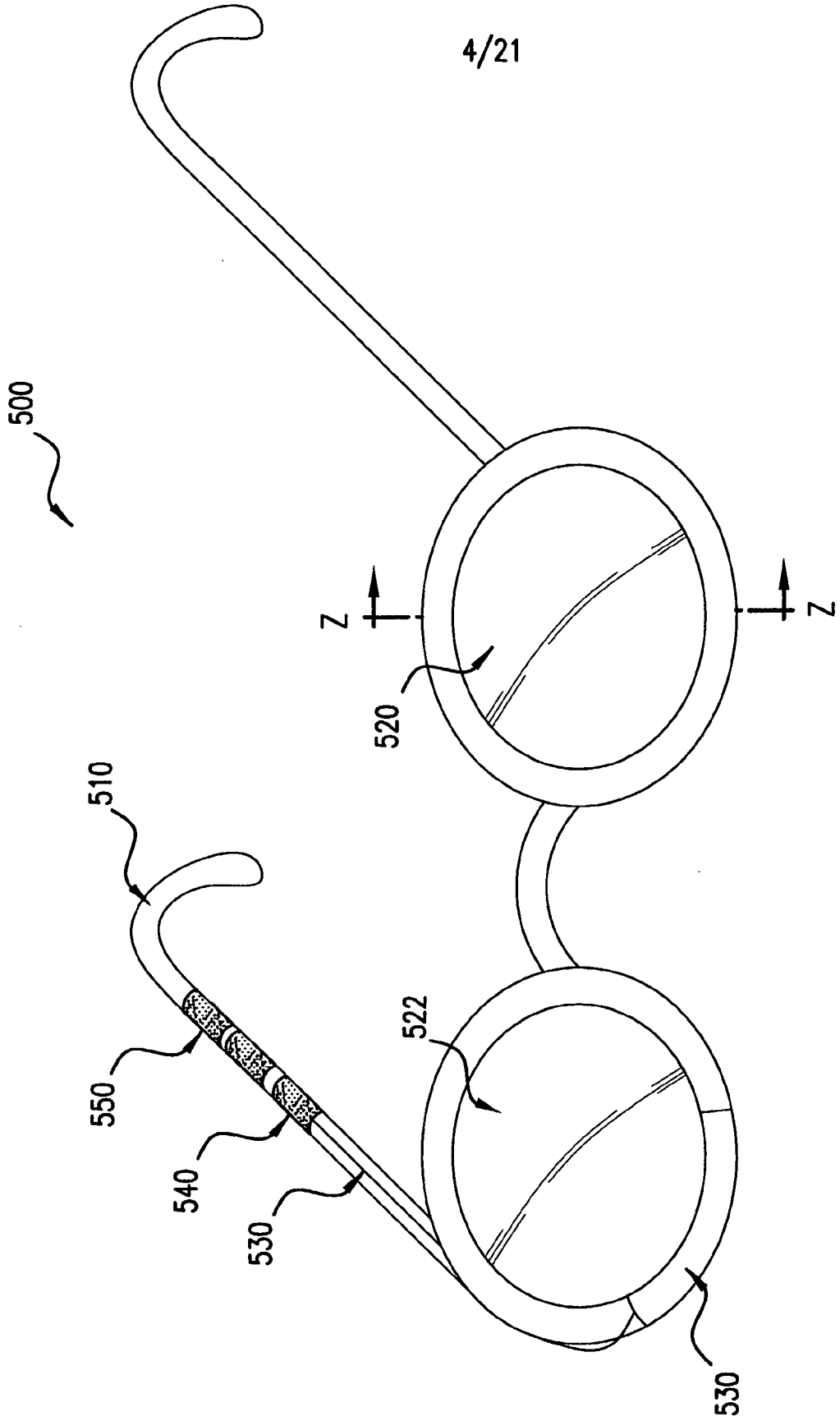


FIG.5

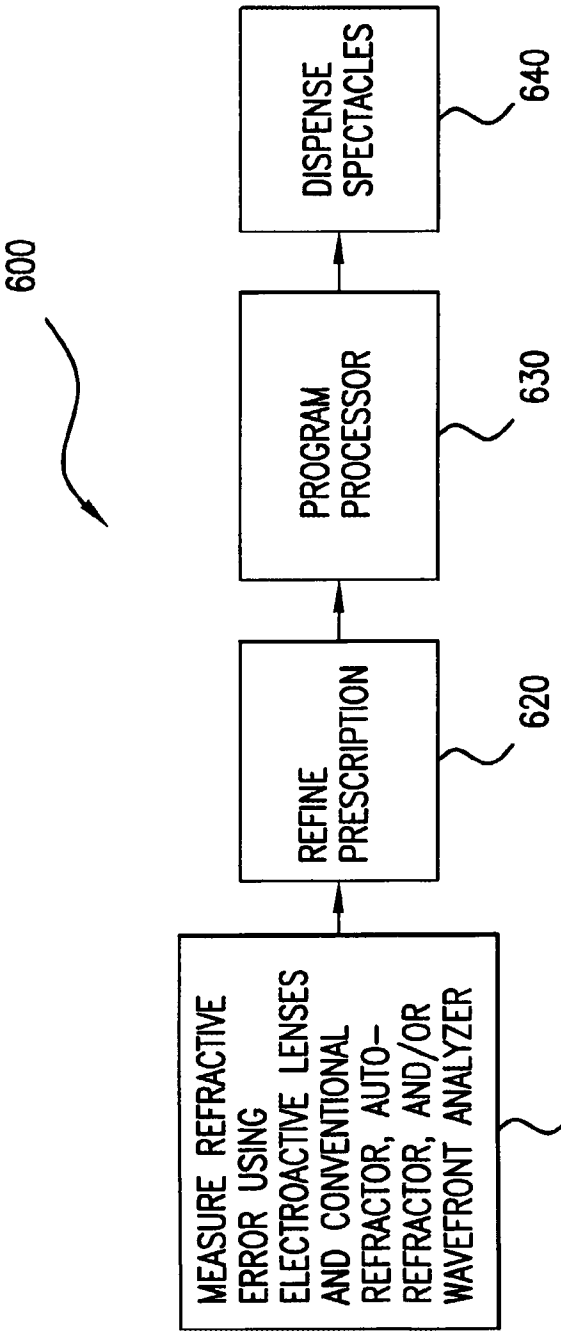

600
MEASURE REFRACTIVE ERROR USING ELECTROACTIVE LENSES AND CONVENTIONAL REFRACTOR, AUTO-REFRACTOR, AND/OR WAVEFRONT ANALYZER
610
REFINE PRESCRIPTION
620
PROGRAM PROCESSOR
630
DISPENSE SPECTACLES
640

FIG.6

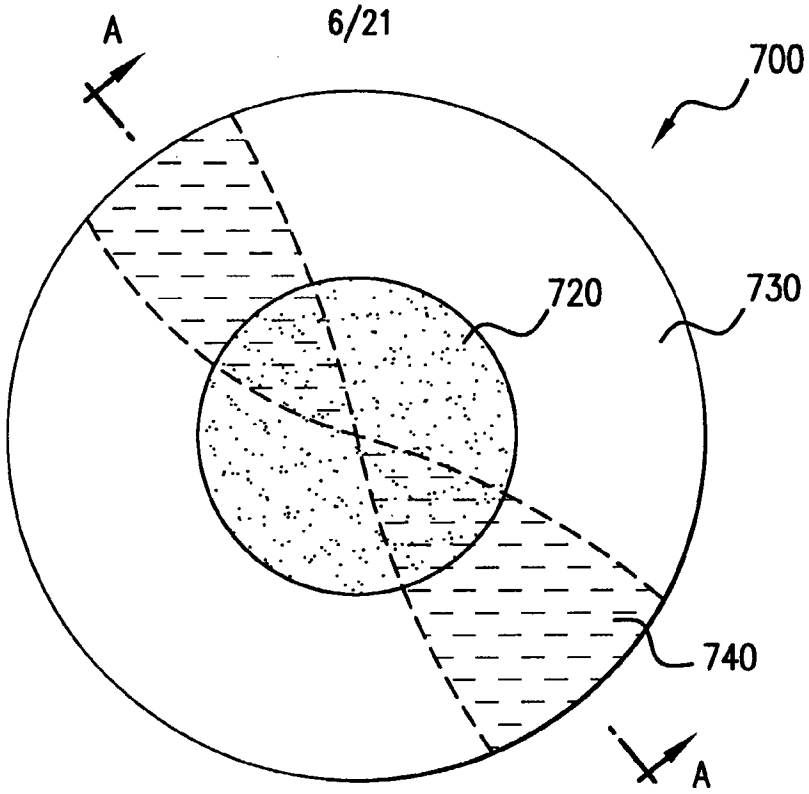


FIG.7

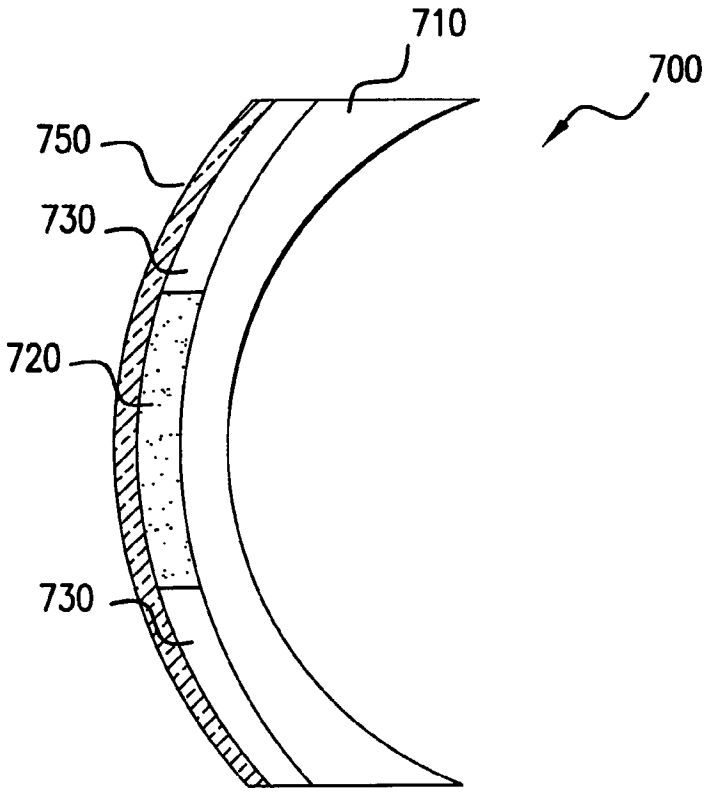


FIG.8

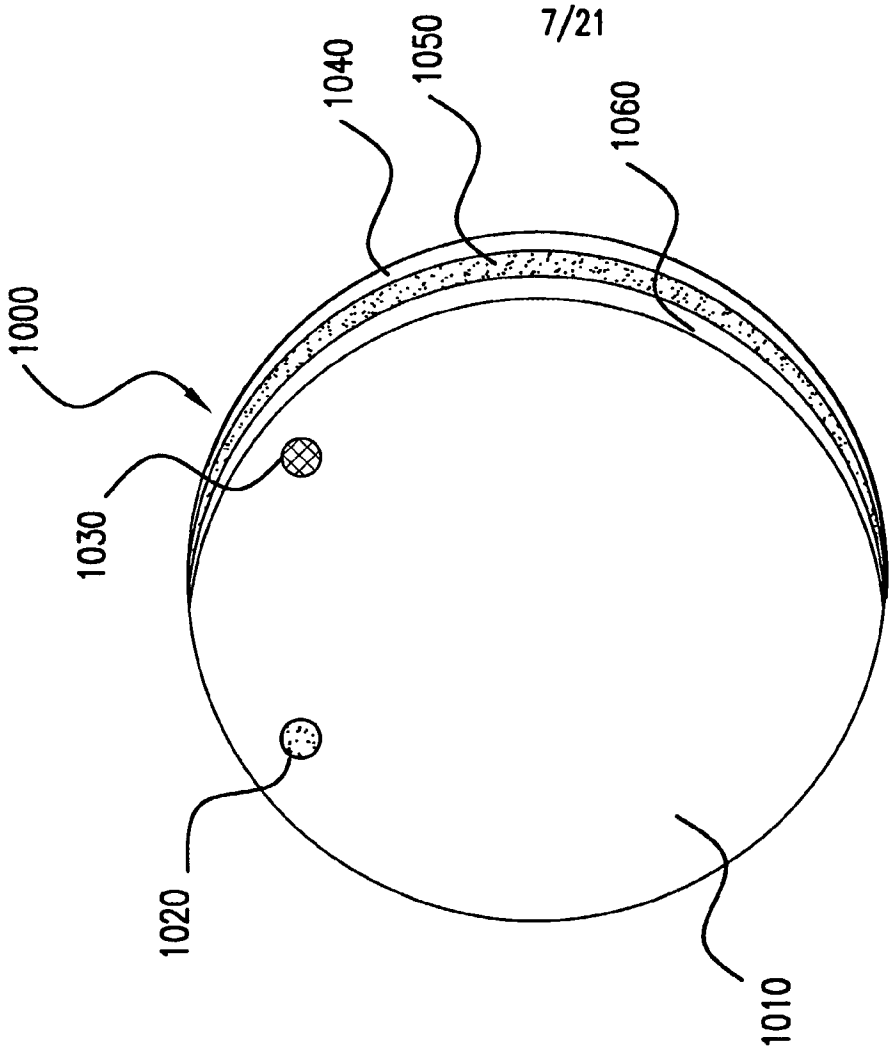


FIG.10

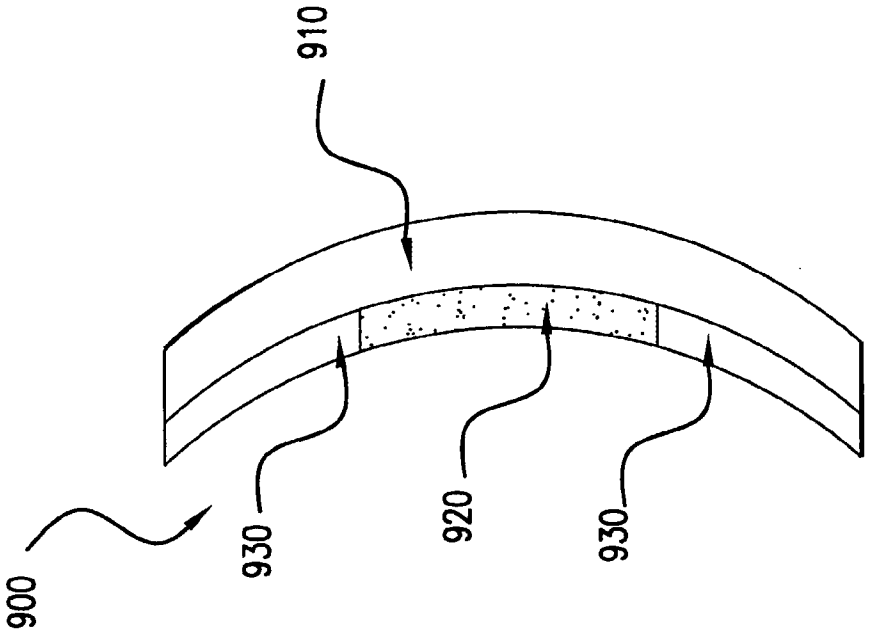


FIG.9

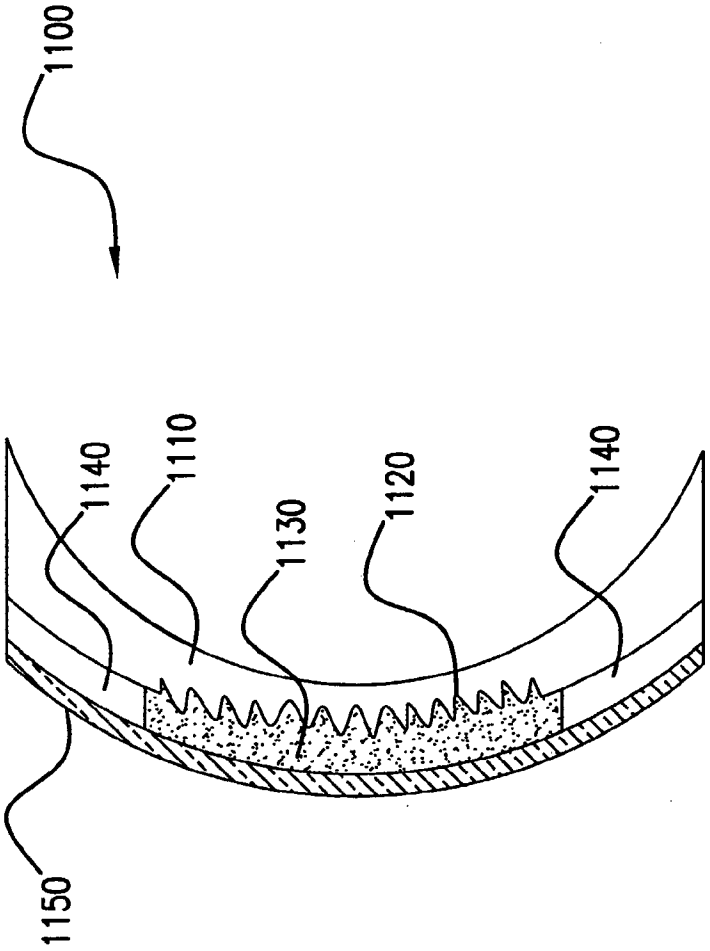


FIG.11

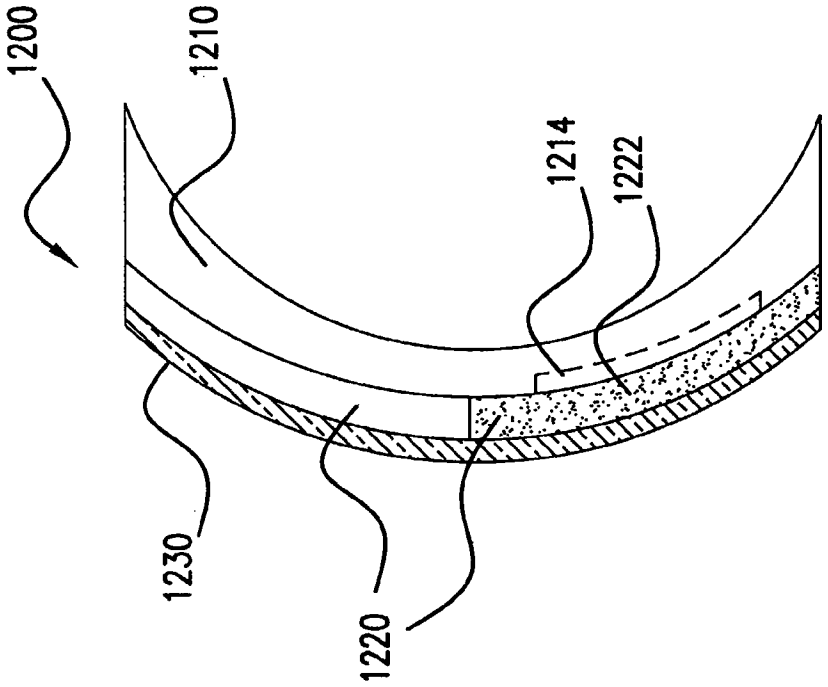

1200
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FIG.13

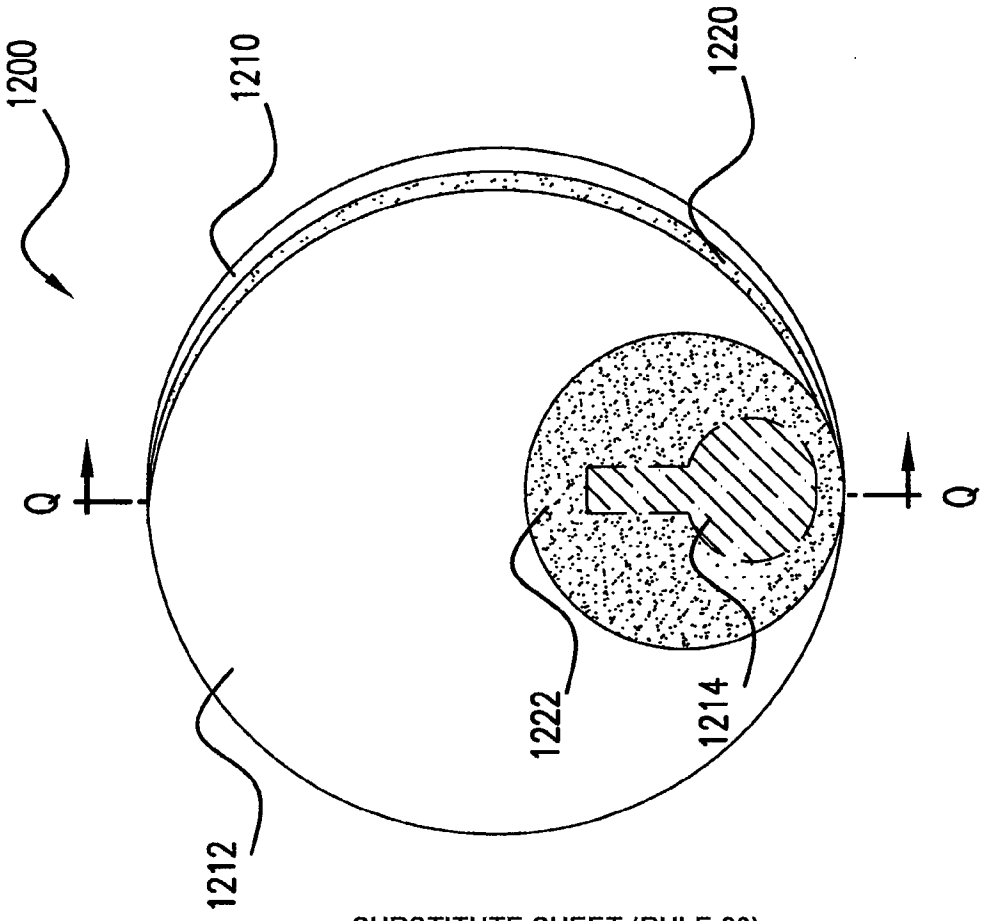

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FIG.12

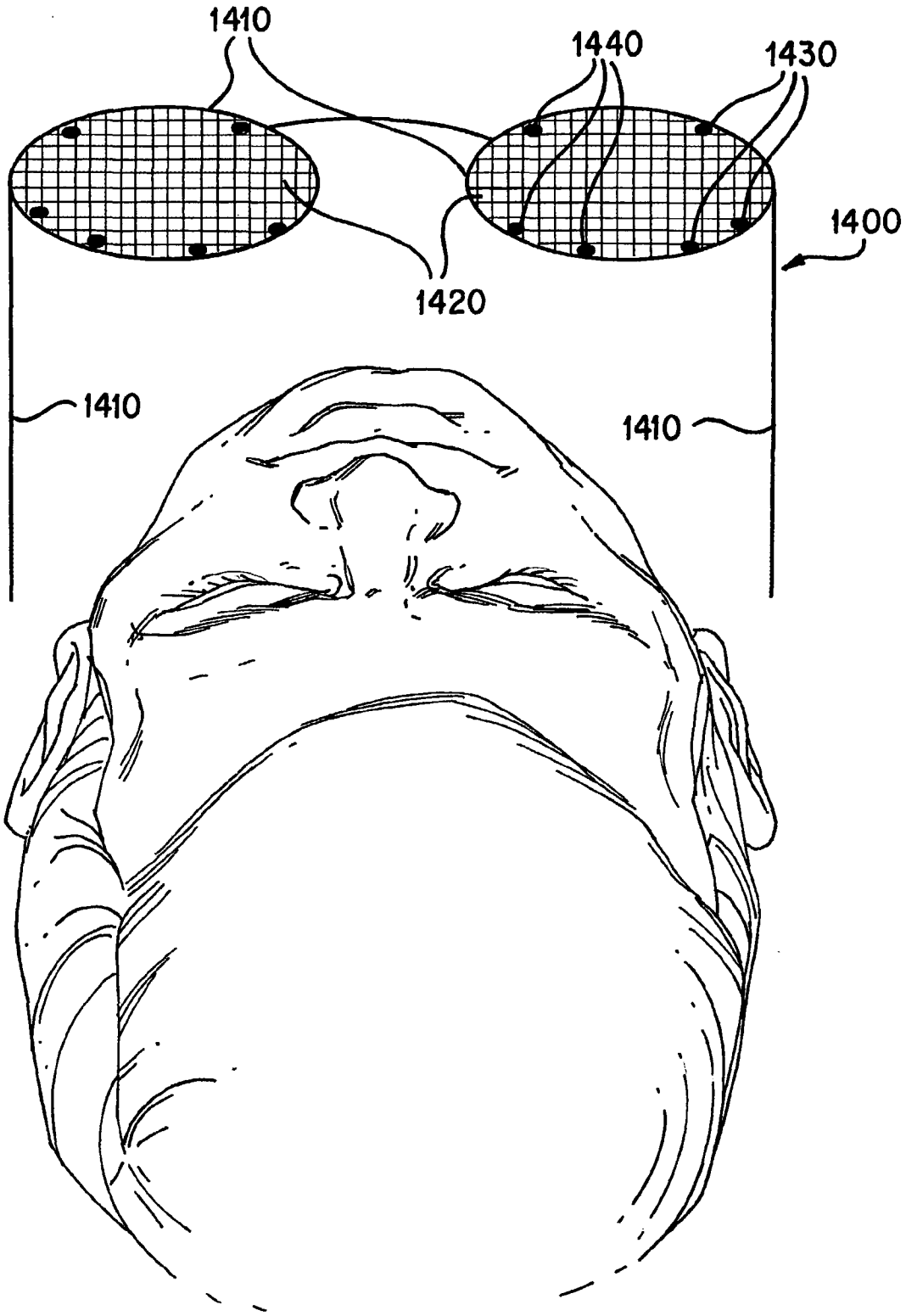


FIG. 14

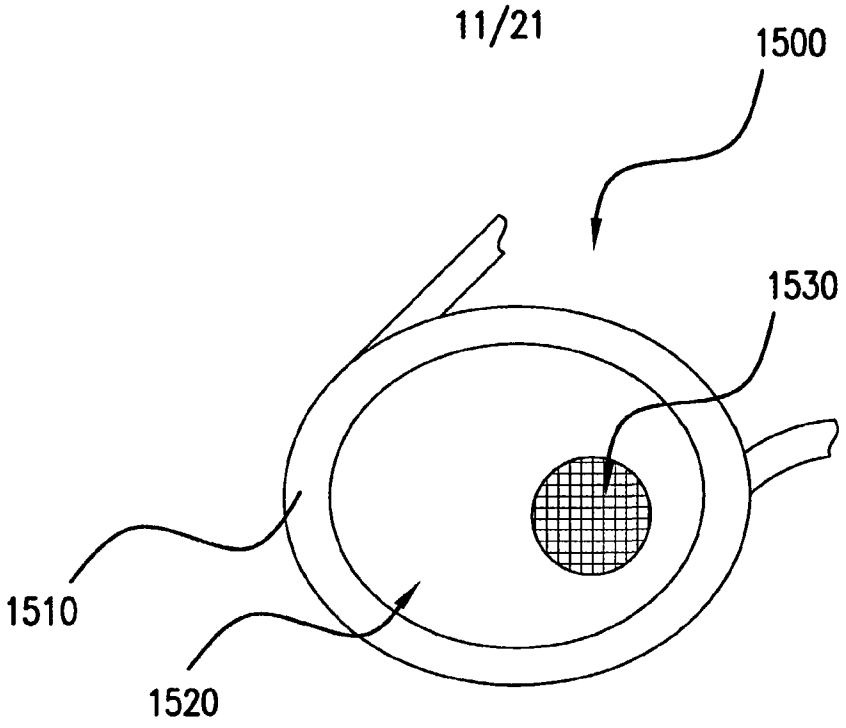


FIG.15

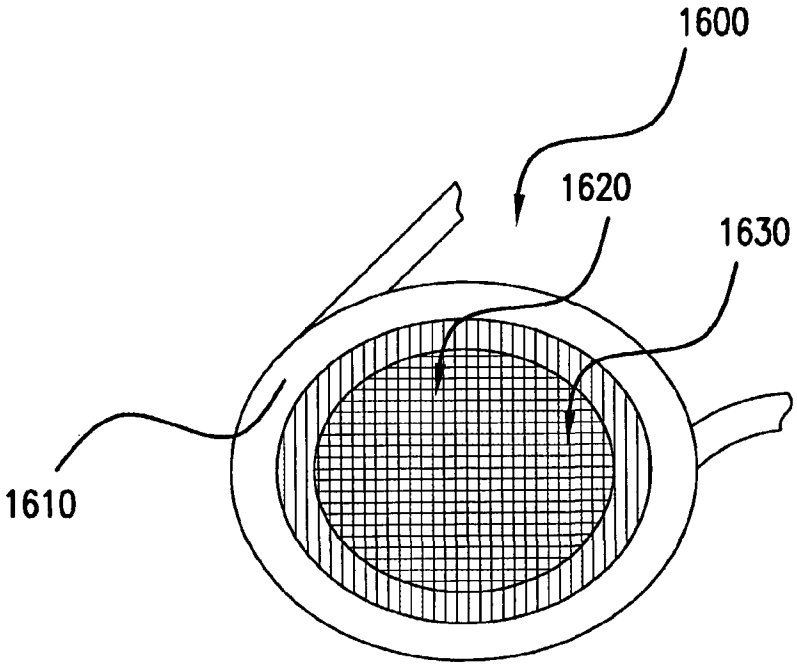


FIG.16

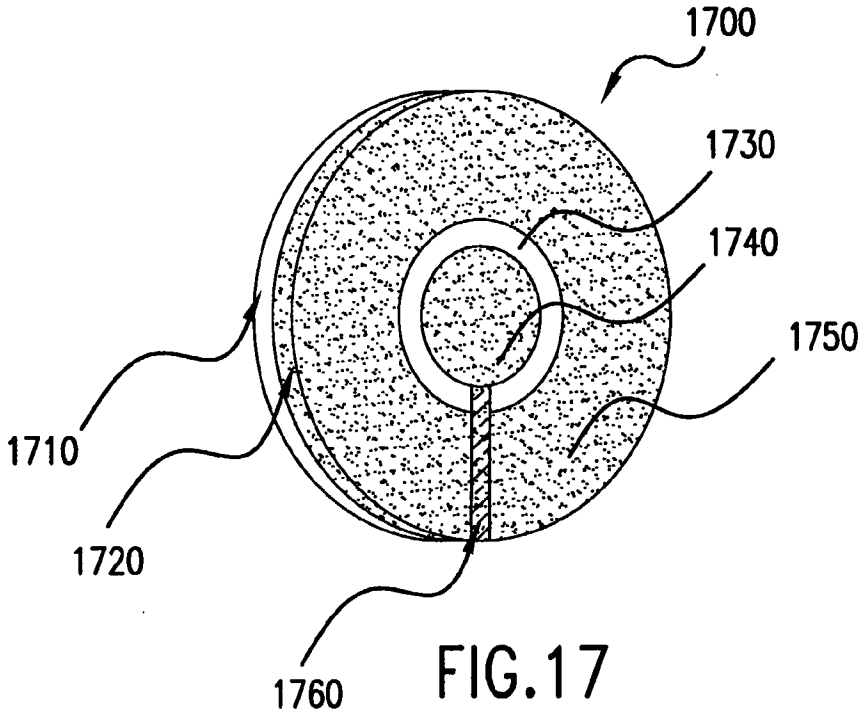

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FIG.17

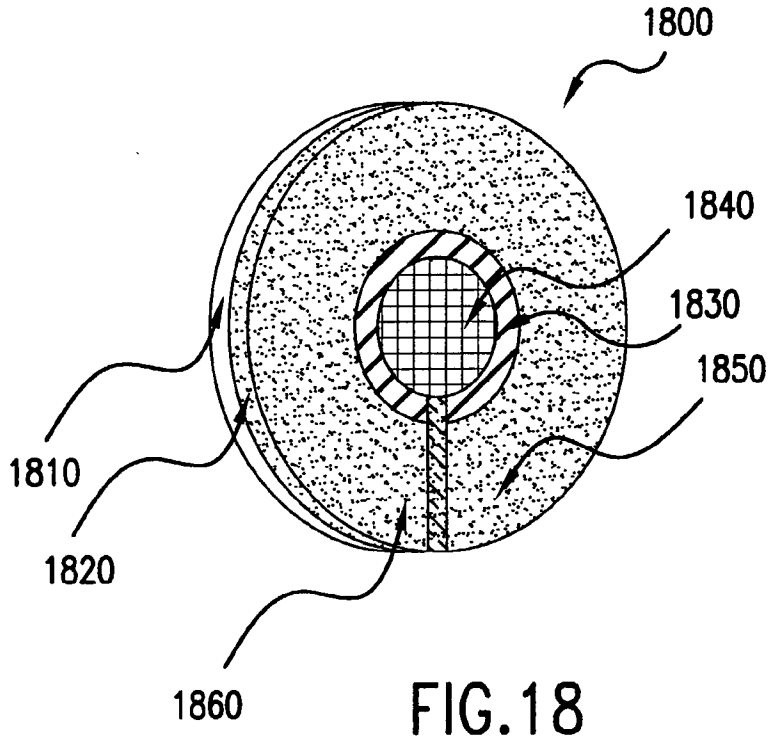

1800
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1850
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1820
1860

FIG.18

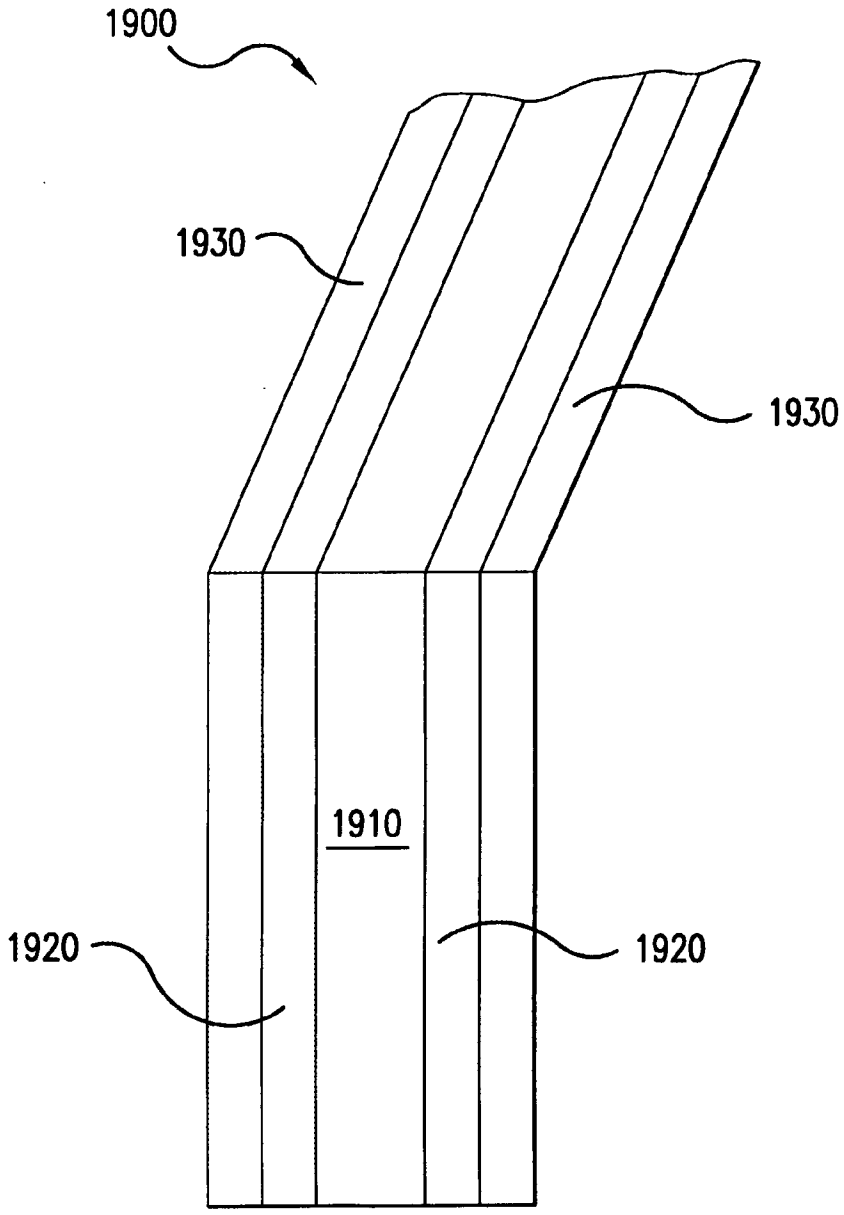


FIG.19

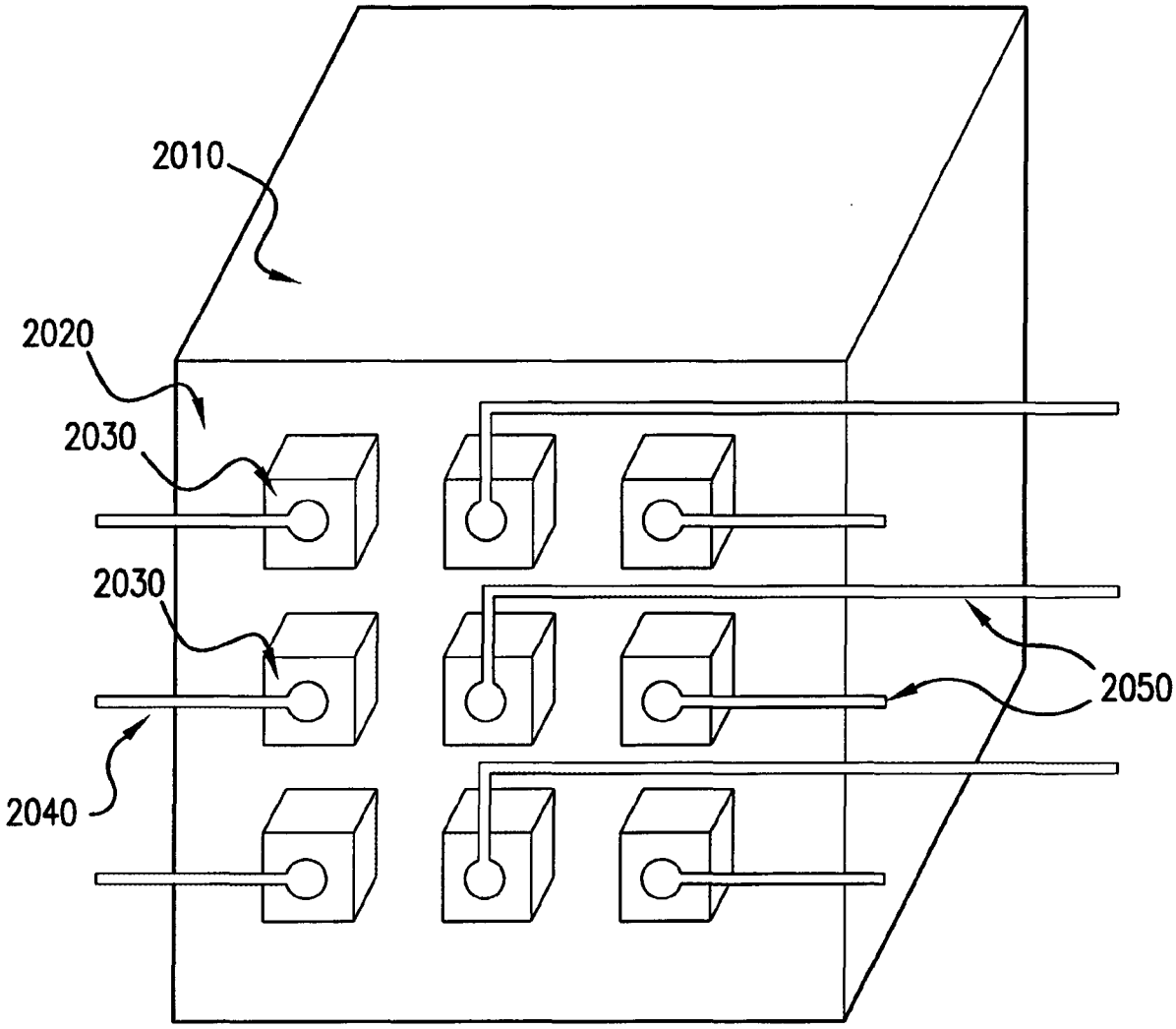


FIG.20

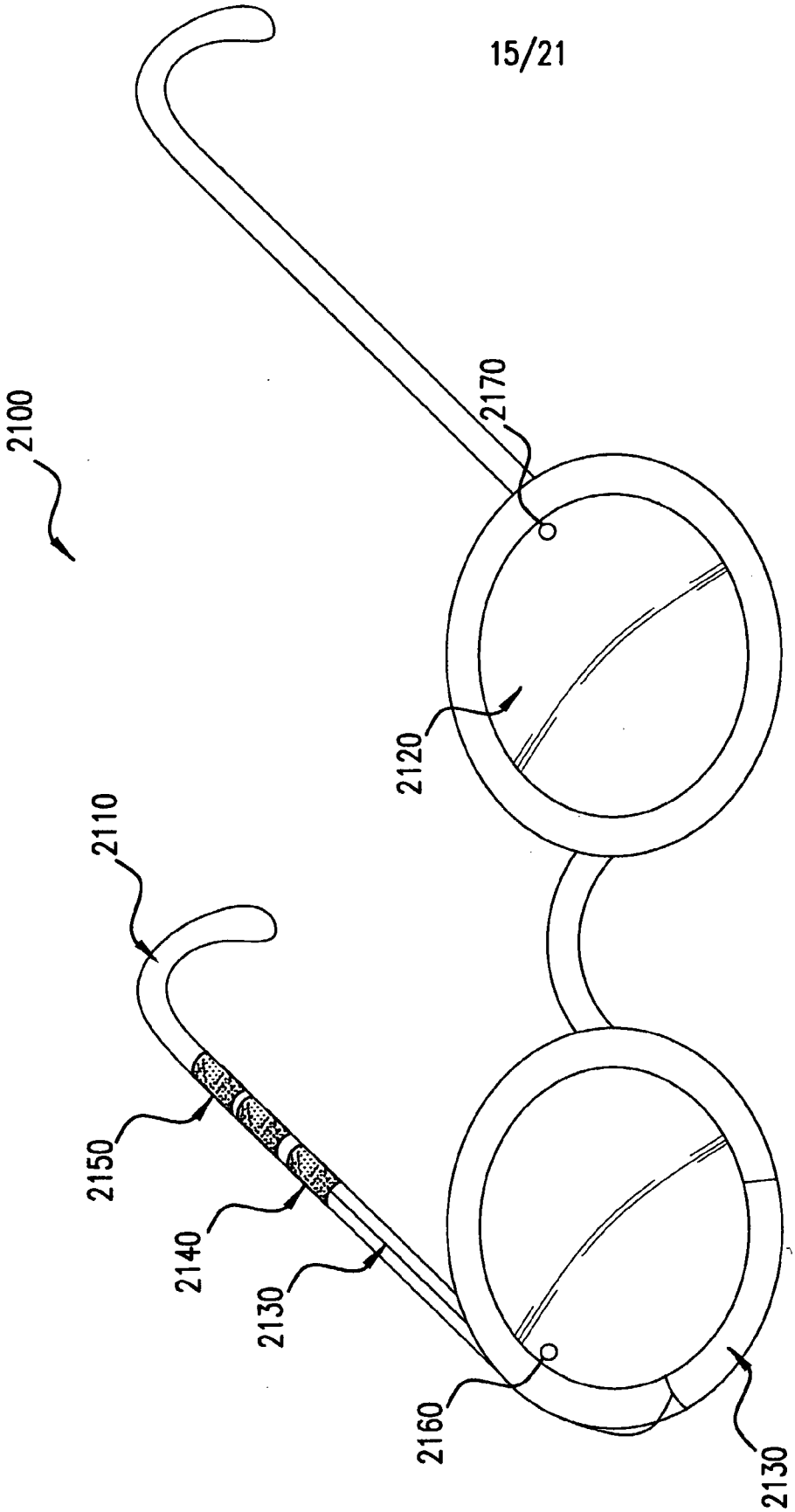


FIG.21

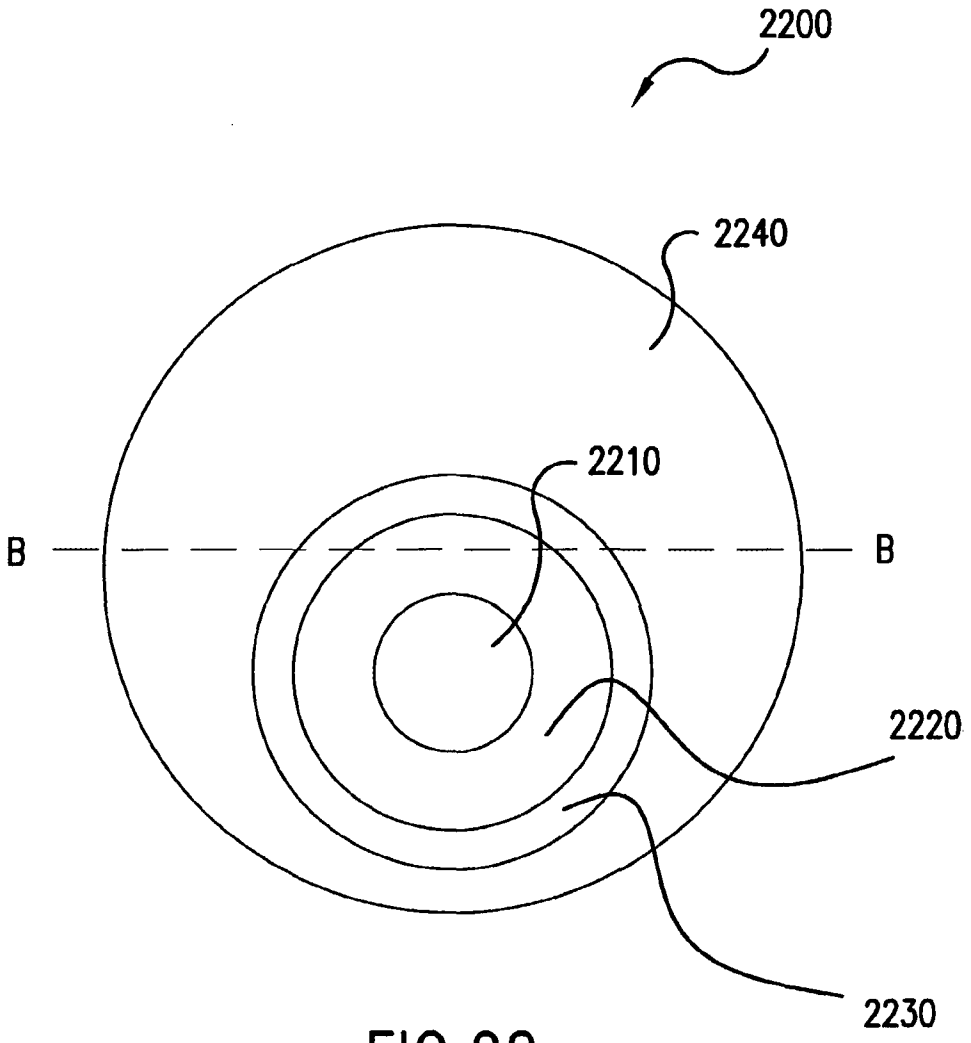


FIG.22

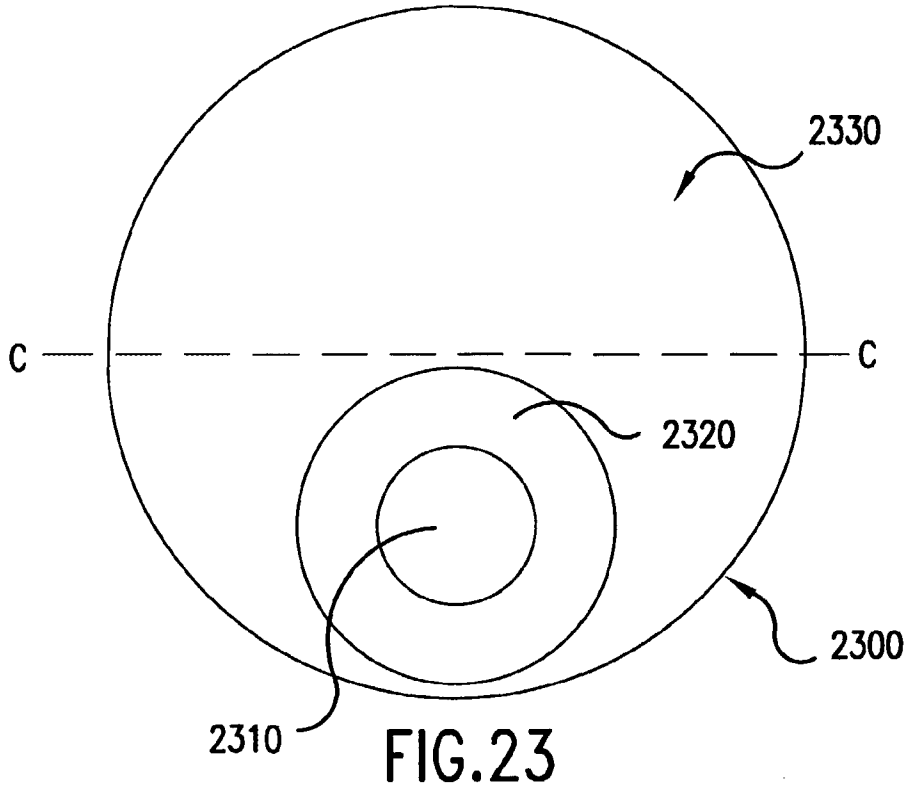


FIG.23

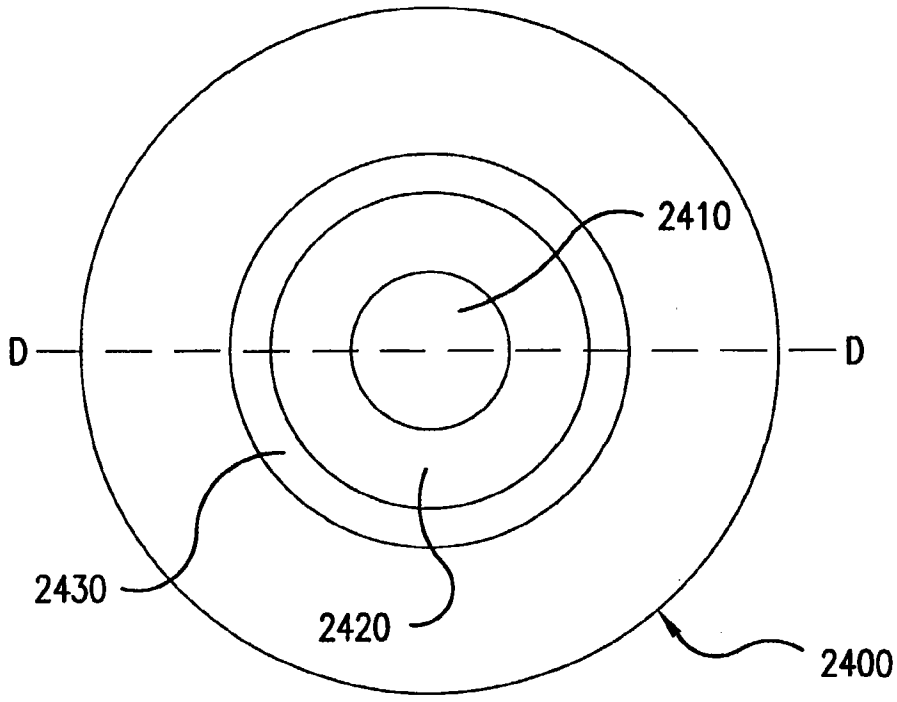


FIG.24

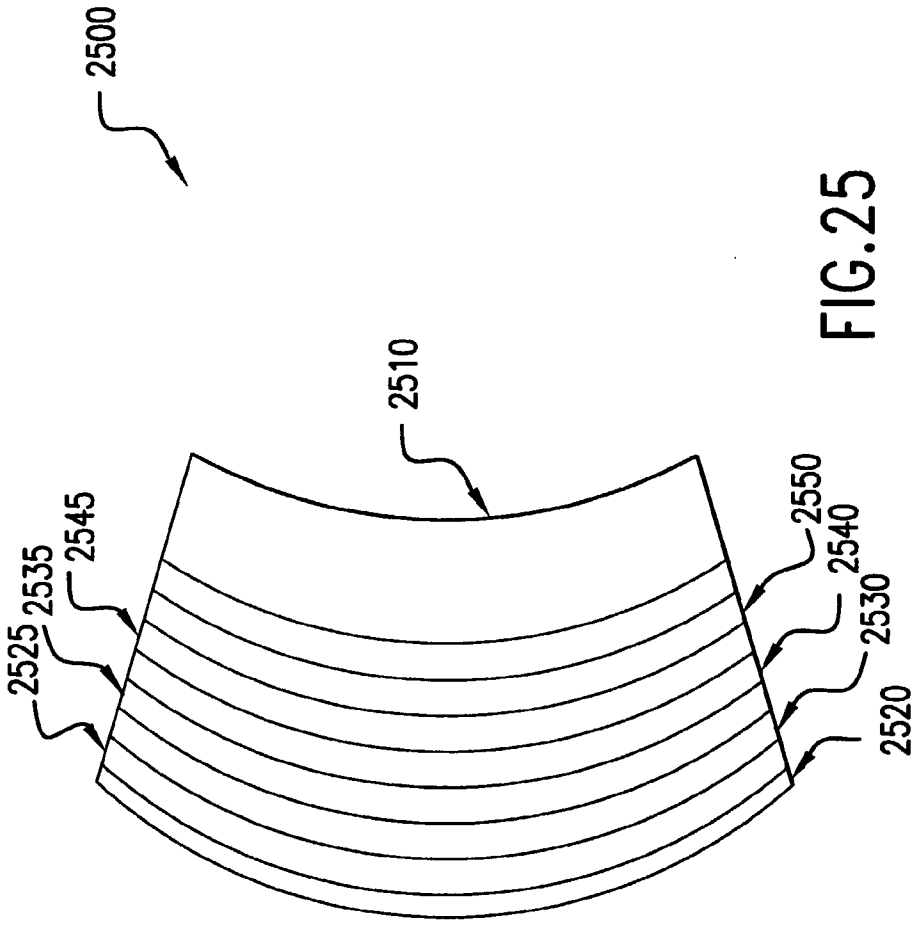


FIG.25

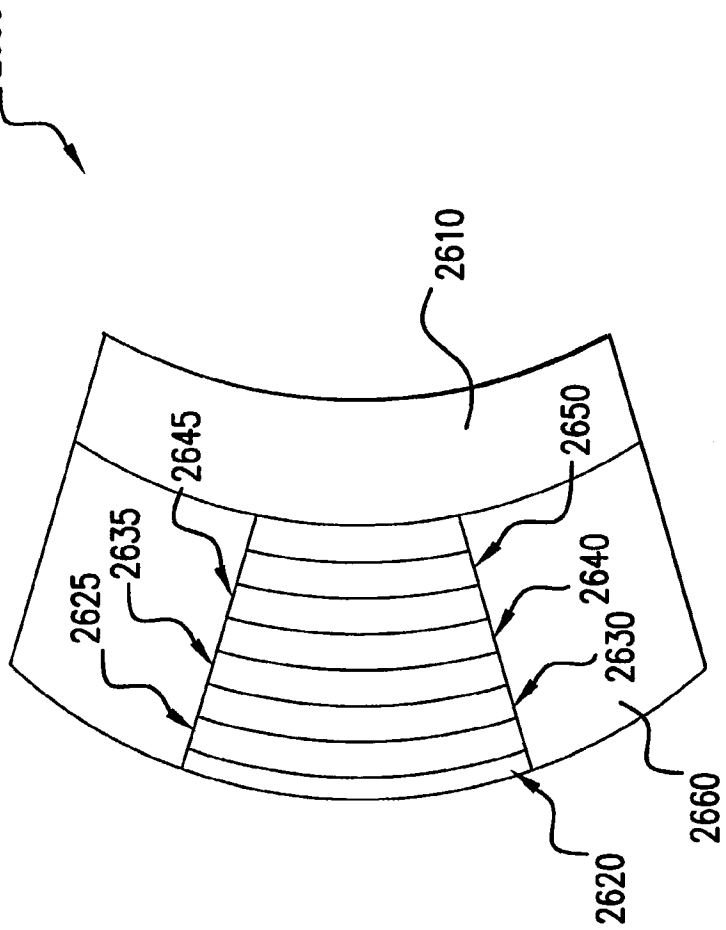


FIG.26

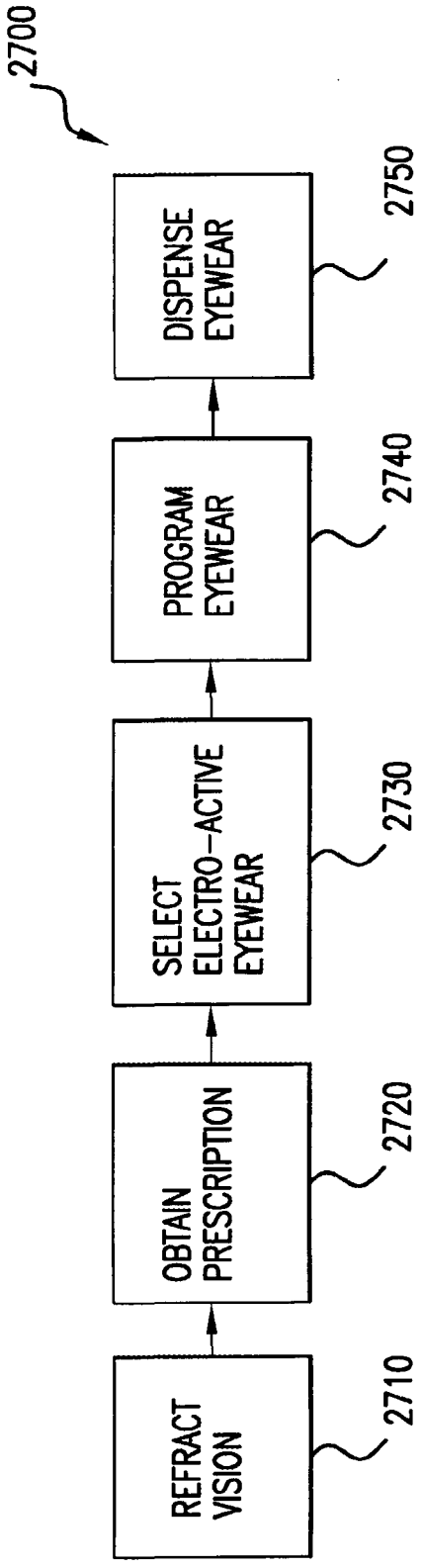

2700
REFRACT VISION
2710
OBTAIN PRESCRIPTION
2720
SELECT ELECTRO-ACTIVE EYEWEAR
2730
PROGRAM EYEWEAR
2740
DISPENSE EYEWEAR
2750

FIG.27

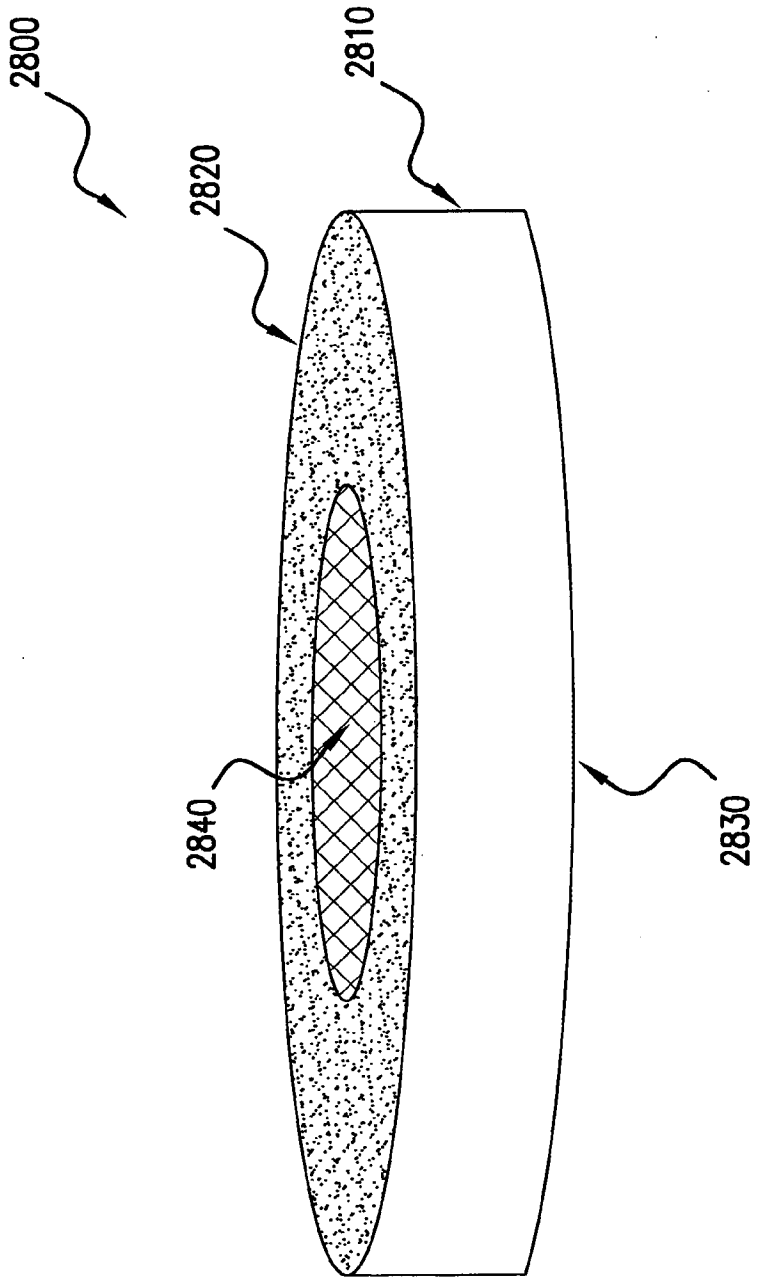


FIG.28

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US00/17964

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) :G02C 7/02
US CL : 351/159,176

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 351/41, 44, 159, 161, 163-165, 168-169, 176-177, 205, 209

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

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

East search

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X ---- A	US 5,359,444 A (PIOSENKA ET AL.) 25 October 1994 (25/10/94), Figures 4, 8-12, column 1, line 34 to column 7, line 23.	113-127, 129-214,217-222,228-246 ---------- 1-112, 128, 215-216,223-227,247
X ---- A	US 4,181,408 A (SENDERS) 01 January 1980 (01/01/80), Figures 1-5, column 2, line 63 to column 7, line 11.	1-112, 128, 147-215, 217-222,231-246 ---------- 113-127, 129-146, 216, 223-230, 247

[X] Further documents are listed in the continuation of Box C. [ ] See patent family annex.

*	Special categories of cited documents:	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A"	document defining the general state of the art which is not considered to be of particular relevance	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E"	earlier document published on or after the international filing date	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&"	document member of the same patent family
"O"	document referring to an oral disclosure, use, exhibition or other means		
"P"	document published prior to the international filing date but later than the priority date claimed		

Date of the actual completion of the international search 21 AUGUST 2000	Date of mailing of the international search report 08 NOV 2000
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703) 305-3230	Authorized officer JORDAN M. SCHWARTZ Telephone No. (703) 308-1286

Form PCT/ISA/210 (second sheet) (July 1998)*

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X ---- A	US 4,601,545 A (KERN) 22 July 1986 (22/07/86), Figures 1-4, 6-8, column 1, line 42 to column 7, line 43.	117-128, 147-215, 217-222, 231-235, 247 ---------- 1-116, 129-146, 216, 223-230, 236-246
X ---- A	US 5,182,585 A (STONER) 26 January 1993 (26/01/93), Figures 1-4, column 2, line 45 to column 10, line 27.	1-112, 117-126, 128-146, 206-215, 217-222, 231-235 ---------- 113-116, 127, 147-205, 216, 223-230, 236-247

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter I of the Patent Cooperation Treaty)

(PCT Rule 44*bis*)

Applicant's or agent's file reference 91904-813919	**FOR FURTHER ACTION**	See item 4 below
International application No. PCT/US2011/042882	International filing date *(day/month/year)* 01 July 2011 (01.07.2011)	Priority date *(day/month/year)* 02 July 2010 (02.07.2010)
International Patent Classification (8th edition unless older edition indicated) See relevant information in Form PCT/ISA/237		
Applicant PIXELOPTICS, INC.		

1. This international preliminary report on patentability (Chapter I) is issued by the International Bureau on behalf of the International Searching Authority under Rule 44 *bis*.1(a).

2. This REPORT consists of a total of 11 sheets, including this cover sheet.

   In the attached sheets, any reference to the written opinion of the International Searching Authority should be read as a reference to the international preliminary report on patentability (Chapter I) instead.

3. This report contains indications relating to the following items:

☒	Box No. I	Basis of the report
☐	Box No. II	Priority
☒	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
☒	Box No. IV	Lack of unity of invention
☒	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
☐	Box No. VI	Certain documents cited
☐	Box No. VII	Certain defects in the international application
☒	Box No. VIII	Certain observations on the international application

4. The International Bureau will communicate this report to designated Offices in accordance with Rules 44*bis*.3(c) and 93*bis*.1 but not, except where the applicant makes an express request under Article 23(2), before the expiration of 30 months from the priority date (Rule 44*bis* .2).

	Date of issuance of this report 08 January 2013 (08.01.2013)
The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No. +41 22 338 82 70	Authorized officer Nora Lindner e-mail: pt03.pct@wipo.int

Form PCT/IB/373 (January 2004)

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To:

see form PCT/ISA/220

PCT

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY
(PCT Rule 43*bis*.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/US2011/042882	01.07.2011	02.07.2010

International Patent Classification (IPC) or both national classification and IPC
INV. G02C7/10 G02C1/06 G02C7/08 G02C11/00

Applicant
PIXELOPTICS, INC.

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☒ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☒ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☒ Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notifed the International Bureau under Rule 66.1*bis*(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA:	Date of completion of this opinion	Authorized Officer
European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Fax: +49 89 2399 - 4465	see form PCT/ISA/210	de Lajarte, Gilles Telephone No. +49 89 2399-2697

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of:

   ☒ the international application in the language in which it was filed

   ☐ a translation of the international application into , which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1 (b)).

2. ☐ This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43bis.1(a))

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of a sequence listing filed or furnished:

   a. (means)

      ☐ on paper

      ☐ in electronic form

   b. (time)

      ☐ in the international application as filed

      ☐ together with the international application in electronic form

      ☐ subsequently to this Authority for the purposes of search

4. ☐ In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

5. Additional comments:

Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non obvious), or to be industrially applicable have not been examined in respect of

☐ the entire international application

☒ claims Nos. 11, 19, 20

because:

☐ the said international application, or the said claims Nos. relate to the following subject matter which does not require an international search *(specify)*:

☐ the description, claims or drawings *(indicate particular elements below)* or said claims Nos. are so unclear that no meaningful opinion could be formed *(specify)*:

☐ the claims, or said claims Nos. are so inadequately supported by the description that no meaningful opinion could be formed *(specify)*:

☒ no international search report has been established for the whole application or for said claims Nos. 11, 19, 20

☐ a meaningful opinion could not be formed without the sequence listing; the applicant did not, within the prescribed time limit:

- ☐ furnish a sequence listing on paper complying with the standard provided for in Annex C of the Administrative Instructions, and such listing was not available to the International Searching Authority in a form and manner acceptable to it.
- ☐ furnish a sequence listing in electronic form complying with the standard provided for in Annex C of the Administrative Instructions, and such listing was not available to the International Searching Authority in a form and manner acceptable to it.
- ☐ pay the required late furnishing fee for the furnishing of a sequence listing in response to an invitation under Rules 13*ter*.1(a) or (b).

☐ See Supplemental Box for further details

Box No. IV Lack of unity of invention

1. ☒ In response to the invitation (Form PCT/ISA/206) to pay additional fees, the applicant has, within the applicable time limit:

   ☐ paid additional fees

   ☐ paid additional fees under protest and, where applicable, the protest fee

   ☐ paid additional fees under protest but the applicable protest fee was not paid

   ☒ not paid additional fees

2. ☐ This Authority found that the requirement of unity of invention is not complied with and chose not to invite the applicant to pay additional fees.

3. This Authority considers that the requirement of unity of invention in accordance with Rule 13.1, 13.2 and 13.3 is

   ☐ complied with

   ☒ not complied with for the following reasons:

   see separate sheet

4. Consequently, this report has been established in respect of the following parts of the international application:

   ☐ all parts.

   ☒ the parts relating to claims Nos. 1-10, 12-18, 21-33

Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	
	No:	Claims	1-10, 12-18, 21-33
Inventive step (IS)	Yes:	Claims	
	No:	Claims	1-10, 12-18, 21-33
Industrial applicability (IA)	Yes:	Claims	1-10, 12-18, 21-33
	No:	Claims	

2. Citations and explanations

see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

Re Item IV

Lack of unity of invention

1 Non unity

It is considered that there are 3 inventions covered by the claims indicated as follows:

- Group 1 (claims 1-10, 12-18, 21-33): connection structure
    - Subgroup 1.1 (claims 1-10, 12-18, 21-28): same two connections for two lenses
    - Subgroup 1.2 (claims 29-33): four connections for two lenses
- Group 2 (claims 11, 19, 20): material choice for electrical isolation

The reasons for which the inventions are not so linked as to form a single general inventive concept, are as follows:

The subject-matter of independent claim 1 is already known (see the grounds for this objection below).

The special technical features of each group are:

- Group 1 : structural connection to the electro-active lenses,
    - Subgroup 1.1: both lenses each connected to the same two electrical paths,
    - Subgroup 1.2: the two lenses are connected with four distinct electrical paths,
- Group 2: choice of materials for improved isolation of the electrical paths.

The problems solved by these special technical features can therefore be construed as:

- Group 1: choice of the electrical structure,
    - Group 1.1: how to reduce the number of electronic components,
    - Group 1.2: how to improve the controlling of the lenses,
- Group 2: how to improve the isolation of the electrical paths.

The requisite unity of invention no longer exists inasmuch as a technical relationship involving one or more of the same or corresponding special technical features does not exist between the subject-matter of the 3 groups of claims.

In conclusion, the groups of claims are not linked by common or corresponding special technical features and define 3 different inventions not linked by a single general inventive concept.

The application, hence does not meet the requirements of unity of invention as defined in Rules 13.1 and 13.2 PCT.

Since the search for subgroup 1.1. brought up documents for subgroup 1.2 without additional effort, no extra search fee for subgroup 1.2 has been requested.

Since the applicant chose not to pay the additional search fee for group 2, the following written opinion covers group 1 only.

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

Reference is made to the following documents:

D1 US 2008/273166 A1 (KOKONASKI WILLIAM [US] ET AL) 6 November 2008 (2008-11-06)

D2 WO 01/02895 A1 (VISION L L C E [US]) 11 January 2001 (2001-01-11)

D3 GB 1 563 929 A (AMERICAN CYANAMID CO) 2 April 1980 (1980-04-02)

D4 WO 01/35159 A1 (PPG IND OHIO INC [US]) 17 May 2001 (2001-05-17)

D5 US 4 991 951 A (MIZUNO MITSUYOSHI [JP] ET AL) 12 February 1991 (1991-02-12)

D6 US 2 930 857 A (ELEANOR HOLLINGSWORTH) 29 March 1960 (1960-03-29)

2 Independent claim 1

The present application does not meet the criteria of Article 33(2) PCT, because the subject-matter of independent claim 1 is not novel.

D1 discloses a first device comprising:

a frame (Fig 1, (1)) further comprising:

a lens housing (Fig 1, (1); Fig 2; Col 3, L 33-38) adapted to support a first lens and a second lens;

a first temple coupled to the lens housing (Fig 4, (51, 52, 55); Col 2, L 67-Col 3, L 12), and

a second temple coupled to the lens housing (Fig 1, (5));

a first conductive path provided by one or more frame elements from the first temple to the lens housing (Fig 1, (11, 51)); and

a second conductive path provided by one or more frame elements from the first temple to the lens housing (Fig 1, (12, 52));

wherein the first conductive path is electrically isolated from the second conductive path (Fig 4, (42, 44, 46, 55); Col 2, L 55-Col 3, L 12).

Thus, the spectacles of D1 have all the features of claim 1, its subject matter being therefore not novel.

Further, D2 and D3 also each anticipates the subject matter of claim 1 (see corresponding passages in the search report).

3 Dependent claims 1-10, 12-18, 21-33

Dependent claims 1-10, 12-18, 21-33 do not appear to contain any additional features which, in combination with the features of any claim to which it refers, meet the requirements of the PCT in respect of novelty and/or inventive step (Article 33(2, 3) PCT), the reasons being as follows:

- claim 2: one electrical insulator between a portion of first and second conductive path (Fig 3, (32); Col 2, L 57-62),

- claim 3: hinge (D1, Fig 4, (40); alternatively, faced with the problem of closing the temples, the person skilled in the art would transform the screw (40) fixation into a hinge without requiring an inventive activity; D2, Fig 4B),

- claim 4: insulator in temple (D1, Fig 4, (55)),

- claim 5: insulator in lens housing (D1, Fig 4, (42)),

- claim 6: electronic module connected to first and second conductive paths (D1, Fig 1, (9); Col 3, L 39-45),

- claim 7: first path (D1, Fig 1, (11)) connected to first contact of first lens (D1, Fig 2, (23); Col 3, L 24-32) and second path (Fig 1, (12)) connected to second contact of second lens (Fig 2, (26)),

- claim 8: first path (D1, Fig 1, (11)) connected to first contact of second lens (D1, Fig 2, (24); Col 3, L 24-32) and second path (Fig 1, (12)) connected to second contact of first lens (Fig 2, (25)),

- claim 9: lens housing with non-conductive material (D1, Fig 4, (42)) and first path with conductive material embedded in the lens housing (D1, Fig 2, (23); Col 3, L 24-32),

- claim 10: second path with conductive material embedded in the lens housing (D1, Fig 2, (25); Col 3, L 24-32),

- claim 12: second temple without electronic module (D1, Fig 1, temple connected to (B1)),

- claim 13: second temple or second lens without electronic module (D1, Fig 1, temple connected to (B1)),

- claim 14: first path provided by first portion of lens housing (D1, Fig 1, (11)),

- claim 15: second path provided by second portion of lens housing (D1, Fig 1, (12)),

- claim 16: first and second portion of lens housing isolated from one another by a piece of electrically insulating material (D1, Fig 5, (42)),

- claim 17: semi-rimless spectacles (D2, claim 14; [0067]),

- claim 18: conductive path within the lens housing of semi-rimless spectacles (implicit from D2, claim 14),

- claim 21: lens housing parts separated by air gap (D1, Fig 4, between (42) and (44) on one hand, (44) and 46) on the other hand),

- claim 22: bridge between first and second lens (D1, Fig 1, (12)), with first and second portion (Fig 1, (11, 12)) of the lens housing, with air gap between these two portions (Fig 3, between (32) and (34)),

- claim 23: air gap less than 10 mm (D1, Fig 1),

- claim 24: first and second portion of lens housing in metal (D1, Claim 1),

- claim 25: first part of insulator comprises the lenses (D1, Fig 1),

- claim 26: second part of insulator comprises air gap or second lens (D1, Fig 1),

- claim 27: second part of insulator between lenses (D1, Fig 1, 3, (12)),

- claim 28: full rimmed spectacles (D1, Fig 1),

- claims 29-33: four conductive paths (D2, Fig 14; [0074, 0099]; D3, Fig 1).

Re Item VIII

Certain observations on the international application

4 Clarity

Claim 1 is lacking the essential feature of "a spectacles frame" rather than "a first device". This is otherwise not clear which category of device is meant, e.g. whether telescopes, microscopes or a pair of spectacles are meant.

Furthermore, no example other than a pair of spectacles is provided in the description. As such, the subject matter of claim 1 is not supported over the whole range claimed.

Electronic Acknowledgement Receipt

EFS ID:	15004461
Application Number:	13372240
International Application Number:	
Confirmation Number:	8374
Title of Invention:	ELECTRONIC FRAMES COMPRISING ELECTRICAL CONDUCTORS
First Named Inventor/Applicant Name:	Charles Willey
Customer Number:	20350
Filer:	John P. McGroarty
Filer Authorized By:	
Attorney Docket Number:	91904-831532
Receipt Date:	20-FEB-2013
Filing Date:	13-FEB-2012
Time Stamp:	15:38:33
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		2013_02_20_SIDS_91904-831532.pdf	166067 d4cfdc02e14a74b8342a7f32d16798e688b9e239	yes	3

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Transmittal Letter	1	2
	Information Disclosure Statement (IDS) Form (SB08)	3	3

Warnings:					
Information:					
2	Foreign Reference	WO0102895.pdf	10740122 82d15f7c4b3ccff927f8d7a86ef98aff501eacf0	no	116
Warnings:					
Information:					
3	Non Patent Literature	IPER.pdf	440564 13d80639f6c099bb254f52f0f205763e3f9f8ff5	no	11
Warnings:					
Information:					
		Total Files Size (in bytes):	11346753		

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New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

I hereby certify that this correspondence is being filed via EFS-Web with the United States Patent and Trademark Office on February 20, 2013.

KILPATRICK TOWNSEND & STOCKTON LLP

By: Aneta Mihali Xhiku

PATENT
Attorney Docket No.: 91904-831532(011310US)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:

Charles Willey

Application No.: 13/372,240

Filed: February 13, 2012

For: ELECTRONIC FRAMES COMPRISING ELECTRICAL CONDUCTORS

Customer No.: 72162

Confirmation No.: 8374

Examiner: Choudhury, Mustak

Art Unit: 2872

SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT UNDER 37 CFR §1.97 and §1.98

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Commissioner:

The references cited on attached form PTO/SB/08A and PTO/SB/08B are being called to the attention of the Examiner. Copies of the references [in compliance with the requirements of 37 CFR §1.98(a)(2)] are enclosed. It is respectfully requested that the cited references be expressly considered during the prosecution of this application, and the references be made of record therein and appear among the "references cited" on any patent to issue therefrom.

Also enclosed is a copy of the International Preliminary Report on Patentability corresponding to the PCT/US2011/042882 application.

As provided for by 37 CFR §1.97(g) and (h), no inference should be made that the information and references cited are prior art merely because they are in this statement and no

representation is being made that a search has been conducted or that this statement encompasses all the possible relevant information.

Applicant believes that no fee is required for submission of this statement. However, if a fee is required, the Commissioner is authorized to deduct such fee from the undersigned's Deposit Account No. 20-1430. Please deduct any additional fees from, or credit any overpayment to, the above-noted Deposit Account.

Respectfully submitted,

/John P. McGroarty/

John P. McGroarty
Reg. No. 41,186

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64038089 v1

Substitute for form 1449/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				**Application Number**	13/372,240
				Filing Date	February 13, 2012
				First Named Inventor	Charles Willey
				Art Unit	TBA
(Use as many sheets as necessary)				Examiner Name	TBA
Sheet	1	of	1	Attorney Docket Number	91904-831532(011310US)

U.S. PATENT DOCUMENTS					
Examiner Initials*	Cite No.[1]	Document Number Number Kind Code[2] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	AA	US-2011/0058141	3/2011	Cozzani, Laura Maria	

FOREIGN PATENT DOCUMENTS						
Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3] Number[4] Kind Code[5] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]
	BA					☐

NON PATENT LITERATURE DOCUMENTS			
Examiner Initials *	Cite No.[1]	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T[6]
	CA		☐

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. [1] Applicant's unique citation designation number (optional). [2] See Kind Codes of U.S. Patent Documents at www.uspto.gov or MPEP 901.04. [3] Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). [4] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [5] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. [6] Applicant is to place a check mark here if English language Translation is attached.

64038089 v1

Electronic Acknowledgement Receipt

EFS ID:	14884120
Application Number:	13372240
International Application Number:	
Confirmation Number:	8374
Title of Invention:	ELECTRONIC FRAMES COMPRISING ELECTRICAL CONDUCTORS
First Named Inventor/Applicant Name:	Charles Willey
Customer Number:	20350
Filer:	John P. McGroarty/Aneta Xhiku
Filer Authorized By:	John P. McGroarty
Attorney Docket Number:	91904-831532
Receipt Date:	05-FEB-2013
Filing Date:	13-FEB-2012
Time Stamp:	18:48:18
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		2013_02_05_SIDS_91904-831532.pdf	165346 1ab29bc910c696bfefc4010727cb569de0a68549	yes	3

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Transmittal Letter	1	2
	Information Disclosure Statement (IDS) Form (SB08)	3	3
Warnings:			
Information:			
	Total Files Size (in bytes):	165346	

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New International Application Filed with the USPTO as a Receiving Office
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I hereby certify that this correspondence is being filed via EFS-Web with the United States Patent and Trademark Office on 2/5/13.

KILPATRICK TOWNSEND & STOCKTON LLP

By: Aneta Mihali Xhiku

PATENT
Attorney Docket No.: 91904-831532(011310US)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:

Charles Willey

Application No.: 13/372,240

Filed: February 13, 2012

For: ELECTRONIC FRAMES COMPRISING ELECTRICAL CONDUCTORS

Customer No.: 20350

Confirmation No.: 8374

Examiner: TBA

Art Unit: TBA

SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT UNDER 37 CFR §1.97 and §1.98

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Commissioner:

The references cited on attached form PTO/SB/08A and PTO/SB/08B are being called to the attention of the Examiner. Copies of the references [in compliance with the requirements of 37 CFR §1.98(a)(2)] are not enclosed. It is respectfully requested that the cited references be expressly considered during the prosecution of this application, and the references be made of record therein and appear among the "references cited" on any patent to issue therefrom.

As provided for by 37 CFR §1.97(g) and (h), no inference should be made that the information and references cited are prior art merely because they are in this statement and no representation is being made that a search has been conducted or that this statement encompasses all the possible relevant information.

Applicant believes that no fee is required for submission of this statement. However, if a fee is required, the Commissioner is authorized to deduct such fee from the undersigned's Deposit Account No. 20-1430. Please deduct any additional fees from, or credit any overpayment to, the above-noted Deposit Account.

Respectfully submitted,

/John P. McGroarty/

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Reg. No. 41,186

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San Francisco, California 94111-3834
Tel: 202-481-9900
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JPM:amx
64038089 v1

Substitute for form 1449/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				**Application Number**	13/372,240
				Filing Date	February 13, 2012
				First Named Inventor	Charles Willey
				Art Unit	TBA
(Use as many sheets as necessary)				Examiner Name	TBA
Sheet	1	of	1	Attorney Docket Number	91904-831532(011310US)

U.S. PATENT DOCUMENTS					
Examiner Initials*	Cite No.[1]	Document Number Number Kind Code[2] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	AA				

FOREIGN PATENT DOCUMENTS							
Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3] Number[4] Kind Code[5] (if known)		Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]
	BA	WO	01/35159	5/17/01	PPG Industries Ohio, Inc.		☐

NON PATENT LITERATURE DOCUMENTS			
Examiner Initials *	Cite No.[1]	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T[6]
	CA	Copy of the International Search Report corresponding to the related PCT/US2012/051202 application.	☐

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. [1] Applicant's unique citation designation number (optional). [2] See Kind Codes of U.S. Patent Documents at www.uspto.gov or MPEP 901.04. [3] Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). [4] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [5] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. [6] Applicant is to place a check mark here if English language Translation is attached.

64038089 v1

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
17 May 2001 (17.05.2001)

PCT

(10) International Publication Number
WO 01/35159 A1

(51) International Patent Classification[7]: G02C 7/10, 5/22

(21) International Application Number: PCT/US00/31087

(22) International Filing Date:
9 November 2000 (09.11.2000)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:

09/438,213	12 November 1999 (12.11.1999)	US
09/621,436	21 July 2000 (21.07.2000)	US
09/708,059	8 November 2000 (08.11.2000)	US

(71) Applicant: PPG INDUSTRIES OHIO, INC. [US/US]; 3800 West 143rd Street, Cleveland, OH 44111 (US).

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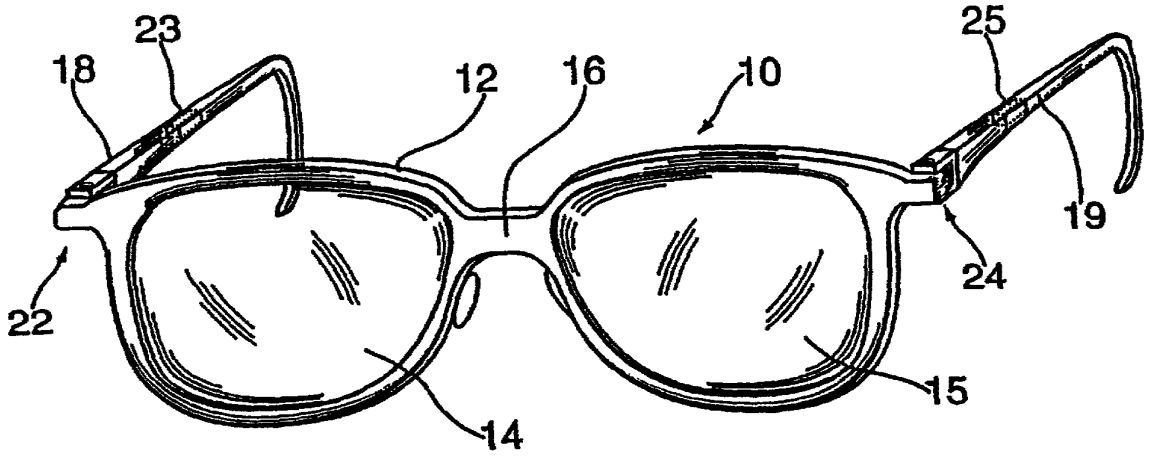
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(54) Title: SPLIT-PIN HINGE WITH WIRE EXTENDING THERETHROUGH



(57) Abstract: Hinge and one or more wires, or electrical conductors, wherein a segment of such wire or wires extends axially through at least one hollow pivot pin portion of a hinge and wherein such segment of the wire or wires is placed in torsion upon the hinge being pivoted. The hinge and wire may be used as part of an eyeglass assembly having electronics within the temple which influence a lens. In such an arrangement the hinge has two hollow pivot pin portions and a wire associated with the electronics routed through each. One pivot pin portion is made of an electrically insulating material and a wire associated with the positive side of the electronics is routed through this portion.

WO 01/35159 A1

SPLIT-PIN HINGE WITH WIRE EXTENDING THERETHROUGH

CROSS-REFERENCE TO RELATED APPLICATION

This application is a continuation-in-part of Application No. 09/438,213, filed November 12, 1999.

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates generally to a hinge and a wire extending through the hinge and further relates to eyeglasses, such as electrooptic eyeglasses, including a hinge through which one or more, preferably a set, of conductors extend to connect electrical components such as an electrical circuit and power supply to an eyeglass lens, thereby causing the lens to change an optical characteristic such as, for example, color, opaqueness, transmissivity or other optical property.

2. Description of the Background Art

Eyeglasses typically include a frame in which a pair of eyeglass lenses are mounted, a pair of temples and a pair of hinges pivotally interconnecting the frame and the temples. Each hinge typically includes a tang extending outwardly from one end of the eyeglass frame, a clevis provided on one end of a temple and including a pair of spaced apart and generally parallel clevis members, and a pivot pin. The tang is provided with a pivot pin through hole and the clevis members are provided with a pair of axially aligned pivot pin through holes. The clevis members are placed around the tang, the through holes are axially aligned and the connector pin is inserted into the aligned through holes to pivotally interconnect the tang and clevis. A "barrel type" eyeglass hinge is similar except it contains multiple tangs interleaved with clevises. Eyeglasses are known in the art including electrooptical eyeglass lenses which are provided with or comprise an optical element which changes an optical characteristic, such as opaqueness, color, transmissivity, or other optical property, upon an electrical signal or electric charge being applied to the eyeglass lens. For example, U.S.

Patent 4,756,605, entitled LIQUID CRYSTAL SPECTACLES, patented July 12, 1988, Okada et al. inventors, discloses spectacles having a pair of liquid crystal lenses, a frame, a pair of temples and a pair of hinges pivotally interconnecting the temples and the frame of the spectacles. A regulator circuit is provided in each temple and a regulator circuit is connected to the eyeglass lenses through a pair of conductors with the conductor extending through the brow of the spectacle frame and with the conductor extending through the rim of the spectacle frame. The conductors are connected to transparent electrodes and when voltage from the regulator circuit is applied to the electrodes, the liquid crystal molecules of the liquid crystal layers gradually change their direction of orientation toward (i.e., become perpendicular to) the transparent plate. Thus, the refractive indices of liquid crystal layers, with respect to incident light, can be changed in succession.

Other eyeglasses are known in the art which include electrochromic eyeglass lenses or wherein a transparent layer of electrochromic material is applied to the eyeglass lenses. Upon electrical charge being applied to such electrochromic lenses, the lenses change in transmittance property. See, for example, U.S. Patent 5,520,851 entitled "IRRIDIUM OXIDE FILM FOR ELECTROCHROMIC DEVICE", issued to Yu et al. on May 26, 1996, which is incorporated herein by reference.

The incorporation of such electronics into eyeglasses has produced a new need in the art. Unless all of the electronics, including the electrical signal generating circuit and the power supply, are placed between the hinge and the eyeglass frame, electrical connections between the electronics and the eyeglass lens must be made by traversing the hinge. Electrical connections traversing the hinge could provide only temporary electrical connection between the electronics and the lens which is lost when the frame is closed, or such electrical connections could be provided by

sliding wiper contact which is lost momentarily as the wipers slide, or such electrical connections could be permanently connected wires extending between the electronics and the eyeglass lens. For reliability, permanent connection by wires, or electrical conductors, between the electronics and the lens is preferred. Further, since such permanent wired connections require the wired electrical conductors to traverse the hinge, it is preferable that the wires not experience a concentrated bending moment when the eyeglasses are alternately opened and closed because such repeated concentrated bending moments can result in breakage or shearing of the wires or electrical conductors.

Running the wires or electrical conductors past a hinge or pivot point between a temple and the eyeglass frame introduces several problems. If the wires, or conductors, run to the outside of the hinge or pivot point, the wires or conductors are stretched when the temples are closed on the eyeglass frame. If the wires or conductors are on the inside of the hinge or pivot point, the wires or conductors are stretched when the temples are opened away from the eyeglass frames. If the wires or conductors are on the outside of the hinge or pivot point and made long enough to not be under tension when the temples are closed on the eyeglass frame, the wires or conductors are then compressed and could be kinked when the eyeglass frame is opened and the temples pivoted away from the eyeglass frame.

Accordingly, there is a need in the art for a hinge having one or more wires, such as one or more electrical conductors, extending therethrough which overcomes the above-noted problems in the art particularly as experienced in eyeglass frames as set forth above.

Copending and commonly assigned U.S. Patent Application 09/211,787 discloses a hinge for electrooptic devices which places a torsional stress on conductive wires passing through the hinge.

SUMMARY OF THE INVENTION

The disadvantages associated with the prior art are overcome by the invention of a tang/clevis-type hinge and one or more wires, or electrical conductors, wherein a portion of such wire or wires is run axially through the center of at least one of two separate, axially-aligned, pivot pin portions of said hinge, and through a gap between the opposed ends of said pivot pin portions, thereby causing such wire or wire portions to be placed in torsion upon pivoting movement of the hinge. Thus, the novel tang/clevis-type hinge of this invention is a split pin hinge comprising first and second split pin portions, a tang, a clevis and a wire or conductor, wherein a first portion of said split pin is inserted from a first side of said hinge and a second portion of said split pin is inserted from the opposite side into said tang and clevis thereby pivotally connecting said tang and clevis. The opposing ends of the pin portions do not meet when inserted into the hinge, which forms a gap that allows said wire to pass between the opposed ends of the first and second pin portions and into an axial bore in either or both of the pin portions. As such, the split pin assembly eliminates any stretching of the wire(s) upon opening or closing of the hinge. Such a split-pin hinge and wire combination may be utilized as any eyewear hinge and combined advantageously with the other components of a pair of eyeglasses including eyeglass lenses which undergo a change in optical characteristic, such as transmittance, when an electrical signal, or electric charge, is applied to the eyeglass lenses over wires or electrical conductors.

BRIEF DESCRIPTION OF THE DRAWINGS

The teachings of the present invention can be readily understood by considering the following detailed description in conjunction with the accompanying drawings, in which:

FIG. 1 is a perspective view of a pair of eyeglasses embodying the present invention;

FIG. 2 is an exploded view of a hinge embodying the present invention and including a tang, clevis and first and second split pin portions;

FIG. 3 is an assembled view of the tang, clevis and first and second split pin portions and further showing a pair of wires or electrical conductors extending through a bore in the lower pin portion and the gap between the axially aligned pin portions;

FIG. 4 is a partial diagrammatical view of a wire or electrical conductor experiencing torsion;

FIG. 5 is a partial diagrammatical view of a wire or conductor experiencing bending about a pivot point;

FIG. 6 is an exploded view of an alternative hinge embodiment of the present invention including a tang, clevis and first and second split pin portions; and

Fig. 7 is an assembled view of the tang, clevis and first and second split pin portions and further showing a wire or electrical conductor extending through a bore in each of the pin portions and the gap between the axially aligned pin portions.

DETAILED DESCRIPTION OF THE INVENTION

Referring now to FIG. 1, there are shown electrooptic eyeglasses 10 embodying the present invention. Eyeglasses 10 include a frame 12 in which a pair of eyeglass lenses 14 and 15 are mounted, a nosepiece or bridge 16, temples 18 and 19 and hinges 22 and 24 which mount the temples 18 and 19 pivotally to the frame 12. Electrooptic eyeglass lenses 14 and 15, in a preferred embodiment, are electrochromic lenses of the type known to the art which undergo a change in optical characteristic, for example, a change in their transmittance property, upon the application of a suitable electric charge to the electrochromic lens.

The temples 18 and 19 may have respective electronics, electrical circuits for generating electric charge and power supplies, 23 and 25 mounted suitably internally thereof for respectively applying electric charge to the electrooptic eyeglass lenses 14 and 15 over a pair of wires or electrical conductors not shown in FIG. 1. It will be understood that instead of having two sets of electronics 23 and 25, a single electrical circuit and power supply may be provided in only one of the temples for applying electric charge to only one eyeglass lens and the eyeglass lens 14 and 15 may be electrically interconnected by a suitable conductor (not shown) extending across the bridge 16.

Referring to FIG. 2, representative hinge 24, embodying the present invention, is shown in exploded view. Hinge 24 may include a tang 26, preferably a tang which is generally rectangular, extending outwardly from the eyeglass frame 12, a generally U-shaped clevis 28 extending outwardly from one end of the temple 19 and separate first and second axially-aligned pivot pin portions 30a and 30b, forming split cylindrical and longitudinally extending pivot or connector pins. Alternatively, as depicted in Fig. 6, the tang 26 can extend outwardly from a temple and the clevis 28 can extend outwardly from the frame. Furthermore, the tang 26 may have a rounded distal end to facilitate clearance for movement when the tang 26 is coupled to the clevis 28.

Returning to Fig. 2, the tang 26 is provided with a through hole or bore 31 for receiving pivot or connector pin portions 30a and 30b, and the tang 26 is further provided with a longitudinally extending hole or bore 32 extending through the tang and generally perpendicular to and in communication with the gap 42 (see Fig. 3) between connector pin portions 30a and 30b and hole 31. The clevis 28 includes a pair of spaced apart and substantially parallel clevis members or arms 34 and 35 provided, respectively, with axially aligned pivot

or connector pin through holes or bores 37 and 38 for receiving pivot pin portions 30a and 30b.

One or both of the pivot or connector pin portions 30a and 30b are hollow, i.e., either or both are provided with a centrally formed axial bore 40a and 40b extending longitudinally through the pivot pin portions. Pivot pin portions 30a and 30b are operably connected to the instant hinge by any suitable means. For example, the cylinder shaft diameter of first and second pivot pin portions 30a and 30b can be sized so as to provide a contact or pressure fit within clevis through holes 37 and 38 and a clearance or slip fit through tang through hole 31, or vice versa.

Additionally, pin portions 30a and 30b preferably contain radially extending flanges 54a and 54b. Hole 37 in clevis arm 34 is preferably counterbored to accept the head of flange 54a and hole 38 in clevis arm 35 is preferably counterbored to accept flange 54b. When assembled, flanges 54a and 54b preferably rest against the counterbore surfaces of holes 37 and 38, respectively. Appropriate peens may be used to help secure pivot pin portions 30a and 30b in holes 37 and 38, respectively. Thus, when the pivot pin portions 30a and 30b are fit into bores 37, 38 and 31, they may be retained by peen crimps (not shown) in clevis arms 34 and 35.

It will be understood that bore 32, in the preferred embodiment, provides a passageway for receiving a segment or segments of one or more wires or electrical conductors used to connect the electronics 25 provided in the temple 19 with the electrooptic lens 15 mounted in the eyeglass frame 12. It is noteworthy that the wire(s) or conductor(s) can connect any type of electrical components across the hinge and that direct connection to a lens is not necessary. In a preferred embodiment, axial bores 40a and 40b in either or both of pivot pin portions 30a and 30b, gap 42 formed between the opposing ends of split pin portions 30a and

30b, and bore 32 combine to provide a continuous passageway for various segments of such wires or electrical conductors.

As illustrated in Figs. 3 and 7, the combined length of each pivot pin portion 30a and 30b when placed in opposing relationship is such that when inserted within the clevis 28, they provide a gap 42 through which at least one electrical conductor may pass.

Referring still to FIG. 2, for assembly, the clevis members or arms 34 and 35 are placed over the tang 26 and the pivot or connector pin through hole 31 formed in the tang and the pivot pin through holes 37 and 38 formed respectively in the clevis members 34 and 35 are axially aligned and the pivot pin portions 30a and 30b are inserted through the aligned through holes to hingedly or pivotally interconnect the tang 26 and clevis 28. The opposing ends of pin portions 30a and 30b do not make contact after installation, thereby forming gap 42 which, with bore hole 32 and axial bores 40a and/or 40b, provide a continuous wire passageway. The size of the gap is determined by the relative length of pin portions 30a and 30b and should be sufficient to accommodate all wires or conductors passing therethrough. It should be noted that one or both pivot pin portions 30a and 30b may be slotted at one end to provide a gap in which at least one electrical conductor may pass. In this fashion, the pivot pin portions 30a and 30b may be lengthened so they abut when inserted within the clevis 28.

Preferably, once the pin portions 30a and 30b are inserted such that the flanges 54a and 54b rest against the counterbore surfaces of bores 37 and 38, peens are struck to fix the pin portions 30a and 30b into the hinge 24. Alternatively, it will be understood that the pivot pin portions 30a and 30b, tang pivot pin through hole 31 and clevis pivot pin through holes 37 and 38 are dimensioned such that the cylinders of split pin portions 30a and 30b are alternatively press-fit into the tang through hole 31 to mount

the pivot pin portions 30a and 30b and tang 26 stationarily with respect to each other. Additionally, the cylinders of split pin portions 30a and 30b are alternatively slip-fit into the clevis pivot pin through holes 37 and 38 to permit relative movement between the clevis 28 and the pivot pin portions 30a and 30b, such that pivotal movement is provided between the tang 26 and clevis 28 by the clevis 28 pivoting about the opposed ends of split pin portions 30a and 30b. Alternatively, the pressure and slip-fit sizings can be reversed between the tang and clevis.

Referring now to FIG. 3, the representative hinge 24 is shown assembled as described above with regard to FIG. 2. It will be noted in FIG. 3 that in the assembled condition, gap 42 formed between pivot pin portions 30a and 30b is opposed and in communication with the longitudinal bore 32 formed in tang 26. The eyeglasses 10 may further include one or a plurality, preferably a pair of wires, or electrical conductors 43 and 44, connecting the electronics, electrical circuit and power supply, 25 to electrooptic eyeglass lens 15. The electronics 25 supplies a suitable electric charge over the wires 43 and 44 to the eyeglass lens 15 to cause the eyeglass lens to undergo a change in transmittance property as noted above. In the preferred embodiment, the wires or electrical conductors 43 and 44 are made of spring temper wire, or alternatively, the electrical conductors may include a suitable metal core surrounded by any suitable layer of insulation, such as a plastic insulation layer. As shown in FIG. 3, the wires or electrical conductors 43 and 44 extend along the outside of the clevis 28, are bent inwardly and are extended into the axial bore 40b provided in split pin portion 30b and are bent and extend outwardly and through gap 42 formed between pivot pin portions 30a and 30b and into and through the longitudinal bore 32 formed in the tang 26 for connection, directly or indirectly, to the electrooptic eyeglass lens 15. Connection to lens 15 may be made by any

suitable connection means, for example, by a solder connection to a bus bar applied to lens 15. In a preferred embodiment, the pivot pin portions 30a and 30b are mounted stationarily with respect to the tang 26 and the clevis 28 swings or pivots about the remaining segments of connector pin portions 30a and 30b. Accordingly, it will be understood, that the portions of the wires or electrical conductors 43 and 44 residing in the axial bore 40b of connector pin portion 30b are placed in torsion as indicated diagrammatically in FIG. 4 by the oppositely directed circular arrows, and not subjected to bending as indicated diagrammatically in FIG. 5 about a pivot point, during pivoting movement between the tang 26 and clevis 28 provided by the clevis 28 swinging or pivoting about the opposed pivot pin portions 30a and 30b. In the embodiment shown in FIG. 3, a bore is not required through split pin portion 30a. However, such embodiments are contemplated if, for example, additional wires or conductors extend along both clevis arms 34 and 35.

Referring again to FIG. 3, eyeglasses 10 may further include a suitable cover, not shown, residing over the wires or electrical conductors 43 and 44 and the outer end portion of the temple 19 extending toward the eyeglass frame 12.

FIG. 7 illustrates an alternate embodiment whereby each of the pivot pin portions 30a and 30b has a bore 40a and 40b extending therethrough. Just as before a gap 42 is formed between pivot pin portions 30a and 30b and this gap 42 is in communication with the longitudinal bore 32 formed in tang 26. Details of FIG. 7 are similar to those details in FIG. 3 with the exception of modifications made to accommodate the routing of electrical conductors 43 and 44 such that they pass through axial bore 40a of pivot pin portion 30a and axial bore 40b of pivot pin portion 30b respectively. The electrical conductors 43 and 44 extend along the outside of the clevis 28 but do so on opposite sides of the clevis 28. Both of the electrical

conductors 43 and 44 extend through the longitudinal bore 32 formed in the tang 26 for connection directly or indirectly to the electrooptic eyeglass lens 15 (FIG.2). Therefore, just as before, when the tang 26 is pivoted relative to the clevis 28 about the pivot pin portions 30a and 30b, the portions of the wires or electrical conductors 43 and 44 residing in the axial bores 40a and 40b of the pivot pin portions 30a and 30b respectively are placed in torsion as indicated diagrammatically in FIG. 4 and are not subjected to bending as indicated in diagrammatically in FIG. 5.

In the unlikely event the layer of insulation about the electric conductor 43 or electrical conductor 44 becomes damaged, the spatial separation between the electrical conductors 43 and 44 which occurs along a significant portion of their lengths, will prevent a short between the wires. In particular, if such damage occurs it is likely the result of the torsional motion imparted by pivoting the tang 26 relative to the clevis 28 and as illustrated in FIG. 7, the portions of the electrical conductor 43 and 44 subjected to torsion are routed through the bores 40a and 40b of different pivot pin portions 30a, 30b, and as a result are spatially separate from one another.

To minimize damage that may be caused by abrasion, the edges of pivot pin portions 30a and 30b proximate to the electrical conductors 43 and 44 may be formed with a radius thereby minimizing any cutting action these edges may have.

To provide additional insulation for the electrical conductors 43 and 44, the pivot pin portions 30a and 30b may be comprised of an electrically insulating material, such as plastic. Such plastic may include polyetheretherketone (PEEK) or, in the alternative, polysulfone. For reinforcement, either of these plastics may be glass filled. The plastic may also be 40% glass filled PEEK or 40% glass filled polysulfone. Additionally, other electrically insulating materials may be used in place of plastic.

By providing, as much as possible, separate routing for electrical conductors 43 and 44 as they pass through the clevis 28 and the tang 26, the likelihood of a short between the wires, if and when they become frayed, is minimized. Nevertheless, when and if such damage occurs, the physical separation between the electrical conductors 43 and 44 is such that the likelihood of direct contact between the electrical conductors 43 and 44 when they are damaged is minimal. Therefore to the extent the insulation layer is damaged and the metal core of the wire is not damaged, the electronics associated with the apparatus will maintain their full functionality.

Although pivot pin portions 30a and 30b may be made of plastic, it is also possible to have at least one pivot pin portion made of a material offering greater rigidity, such as metal. To this end, electrical conductors 43 and 44 will be referred to as positive conductor 43 and ground conductor 44. The eyeglass frame and temples may be metal or plastic. When the eyeglass frame and temples are metal, there is a concern that the if the positive electrical conductor 43 becomes frayed in the region of the first pivot pin portion 30a, which is metal, and the positive electrical conductor contacts and shorts with the first pivot pin portion 30a, the power supply of the electronics 25 will be drained. Therefore, in a preferred embodiment of the invention, for an eyeglass frame and temples made of metal, the first pivot pin portion 30a routed through the positive conductor 30a is plastic. The second pivot pin portion 30b associated with the ground conductor 44 may be metal to provide enhanced structural rigidity to the hinge 24.

In the instance of the eyeglass frame and temples made of plastic, or another electrically insulating material, then both pivot pin portions 30a and 30b may be made of metal.

In brief review, it has been discovered that by running a segment of a wire or conductor through the center of

at least one hollow pivot pin portion 30b and then through gap 42 between opposed pivot pin portions 30a and 30b of a hinge, such wire segment is placed in torsion upon pivotal hinge movement, which torsion is distributed along the length of such wire segment and such wire segment experiences relatively moderate strain and such strain is not concentrated at a pivot point as would be the case for such wire portion were the wire portion to experience bending during pivoting of the hinge. Additionally, the inventive arrangement permits the wire(s) to be hidden from view at all times.

Lastly, it will be understood that the present hinge and wire invention may be embodied in apparatus or devices other than eyeglasses and the present hinge and wire invention is not limited to eyeglasses. Furthermore, the foregoing embodiment of the invention contains a single tang that couples to a clevis having two arms. Those skilled in the art will realize from the foregoing disclosure that the hinge can alternatively contain multiple tangs and multiple clevis arms, i.e., the hinge could be a barrel-type hinge.

Although various embodiments which incorporate the teachings of the present invention have been shown and described in detail herein, those skilled in the art can readily devise many other varied embodiments that still incorporate these teachings.

What is claimed is:

1. A hinge and wire apparatus comprising at least a first wire and a second wire and a pivotable hinge including first and second opposed, axially aligned, pivot pin portions, at least one of said pivot pin portion having a centrally formed axial bore extending therethrough, wherein a first wire segment of at least one wire extends through the bore of said first pivot pin portion and through a gap between the opposing ends of said pivot pin portions, thereby placing said at least one wire in torsion upon pivoting of said hinge.

2. The hinge and wire apparatus of claim 1 wherein said first pivot pin portion and said second pivot pin portion each have a centrally formed axial bore extending therethrough and wherein a first wire segment of said first wire extends through the bore of said first pivot pin portion and through said gap and wherein a first wire segment of said second wire extends through the bore of said second pivot pin portion and through said gap, thereby placing said first and second wires in torsion upon pivoting of said hinge.

3. The hinge and wire apparatus of claim 1 further comprising a tang and clevis having said pivot pin portions pivotally interconnecting said tang and said clevis.

4. The hinge and wire apparatus of claim 3, wherein said tang further comprises a tang wire passageway, wherein a second segment of said wire extends through said tang wire passageway.

5. The hinge and wire apparatus according to claim 4 wherein said gap between said pivot pin portions is generally opposite said tang wire passageway.

6. The hinge and wire apparatus according to claim 1 wherein said pivot pin portions each comprise a generally cylindrical and longitudinally extending body and wherein said gap is present between the opposing ends of said pivot pin portions when said portions are fully inserted within said hinge.

7. The hinge and wire apparatus according to claim 6 wherein said tang includes a first pivot pin through hole extending therethrough for receiving said pivot pin portions and a longitudinal bore extending generally longitudinally through said tang and generally perpendicular to and in communication with said first pivot pin through hole.

8. The hinge and wire apparatus according to claim 7 wherein said clevis includes a generally U-shaped body including a pair of spaced apart substantially parallel clevis members having, respectively, second and third axially aligned pivot pin through holes extending therethrough for receiving said pivot pin portions, upon said clevis members being placed over said tang and upon said pivot pin through holes being axially aligned said pivot pin portions being inserted through said pivot pin through holes to pivotally interconnect said tang and said clevis.

9. The hinge and wire apparatus of claim 1 wherein said pivot pin portions each comprise a first end and a second end, wherein each of said first ends contains a radially extending flange.

10. An eyeglass apparatus, comprising:

an eyeglass frame, a pair of temples and a pair of hinges respectively pivotally interconnecting said eyeglass frame with said temples, a pair of eyeglass lenses mounted in said eyeglass frame and each of said eyeglass lenses

comprising optical means for changing an optical characteristic of said eyeglass lenses upon receipt of an electrical signal, an electrical circuit for providing an electrical signal to at least one of said eyeglass lenses and said electrical circuit mounted to at least one of said temples, at least one of said hinges including a tang and a clevis and first and second separate, axially-aligned pivot pin portions pivotally interconnecting said tang and said clevis, at least a first electrical conductor interconnecting said electrical circuit with at least one of said eyeglass lenses and a first segment of said first electrical conductor extending through a conductor passageway formed in one of said pivot pin portions.

11. The eyeglass apparatus of claim 10 wherein a conductor passageway is formed in both said first pivot pin portion and said second pivot pin portion and wherein said first electrical conductor extends through said conductor passageway of said first pivot pin portion and wherein a second electrical conductor extends through said conductor passageway of said second pivot pin portion.

12. The eyeglass apparatus of claim 11 wherein

a) said first electrical conductor is an electrical positive conductor for said electrical circuit and said second electrical conductor is an electrical ground conductor for said electrical circuit;

b) at least one of said eyeglass frame and temple associated with said electrical circuit is metal; and

c) said first pivot pin portion is made of an electrically insulating material.

13. The eyeglass apparatus of claim 12 wherein said electrically insulating material is plastic.

14. The eyeglass apparatus of claim 12 wherein said second pivot pin portion is made of metal.

15. The eyeglass apparatus of claim 11 wherein

a) said eyeglass frame and temple associated with said electrical circuit are made of an electrically insulating material; and

b) said first pivot pin portion is made of metal.

16. The eyeglass apparatus of claim 15 wherein the electrically insulating material is plastic.

17. The eyeglass apparatus of claim 15 wherein said second pivot pin member is made of metal.

18. The eyeglass apparatus of claim 10 wherein a second segment of each electrical conductor extends through a gap between opposing end of said pivot pin portions and through a second conductor passageway formed in said tang.

19. The eyeglass apparatus according to claim 11 wherein each of said pivot pin portions comprises a generally cylindrical and longitudinally extending body and wherein each conductor passageway comprises an axial bore extending generally longitudinally through each pivot pin portions and in communication with said gap.

20. The eyeglass apparatus according to claim 19 wherein said tang includes a first pivot pin through hole extending therethrough for receiving said pivot pin portions and wherein said second conductor passageway comprises a longitudinal bore extending generally longitudinally through said tang and generally perpendicular to and in communication with said first pivot pin through hole.

21. The eyeglass apparatus according to claim 10 wherein said clevis includes a generally U-shaped body including a pair of spaced apart substantially parallel and generally rectangular clevis members having, respectively, second and third axially aligned pivot pin through holes extending therethrough for receiving said pivot pin portions, upon said clevis members being placed over said tang and upon said pivot pin through holes being axially aligned said pivot pin portions being inserted through said pivot pin through holes to pivotally interconnect said tang and said clevis.

22. The eyeglass apparatus according to claim 10 wherein said eyeglass apparatus further comprises a second electrical circuit for providing an electrical signal to the other of said eyeglass lenses and said second electrical circuit mounted to the other one of said temples, a second hinge including a second tang and a second clevis and a second pair of separate, axially aligned pivot pin portions pivotally interconnecting said second tang and said second clevis, a second electrical conductor interconnecting said second electrical circuit with the other of said eyeglass lenses and a segment of said second electrical conductor extending through a conductor passageway formed in either of the pivot pin portions comprising said second pair and a second segment of said second electrical conductor extending through a fourth conductor passageway formed in said second tang, said second electrical conductor being placed in torsion upon pivotal movement between said second tang and said second clevis about said second pair of pivot pin portions.

23. The eyeglass apparatus according to claim 22 wherein at least one of said hinges includes a tang which extends outwardly from either said eyeglass frame or from an end of one temple and wherein said clevis extends outwardly from the other of said eyeglass frame or end of one temple.

24. The eyeglass apparatus of claim 10 wherein each of said pivot pin portions further comprise a first end and a second end, wherein each of said first ends contains a radially extending flange.

25. The eyeglass apparatus according to claim 10 wherein at least one of said hinges includes a tang which extends outwardly from either said eyeglass frame or from an end of one temple and wherein said clevis extends outwardly from the other of said eyeglass frame or end of one temple.

26. An eyeglass apparatus, comprising an eyeglass frame, a pair of temples and a pair of hinges respectively pivotally interconnecting said eyeglass frame with said temples, a pair of eyeglass lenses mounted in said eyeglass frame and each of said eyeglass lenses comprising optical means for changing an optical characteristic of said eyeglass lenses upon receipt of an electrical signal, an electrical circuit for providing an electrical signal to at least one of said eyeglass lenses and said electrical circuit mounted to at least one of said temples, each hinge including a tang and a clevis and first and second separate, axially-aligned pivot pin portions pivotally interconnecting said tang and said clevis, at least a first and second electrical conductor interconnecting said electrical circuit with at least one of said eyeglass lenses and a first segment of said first electrical conductor extending through a conductor passageway formed in said first pivot pin portion and a first segment of said second electrical conductor extending through a conductor passageway formed in said second pivot pin portion, wherein said first electrical conductor is an electrical positive conductor for said electrical circuit, wherein at least one of said eyeglass frame and said temple associated with said electrical circuit are metal and wherein said first pivot pin portion is plastic.

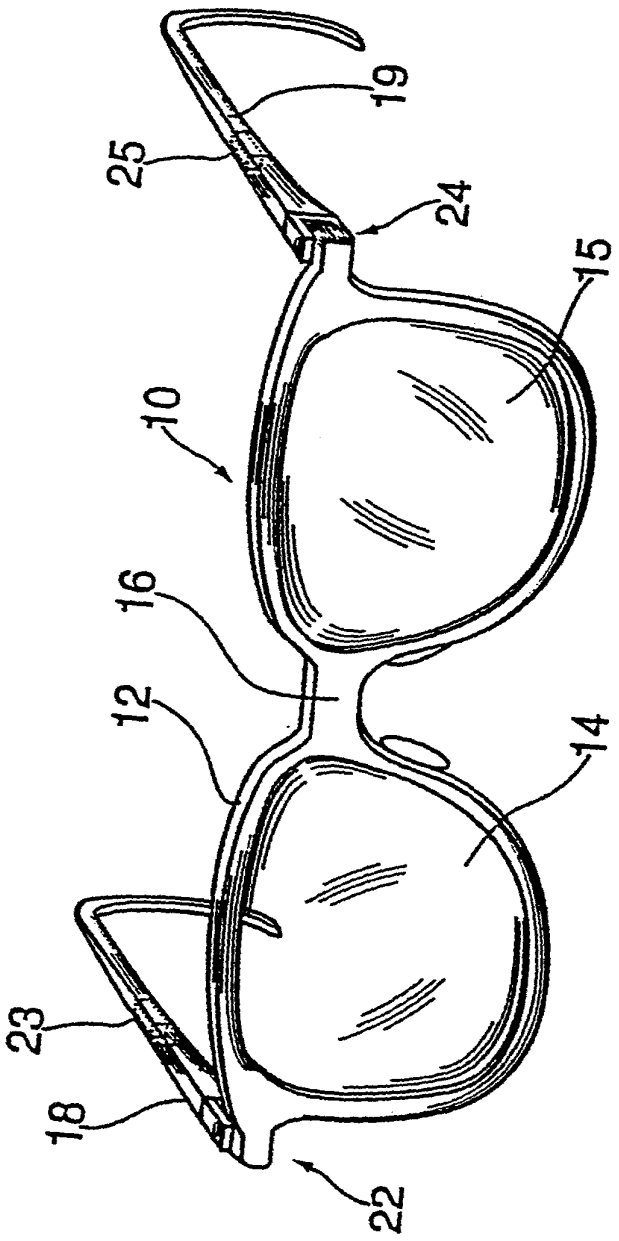


FIG.1

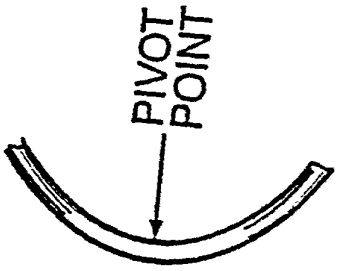


FIG.5

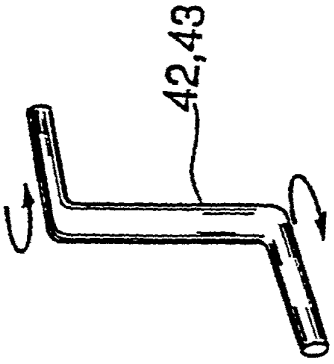


FIG.4

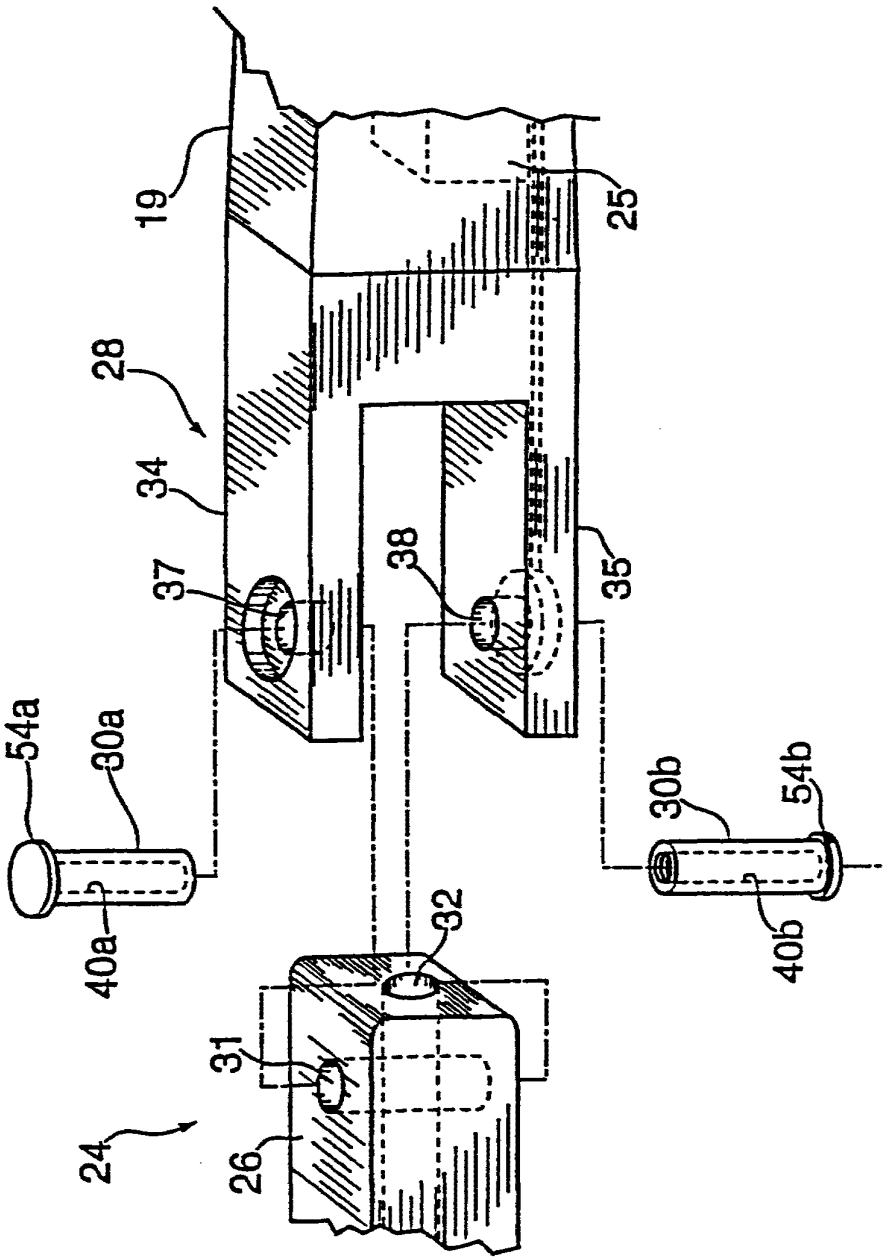


FIG. 2

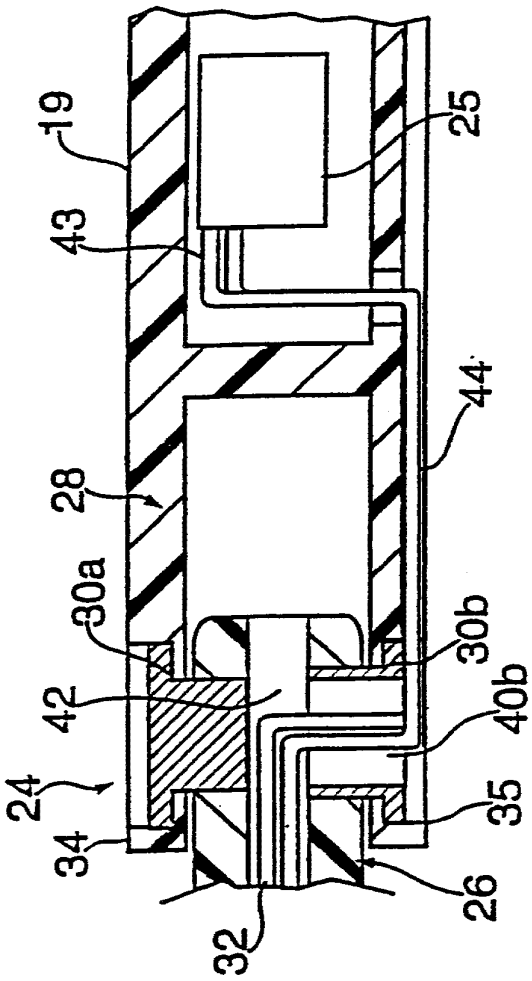


FIG. 3

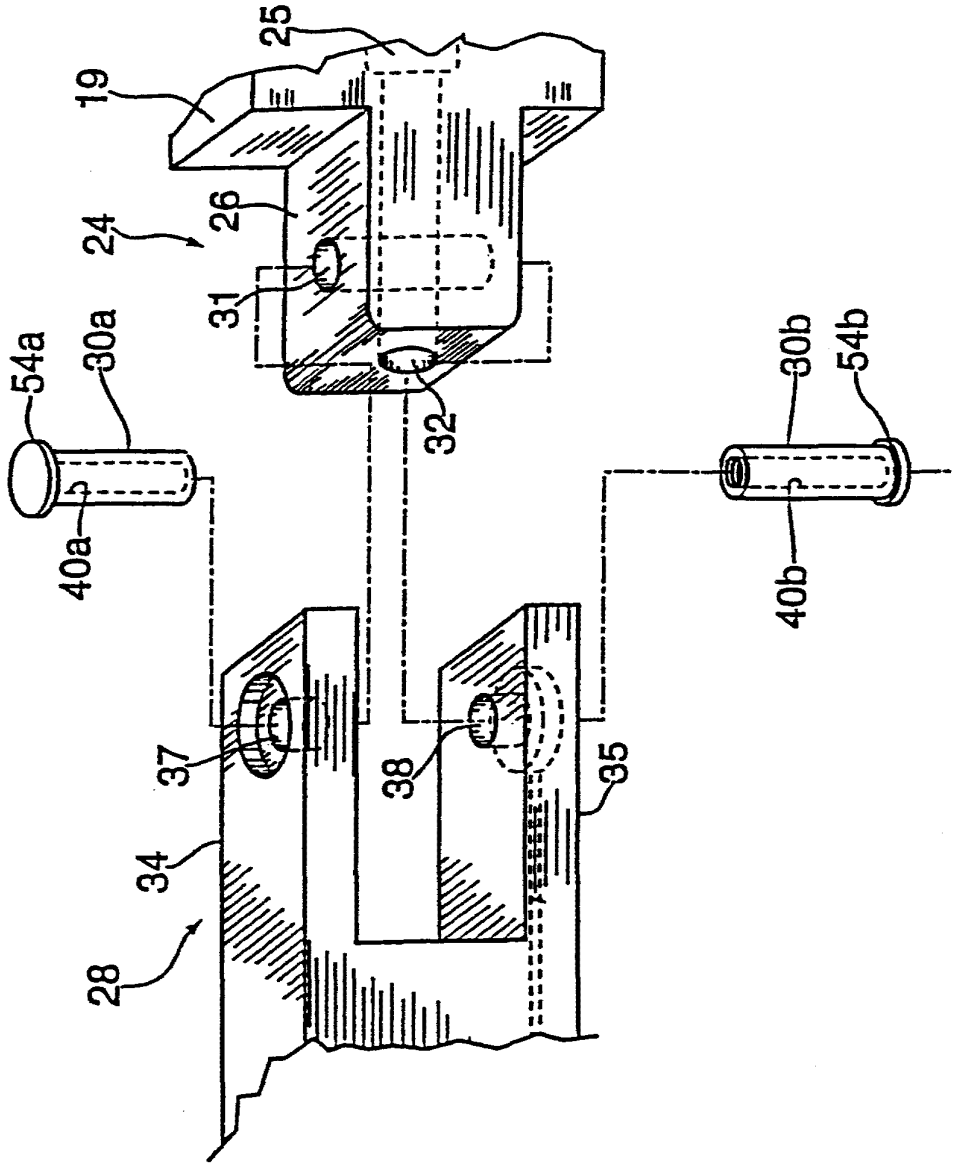


FIG. 6

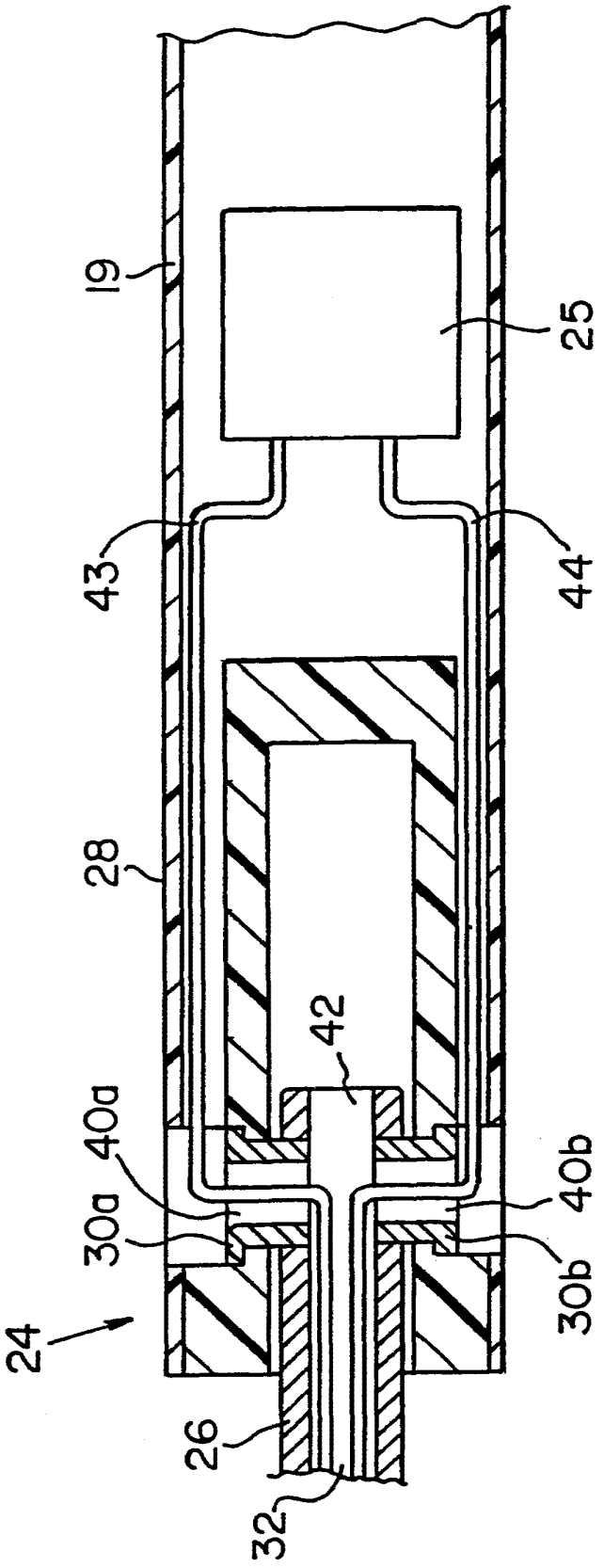


FIG. 7

INTERNATIONAL SEARCH REPORT

Interr nal Application No
PCT/US 00/31087

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 G02C7/10 G02C5/22

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 G02C

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

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P,A	WO 00 36454 A (PPG IND OHIO INC) 22 June 2000 (2000-06-22) cited in the application claims	1-26
A	WO 99 13682 A (ARNELL ROSS LTD) 18 March 1999 (1999-03-18) page 11, line 5 -page 12, line 11	1,10-17
A	US 4 991 951 A (MIZUNO MITSUYOSHI ET AL) 12 February 1991 (1991-02-12) column 2, line 32 -column 3, line 44	1,10,26
A	US 3 603 305 A (OPPENHEIMER JESS) 7 September 1971 (1971-09-07) column 4, line 45 - line 63	1,10,26

-/--

[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
5 February 2001	12/02/2001

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	CALLEWAERT, H

1

Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

Intern nal Application No
PCT/US 00/31087

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication,where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 835 185 A (DORFMAN LEONARD M ET AL) 10 November 1998 (1998-11-10) column 9, line 45 -column 10, line 24	1,10,26

1

INTERNATIONAL SEARCH REPORT

...ormation on patent family members

Interr nal Application No
PCT/US 00/31087

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 0036454 54 A		NONE	
WO 9913682 A	18-03-1999	NONE	
US 4991951 A	12-02-1991	JP 2266322 A JP 2817178 B IT 1239773 B	31-10-1990 27-10-1998 15-11-1993
US 3603305 A	07-09-1971	NONE	
US 5835185 A	10-11-1998	NONE	

Form PCT/ISA/210 (patent family annex) (July 1992)

Electronic Acknowledgement Receipt

EFS ID:	14473151
Application Number:	13372240
International Application Number:	
Confirmation Number:	8374
Title of Invention:	ELECTRONIC FRAMES COMPRISING ELECTRICAL CONDUCTORS
First Named Inventor/Applicant Name:	Charles Willey
Customer Number:	20350
Filer:	John P. McGroarty/Aneta Xhiku
Filer Authorized By:	John P. McGroarty
Attorney Docket Number:	91904-831532
Receipt Date:	14-DEC-2012
Filing Date:	13-FEB-2012
Time Stamp:	14:26:32
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		2012_12_14_SIDS_91904-831532.pdf	165956 7f68dffa68171e7fac7478a6b2a308dd611af5cc	yes	3

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Transmittal Letter	1	2
	Information Disclosure Statement (IDS) Form (SB08)	3	3

Warnings:					
Information:					
2	Foreign Reference	WO0135159.pdf	1045090 68de1fcf9441f78f9295cb3be6d260d9fbb45eef	no	28
Warnings:					
Information:					
3	Non Patent Literature	isr_831532.pdf	318589 b29d08c1b4a93f3ec8edeaaa7cbaa83ea5557abc	no	8
Warnings:					
Information:					
		Total Files Size (in bytes):	1529635		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

I hereby certify that this correspondence is being filed via EFS-Web with the United States Patent and Trademark Office on 12/14/12.

KILPATRICK TOWNSEND & STOCKTON LLP

By: Aneta Mihali Xhiku

PATENT
Attorney Docket No.: 91904-831532(011310US)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:

Charles Willey

Application No.: 13/372,240

Filed: February 13, 2012

For: ELECTRONIC FRAMES COMPRISING ELECTRICAL CONDUCTORS

Customer No.: 20350

Confirmation No.: 8374

Examiner: TBA

Art Unit: TBA

SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT UNDER 37 CFR §1.97 and §1.98

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Commissioner:

The references cited on attached form PTO/SB/08A and PTO/SB/08B are being called to the attention of the Examiner. Copies of the references [in compliance with the requirements of 37 CFR §1.98(a)(2)] are enclosed. It is respectfully requested that the cited references be expressly considered during the prosecution of this application, and the references be made of record therein and appear among the "references cited" on any patent to issue therefrom.

Also enclosed is a copy of the International Search Report corresponding to the related PCT/US2012/051202 application.

As provided for by 37 CFR §1.97(g) and (h), no inference should be made that the information and references cited are prior art merely because they are in this statement and no

representation is being made that a search has been conducted or that this statement encompasses all the possible relevant information.

Applicant believes that no fee is required for submission of this statement. However, if a fee is required, the Commissioner is authorized to deduct such fee from the undersigned's Deposit Account No. 20-1430. Please deduct any additional fees from, or credit any overpayment to, the above-noted Deposit Account.

Respectfully submitted,

/John P. McGroarty/

John P. McGroarty
Reg. No. 41,186

KILPATRICK TOWNSEND & STOCKTON LLP
Two Embarcadero Center, Eighth Floor
San Francisco, California 94111-3834
Tel: 202-481-9900
Fax: 202-481-3972
JPM:amx
64038089 v1

UNITED STATES PATENT AND TRADEMARK OFFICE

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United States Patent and Trademark Office
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P.O. Box 1450
Alexandria, Virginia 22313-1450
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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
13/372,240	02/13/2012	Charles Willey	91904-831532

CONFIRMATION NO. 8374

20350
KILPATRICK TOWNSEND & STOCKTON LLP
TWO EMBARCADERO CENTER
EIGHTH FLOOR
SAN FRANCISCO, CA 94111-3834

PUBLICATION NOTICE



Title:ELECTRONIC FRAMES COMPRISING ELECTRICAL CONDUCTORS

Publication No.US-2012-0262667-A1
Publication Date:10/18/2012

NOTICE OF PUBLICATION OF APPLICATION

The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

The publication may be accessed through the USPTO's publically available Searchable Databases via the Internet at www.uspto.gov. The direct link to access the publication is currently http://www.uspto.gov/patft/.

The publication process established by the Office does not provide for mailing a copy of the publication to applicant. A copy of the publication may be obtained from the Office upon payment of the appropriate fee set forth in 37 CFR 1.19(a)(1). Orders for copies of patent application publications are handled by the USPTO's Office of Public Records. The Office of Public Records can be reached by telephone at (703) 308-9726 or (800) 972-6382, by facsimile at (703) 305-8759, by mail addressed to the United States Patent and Trademark Office, Office of Public Records, Alexandria, VA 22313-1450 or via the Internet.

In addition, information on the status of the application, including the mailing date of Office actions and the dates of receipt of correspondence filed in the Office, may also be accessed via the Internet through the Patent Electronic Business Center at www.uspto.gov using the public side of the Patent Application Information and Retrieval (PAIR) system. The direct link to access this status information is currently http://pair.uspto.gov/. Prior to publication, such status information is confidential and may only be obtained by applicant using the private side of PAIR.

Further assistance in electronically accessing the publication, or about PAIR, is available by calling the Patent Electronic Business Center at 1-866-217-9197.

Office of Data Managment, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
13/372,240	02/13/2012	2873	1440	91904-831532	21	2

CONFIRMATION NO. 8374

UPDATED FILING RECEIPT

20350
KILPATRICK TOWNSEND & STOCKTON LLP
TWO EMBARCADERO CENTER
EIGHTH FLOOR
SAN FRANCISCO, CA 94111-3834

OC00000055231189

Date Mailed: 07/10/2012

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Applicant(s)

Charles Willey, Roanoke, VA;

Assignment For Published Patent Application

PixelOptics, Inc., Roanoke, VA

Power of Attorney: The patent practitioners associated with Customer Number 20350

Domestic Priority data as claimed by applicant

This appln claims benefit of 61/441,817 02/11/2011

Foreign Applications (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.)

If Required, Foreign Filing License Granted: 02/24/2012

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 13/372,240**

Projected Publication Date: 10/18/2012

Non-Publication Request: No

Early Publication Request: No

Title

ELECTRONIC FRAMES COMPRISING ELECTRICAL CONDUCTORS

Preliminary Class

351

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4158).

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Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

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PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 13/372,240

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY FEE($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	380
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	620
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	250
TOTAL CLAIMS (37 CFR 1.16(i))	21 minus 20 =	* 1			OR	x 60 =	60
INDEPENDENT CLAIMS (37 CFR 1.16(h))	2 minus 3 =	*				x 250 =	0.00
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						0.00
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							0.00
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	1310

APPLICATION AS AMENDED - PART II

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY ADDITIONAL FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
AMENDMENT A	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE($)	ADDITIONAL FEE($)		RATE($)	ADDITIONAL FEE($)
AMENDMENT B	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
13/372,240	02/13/2012	Charles Willey	91904-831532

CONFIRMATION NO. 8374

20350
KILPATRICK TOWNSEND & STOCKTON LLP
TWO EMBARCADERO CENTER
EIGHTH FLOOR
SAN FRANCISCO, CA 94111-3834

POA ACCEPTANCE LETTER

OC00000055231075

Date Mailed: 07/10/2012

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 06/27/2012.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

/gbien-aime/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

I hereby certify that this correspondence is being filed via EFS-Web with the United States Patent and Trademark Office

on 6/27/12

KILPATRICK TOWNSEND & STOCKTON LLP

By: Jodee Doll

PATENT
Attorney Docket No.: 91904-831532
Client Ref. No.: P9933-USP176

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Charles Willey	Confirmation No. 8374
Application No.: 13/372,240	Examiner: TBD
Filed: Feb 13, 2012	Technology Center/Art Unit: 2873
For: ELECTRONIC FRAMES COMPRISING ELECTRICAL CONDUCTORS	TRANSMITTAL LETTER – RESPONSE TO NOTICE OF MISSING PARTS
Customer No. 72162	

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Commissioner:

Pursuant to the Notice to File Missing Parts of Nonprovisional Application, dated February 29, 2012, enclosed are the following to be made of record in the above identified application:

1) Executed Declaration
2) Power of Attorney and Statement under 3.73(b)
3) Preliminary Amendment
4) Extension of Time

Payment in the following amount is herewith submitted:

Large Entity:	(a) Filing Fee	$380
	(b) Search Fee	$620
	(c) Examination Fee	$250

(d) Extension of Time Fee	$150
(e) Excess Claims Fees (§ 1.16(b),(c)):	$60
(f) Multiple Dependent Claims	$0
(g) Missing Parts Surcharge	$130

The Commissioner is hereby authorized to charge any additional fees associated with this paper or during the pending of this application, or credit any overpayment, to Deposit Account No. 20-1430.

Respectfully submitted,

6/27/12

John P. McGroarty
Registration No. 41,186

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Two Embarcadero Center, Eighth Floor
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Tel: 415-576-0200
Fax: 415-576-0300
Attachments
JPM/jrs

DECLARATION

As a below named inventor, I declare that:

My residence, post office address and citizenship are as stated below next to my name; I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural inventors are named below) of the subject matter which is claimed and for which a patent is sought on the invention entitled: ELECTRONIC FRAMES COMPRISING ELECTRICAL CONDUCTORS the specification of which ____ is attached hereto or _X_ was filed on February 13, 2012 as Application No. 13/372,240 and was amended on _____ (if applicable).

I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above. I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56.

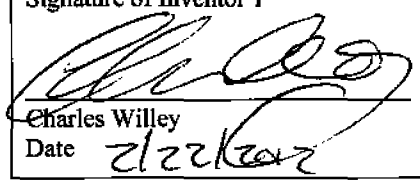
I hereby claim the benefit under Title 35, United States Code § 119(e) of any United States provisional application(s) listed below:

Application No.	Filing Date
61/441,817	February 11, 2011

Full Name of Inventor 1:	Last Name: **WILLEY**	Suffix:	First Name: **CHARLES**	Middle Name or Initial:	
Residence & Citizenship:	City: **Roanoke**		State/Foreign Country: **Virginia**	Country of Citizenship: **United States**	
Post Office Address:	Post Office Address: **1801 Windsor Avenue**		City: **Roanoke**	State/Country: **Virginia**	Postal Code: **24015**

I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Signature of Inventor 1



Charles Willey
Date 2/22/2012

63992679 v1

POWER OF ATTORNEY
OR
REVOCATION OF POWER OF ATTORNEY
WITH A NEW POWER OF ATTORNEY
AND
CHANGE OF CORRESPONDENCE ADDRESS

Application Number	13/372240
Filing Date	February 13, 2012
First Named Inventor	Charles Willey
Title	ELECTRONIC FRAMES COMPRISING ELECTRICAL CONDUCTORS
Art Unit	TBD
Examiner Name	TBD
Attorney Docket	91904-831532

I hereby revoke all previous powers of attorney given in the above-identified application.

☐ A Power of Attorney is submitted herewith.

OR

☒ I hereby appoint Practitioner(s) associated with the following Customer Number as my/our attorney(s) or agent(s) to prosecute the application identified above, and to transact all business in the United States Patent and Trademark Office connected therewith:

20350

OR

☐ I hereby appoint Practitioner(s) named below as my/our attorney(s) or agent(s) to prosecute the application identified above, and to transact all business in the United States Patent and Trademark Office connected therewith:

Practitioner(s) Name	Registration Number

I further authorize any of the above-identified practitioners to execute a Statement Under 37 CFR 3.73(b) on my/our behalf to certify the chain of title and establish my/our ownership in the application identified above.

Please recognize or change the correspondence address for the above-identified application to:

☒ The address associated with the above-mentioned Customer Number:

OR

☐ The address associated with Customer Number:

OR

☐ Firm or Individual Name					
Address					
City		State		Zip	
Country					
Telephone		Email			

I am the:

☐ Applicant/Inventor.

OR

☒ Assignee of record of the entire interest. See 37 CFR 3.71.

Statement under 37 CFR 3.73(b) (Form PTO/SB/96 submitted herewith or filed on _____.

SIGNATURE of Applicant or Assignee of Record

Signature	Evelyn Blake	Date	2/20/12
Name	Evelyn Blake	Telephone	
Title and Company	Secretary, PixelOptics, Inc.		

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below*.

☐ *Total of _____ forms are submitted.

63992623 v1

Attorney Docket No. 91904-831532

STATEMENT UNDER 37 CFR 3.73(b)

Applicant/Patent Owner: Charles Willey

Application No./Patent No.: 13/372,240 Filed/Issue Date: February 13, 2012

Titled: ELECTRONIC FRAMES COMPRISING ELECTRICAL CONDUCTORS

PixelOptics, Inc., a corporation
(Name of Assignee) (Type of Assignee: corporation, partnership, university, government agency, etc.)

states that it is:

1. ☒ the assignee of the entire right, title, and interest in;

2. ☐ an assignee of less than the entire right, title, and interest in (The extent (by percentage) of its ownership interest is _____%); or

3. ☐ the assignee of an undivided interest in the entirety of (a complete assignment from one of the joint inventors was made)

the patent application/patent identified above, by virtue of either:

A. ☒ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel _____, Frame _____, or for which a copy thereof is attached.

OR

B. ☐ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at

Reel _____, Frame _____, or for which a copy thereof is attached.

2. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at

Reel _____, Frame _____, or for which a copy thereof is attached.

3. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at

Reel _____, Frame _____, or for which a copy thereof is attached.

☐ Additional documents in the chain of title are listed on a supplemental sheet (s).

☒ As required by 37 CFR 3.73(b)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (*i.e.*, a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

/John P. McGroarty/ 6/27/12
Signature Date

John P. McGroarty, Reg. No. 41,186
Printed or Typed Name

_____
Title

64188530 v1

ASSIGNMENT OF PROVISIONAL PATENT APPLICATION

SOLE

WHEREAS, Charles Willey of 1801 Windsor Avenue, Roanoke, VA 24015, hereinafter referred to as "Assignor," is the inventor of the invention described and set forth in the below-identified provisional patent application:

Title of Invention: SPECTACLE LENS ELECTRONIC MODULE

Filing Date: 02/11/2011

Application No.: 61/441,817; and

WHEREAS, PixelOptics, Inc., located at 5241 Valleypark Drive, Roanoke, VA 24019, hereinafter referred to as "ASSIGNEE," is desirous of acquiring an interest in the invention and application and in any U.S. Letters Patent and Registrations which may be granted on any patent application claiming priority from the same;

For good and valuable consideration, receipt of which is hereby acknowledged by Assignor, Assignor has assigned, and by these presents does assign to Assignee all right, title and interest in and to the invention and application and to all foreign counterparts (including patent, utility model and industrial designs), and in and to any Letters Patent and Registrations which may hereafter be granted on any patent application claiming priority from the same in the United States and all countries throughout the world, and to claim the priority from the application as provided by the Paris Convention. The right, title and interest is to be held and enjoyed by Assignee and Assignee's successors and assigns as fully and exclusively as it would have been held and enjoyed by Assignor had this Assignment not been made, for the full term of any Letters Patent and Registrations which may be granted thereon, or of any division, renewal, continuation in whole or in part, substitution, conversion, reissue, prolongation or extension thereof.

Assignor further agrees that Assignor will, without charge to Assignee, but at Assignee's expense, (a) cooperate with Assignee in the prosecution of U.S. Patent applications and foreign counterparts on the invention and any improvements, (b) execute, verify, acknowledge and deliver all such further papers, including applications and instruments of transfer, and (c) perform such other acts as Assignee lawfully may request to obtain or maintain Letters Patent and Registrations for the invention and improvements in any and all countries, and to vest title thereto in Assignee, or Assignee's successors and assigns.

IN TESTIMONY WHEREOF, Assignor has signed his/her name on the date indicated.

Dated: 3/30/2011

Charles Willey

I hereby certify that this correspondence is being filed via EFS-Web with the United States Patent and Trademark Office on 6/27/13

KILPATRICK TOWNSEND & STOCKTON LLP

By: Joan Sall

PATENT
Attorney Docket No.: 91904-831532

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Charles Willey	Confirmation No. 8374
Application No.: 13/372,240	Examiner: TBD
Filed: Feb 13, 2012	Technology Center/Art Unit: 2873
For: ELECTRONIC FRAMES COMPRISING ELECTRICAL CONDUCTORS	PRELIMINARY AMENDMENT
Customer No. 72162	

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Commissioner:

Prior to examination of the above-referenced application, please enter the following amendments and remarks:

Amendments to the Claims are reflected in the listing of claims which begins on page 2 of this paper.

Remarks/Arguments begin on page 6 of this paper.

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings of claims in the application:

Listing of Claims:

1. - 40. (Cancelled)

41. (New) A first device, comprising:

a lens housing adapted to support a first lens and a second lens;

a first temple movably coupled to the lens housing;

a second temple movably coupled to the lens housing;

an electronics module disposed at least partially within the first temple; and

a first electrical conductor coupled to the first temple;

wherein a first conductive path is provided from the first temple to the lens housing at least in part by the first electrical conductor; and

wherein the first electrical conductor is configured to couple the electronics module to the first temple.

42. (New) The first device of claim 41, wherein the first electrical conductor is configured to constrain the electronics module.

43. (New) The first device of claim 41, wherein the first electrical conductor is integrally coupled to the first temple.

44. (New) The first device of claim 43, wherein the first electrical conductor is insert molded with the first temple.

45. (New) The first device of claim 41, wherein the first electrical conductor comprises a lug.

46. (New) The first device of claim 41, further comprising:

a second electrical conductor coupled to the first temple;

wherein a second conductive path is provided from the first temple to the lens housing at least in part by the second electrical conductor; and

wherein the second electrical conductor is configured to constrain the electronics module.

47. (New) The first device of claim 41, wherein the electronics module comprises any two of: a power source, a controller, and a sensor.

48. (New) The first device of claim 47, wherein the sensor comprises a touch switch.

49. (New) The first device of claim 41, wherein the first electrical conductor is electrically coupled to a slip ring.

50. (New) The first device of claim 49, further comprising a hinge, wherein the slip ring is disposed substantially within the hinge.

51. (New) The first device of claim 41, wherein the electronics module is configured to be removably coupled to the first temple.

52. (New) The first device of claim 41, wherein the electronics module comprises an opening;

wherein the first electrical conductor has a first portion that extends a first distance of at least approximately 1 cm into the electronic module through the opening, and

wherein the first electrical conductor has a second portion that extends a second distance of at least approximately 1 cm outside of the electronics module away from the opening.

53. (New) The first device of claim 52,

wherein the first distance that the first portion of the first electrical conductor extends into the electronics module is at least approximately 2 cm, and

wherein the second distance that the second portion of the first electrical conductor extends away from the opening is at least approximately 2 cm.

54. (New) The first device of claim 41, wherein the first electrical conductor comprises a single structural element.

55. (New) The first device of claim 41, wherein the first electrical conductor is configured to maintain the first conductive path as the first temple is moved relative to the lens housing.

56. (New) The first device of claim 41, further comprising a first lens and a second lens coupled to the lens housing;

wherein the first lens has a first electrical contact; and

wherein the first conductive path is electrically coupled to the first electrical contact.

57. (New) A first method, comprising:

providing a capacitive touch switch;

disposing a plurality of electronic components on the capacitive switch; and

coupling the capacitive touch switch to a partial enclosure.

58. (New) The first method of claim 57, further comprising the step of disposing the enclosure substantially within a temple of an eyeglass frame.

59. (New) The first method of claim 58,

wherein the eye glass frame comprises electro-active eyeglass frames;

wherein the eyeglass frame comprises a first conductive path; and

wherein the first method further comprises the step of electrically coupling at least one of the electronic components to the first conductive path.

60. (New) The first method of claim 57, further comprising the step of applying a conformal coating to the plurality of electronic components.

61. (New) The first method of claim 57, wherein the capacitive touch switch and the enclosure are configured to be pressure fitted.

REMARKS/ARGUMENTS

By this amendment, claims 1-40 have been cancelled and claims 41-61 added. Support for the new claims can be found throughout the specification, claims, and figures as originally filed. No new matter has been filed.

CONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

Further, the Commissioner is hereby authorized to charge any additional fees or credit any overpayment in connection with this paper to Deposit Account No. 20-1430.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 415-576-0200.

Respectfully submitted,

6/27/12

John P. McGroarty
Registration No. 41,186

KILPATRICK TOWNSEND & STOCKTON LLP
Two Embarcadero Center, Eighth Floor
San Francisco, California 94111-3834
Tel: 415-576-0200
Fax: 415-576-0300
Attachments

JPM/jrs

64310884 v1

Electronic Patent Application Fee Transmittal

Application Number:	13372240
Filing Date:	13-Feb-2012
Title of Invention:	ELECTRONIC FRAMES COMPRISING ELECTRICAL CONDUCTORS
First Named Inventor/Applicant Name:	Charles Willey
Filer:	John P. McGroarty/Joan Soll
Attorney Docket Number:	91904-831532

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Utility application filing	1011	1	380	380
Utility Search Fee	1111	1	620	620
Utility Examination Fee	1311	1	250	250
Pages:				
Claims:				
Claims in excess of 20	1202	1	60	60
Miscellaneous-Filing:				
Late filing fee for oath or declaration	1051	1	130	130

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Extension - 2 months with $0 paid	1252	1	560	560
Miscellaneous:				
		Total in USD ($)		**2000**

Electronic Acknowledgement Receipt

EFS ID:	13123848
Application Number:	13372240
International Application Number:	
Confirmation Number:	8374
Title of Invention:	ELECTRONIC FRAMES COMPRISING ELECTRICAL CONDUCTORS
First Named Inventor/Applicant Name:	Charles Willey
Customer Number:	20350
Filer:	John P. McGroarty/Joan Soll
Filer Authorized By:	John P. McGroarty
Attorney Docket Number:	91904-831532
Receipt Date:	27-JUN-2012
Filing Date:	13-FEB-2012
Time Stamp:	18:18:07
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	$2000
RAM confirmation Number	8447
Deposit Account	201430
Authorized User	KILPATRICK TOWNSEND & STOCKTON, LLP

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.20 (Post Issuance fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		2012_06_27_MP_91904-831532.pdf	234100 27a17054f19fd9ad13a7de268040fe817178a5fb	yes	13

Multipart Description/PDF files in .zip description

Document Description	Start	End
Extension of Time	1	1
Applicant Response to Pre-Exam Formalities Notice	2	3
Oath or Declaration filed	4	4
Power of Attorney	5	5
Assignee showing of ownership per 37 CFR 3.73(b).	6	7
Preliminary Amendment	8	8
Claims	9	12
Applicant Arguments/Remarks Made in an Amendment	13	13

Warnings:

Information:

2	Fee Worksheet (SB06)	fee-info.pdf	40051 f0676e9941965a109c22966fbd077ed6bf8f5feb	no	2

Warnings:

Information:

Total Files Size (in bytes):	274151

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/22 (07-09)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PETITION FOR EXTENSION OF TIME UNDER 37 CFR 1.136(a) *(Fees pursuant to the Consolidated Appropriations Act, 2005 (H.R. 4818).)*	Docket Number (Optional) 91904-831532
Application Number 13/372,240	Filed Feb 13, 2012
For ELECTRONIC FRAMES COMPRISING ELECTRICAL CONDUCTORS	
Art Unit 2873	Examiner TBD

This is a request under the provisions of 37 CFR 1.136(a) to extend the period for filing a reply in the above identified application.

The requested extension and fee are as follows (check time period desired and enter the appropriate fee below):

	Fee	Small Entity Fee	
☐ One month (37 CFR 1.17(a)(1))	$150	$75	$____
☒ Two months (37 CFR 1.17(a)(2))	$560	$280	$560
☐ Three months (37 CFR 1.17(a)(3))	$1270	$635	$____
☐ Four months (37 CFR 1.17(a)(4))	$1980	$990	$____
☐ Five months (37 CFR 1.17(a)(5))	$2690	$1345	$____

☐ Applicant claims small entity status. See 37 CFR 1.27.

☐ A check in the amount of the fee is enclosed.

☒ Payment by credit card.

☐ The Director has already been authorized to charge fees in this application to a Deposit Account.

☒ The Director is hereby authorized to charge any fees which may be required, or credit any overpayment, to Deposit Account Number 20-1430 .

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

I am the

☐ applicant/inventor.

☐ assignee of record of the entire interest. See 37 CFR 3.71
Statement under 37 CFR 3.73(b) is enclosed. (Form PTO/SB/96).

☒ attorney or agent of record. Registration Number 41,186

☐ attorney or agent under 37 CFR 1.34.
Registration number if acting under 37 CFR 1.34. _____ .

Signature	Date
John P. McGroarty	202-481-9950
Typed or printed name	Telephone Number

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below.

☐ Total of _____ forms are submitted.

This collection of information is required by 37 CFR 1.136(a). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 6 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Substitute for form 1449/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				**Application Number**	13/372,240
				Filing Date	February 13, 2012
				First Named Inventor	Charles Willey
				Art Unit	TBA
(Use as many sheets as necessary)				Examiner Name	TBA
Sheet	1	of	5	Attorney Docket Number	91904-831532(011310US)

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number Kind Code[2] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	AA	US-4,418,990	12/6/83	Gerber	
	AB	US-5,742,379	4/21/98	Reifer	
	AC	US-6,115,177	9/5/00	Vossler	
	AD	US- 6,719,425	4/13/04	Conner	
	AE	US-2001/0007493	7/2001	Masunaga et al.	
	AF	US-2001/0043266	11/22/01	Robinson et al.	
	AG	US-2002/0140899	10-2002	Blum et al.	
	AH	US-2004/000733	1/1/04	Swab et al.	
	AI	US-2005/0225723	10/13/05	Pilu	
	AJ	US-2005/0237485	10/27/2005	Blum et al.	
	AK	US-2005/0242771	11/3/2005	Blum et al.	
	AL	US-2005/0264752	12-01-2005	Howell et al.	
	AM	US-2005/078274	4/14/05	Howell et al.	
	AN	US-2005/270479	12/8/05	Canavan et al.	
	BA	US-2005/270481	12/8/05	Blum et al.	
	BB	US-2006/023158	2/2/06	Howell et al.	
	BC	US-2006/092340	5/4/06	Blum et al.	
	BD	US-2006/203186	9/14/06	Ifergan	
	BE	US-2007/0296918	12-2007	Blum et al.	
	BF	US-2007/121061	5/31/07	Young	
	BG	US-2007/258039	11/8/07	Duston et al.	
	BH	US-2008/0106695	05-08-2008	Kokonaski et al.	
	CA	US-2008/273166	11/6/08	Kokonaski	
	CB	US-2008/316420	10/25/08	Agazarova Mazal	
	CC	US-2010/0177277	7/15/10	Kokonaski et al.	
	CD	US-2010/0201938	8/12/10	Jackson et al.	
	CE	US-2010/0309426	12/9/2010	Howell et al.	
	CF	US-2930857	3/29/60	Hollingsworth	
	CG	US-4,152,846	5/8/79	Witt	
	CH	US-4,283,127	8/11/81	Rosenwinket et al.	

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. [1] Applicant's unique citation designation number (optional). [2] See Kind Codes of U.S. Patent Documents at www.uspto.gov or MPEP 901.04. [3] Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). [4] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [5] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. [6] Applicant is to place a check mark here if English language Translation is attached.

64038089 v1

Substitute for form 1449/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				**Application Number**	13/372,240
				Filing Date	February 13, 2012
				First Named Inventor	Charles Willey
				Art Unit	TBA
(Use as many sheets as necessary)				Examiner Name	TBA
Sheet	2	of	5	Attorney Docket Number	91904-831532(011310US)

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number Kind Code[2] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	CI	US-4,756,605	07-12-1988	Okada etal.	
	CJ	US-4,875,030	10/17/89	Chiu	
	CK	US-4,907,860	3/13/90	Noble	
	CL	US-4,967,268	10/30/90	Lipton et al.	
	CM	US-4,991,258	2/12/91	Drlik	
	CN	US-4,991,951	02-12-1991	Mizuno et al.	
	DA	US-5,182,585	1/26/93	Stoner	
	DB	US-5,463,428	10/31/95	Lipton et al.	
	DC	US-5,657,107	8/12/97	Wagner et al.	
	DD	US-5,760,869	6/2/98	Mitamura	
	DE	US-5,764,338	6/9/98	Carol Anne Mack	
	DF	US-5,835,185	11/10/98	Kallman et al.	
	DG	US-6,097,450	8/1/00	Humphrey	
	DH	US-6,336,250	1/8/02	Takeda et al.	
	DI	US-6,582,075	6/24/03	Swab et al.	
	DJ	US-6,595,634	07-22-2003	Pilat, Jr.	
	DK	US-6,626,532	09-30-2003	Nishioka et al.	
	DL	US-6,866,386	03-2005	Chen, Joy	
	DM	US-7,009,757	3/7/06	Nishioka et al.	
	DN	US-7,063,420	06-20-2006	Lerner et al.	
	EA	US-7,104,645	09-12-2006	Pilat, Jr.	
	EB	US-7,140,727	12-28-2006	Pilat, Jr. et al.	
	EC	US-7,425,066	09-16-2008	Blum e tal.	
	ED	US-7,784,935	8/31/10	Jackson et al.	
	EE	US-7,813,048	10/12/2010	Lynch et al.	

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]

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Substitute for form 1449/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				**Application Number**	13/372,240
				Filing Date	February 13, 2012
				First Named Inventor	Charles Willey
				Art Unit	TBA
(Use as many sheets as necessary)				Examiner Name	TBA
Sheet	3	of	5	Attorney Docket Number	91904-831532(011310US)

		Country Code[3]	Number[4]	Kind Code[5] (*if known*)				
	FA	WO	2009/081542		7/2/09	Panasonic Corp.		☐
	FB	GB	1563929		4/2/80	American Cyanamid Co		
	FC	WO	2010/062504		6/3/2010	CJoahrneson & Johnson Vision		
	GA	DE	2304134		8/30/73	Gould Inc.		
	GB	WO	2008/002388		1/3/08	PixelOptics Inc.		
	GC	GB	2170613		08-06-1986	Olympus Optical Co., Ltd.		
	GD	WO	2007/142520		12-13-2007	Varibel BV.		
	GE	EP	1916561		04-30-2008	Varibel BV.		
	GF	EP	1727393		11-29-2006	Varibel BV.		
	GG	WO	99/21400		04-29-1999	Technische Universiteit Delft		
	GH	WO	2004/028203		04-01-2004	Stichting Voor De Technische Wetenschappen		
	GI	WO	2008/046858		04-24-2008	Essilor International		
	GJ	JP	09294654		12-17-2009	Scalar Corp.		
	GK	WO	2009/136667		11-12-2009	Scalar Corp.		
	GL	WO	2010/080999		7/15/10	PixelOptics, Inc.		
	GM	EP	1647854		4/19/06	Sunshine Optical Company		
	GN	WO	2009/098719		8/13/09	Laura Maria Cozzani		
	GO	EP	2233964		9/29/10	Panasonic Corp.		
	GP	WO	2009/126946		10/15/09	PixelOptics, Inc.		
	GQ	EP	0061002		9/29/82	Desil SPA Occhialeria		
	GR	JP	2008/083299		4/10/08	Biito KK		

NON PATENT LITERATURE DOCUMENTS			
Examiner Initials *	Cite No.[1]	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T[6]

Examiner Signature		Date Considered	

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(Use as many sheets as necessary)				Examiner Name	TBA
Sheet	4	of	5	Attorney Docket Number	91904-831532(011310US)

NON PATENT LITERATURE DOCUMENTS

Examiner Initials *	Cite No.[1]	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T[6]
	HA	US provisional patent application no. 61/361,110, filed on July 2, 2010	☐
	HB	US provisional patent application no. 61/376,719, filed on August 25, 2010	☐
	HC	US provisional patent application no. 61/415,391, filed on November 19, 2010	☐
	HD	US non-provisional patent application no. 12/684,490, filed on January 8, 2010	☐
	HE	U.S. non-provisional application no. 13/175,633 filed on July 1, 2011	☐
	HF	U.S. non-provisional application no. 13/175,634 filed on July 1, 2011	☐
	HG	U.S. provisional patent application no. 61/362,877 filed July 9, 2010	☐
	HH	US non-provisional patent application no. 13/179,219, filed on July 8, 2011	☐
	IA	U.S. provisional patent application no. 61/481,353 filed on May 2, 2011	☐
	IB	U.S. provisional patent application no. 61/441,817 filed on February 11, 2011	
	IC	International Search Report corresponding to the PCT/US2011/042883 application.	☐

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(Use as many sheets as necessary)				Examiner Name	TBA
Sheet	5	of	5	Attorney Docket Number	91904-831532(011310US)

NON PATENT LITERATURE DOCUMENTS

Examiner Initials *	Cite No.[1]	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T[6]
	ID	International Search Report corresponding to the PCT/US2011/042882 application.	
	IE	International Search Report and Written Opinion in corresponding PCTIUS2008/058056 application.	
	IF	Partial International Search Report in corresponding PCT/US2010/020498 application.	
	IG	European Search Report in related EP07852880.9 application.	
	IH	"Hearing Mojo: Varibel Hearing-Aid Glasses Integrate Eight Directional Microphones," February 27, 2009, pages 1-4 *URL-http://hearingmojo.com/b/og-mt/blog-mt/2006/04/varibel_hearingaid_glasses_dou.html*	
	JA	International Search Report corresponding to the PCT/US2011/061505 application	
	JB	International Search Report corresponding to the PCT/US2011/061495 application	
	JC	International Search Report corresponding to the PCT/US2011/043591 application	

Examiner Signature		Date Considered	

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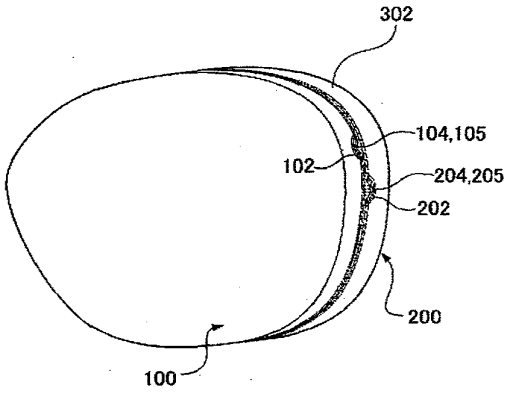
(81) 指定国 (表示のない限り、全ての種類の国内保護が可能): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

[続葉有]

(54) **Title:** METHOD FOR MANUFACTURING LENS FOR ELECTRONIC SPECTACLES, LENS FOR ELECTRONIC SPECTACLES, AND ELECTRONIC SPECTACLES

(54) 発明の名称: 電子メガネ用レンズの製造方法と電子メガネ用レンズおよび電子メガネ

[図35]



(57) **Abstract:** A lens for electronic spectacles including an electrode pattern which is used for supplying electrical energy to an electric element provided in the lens and has a relatively low resistance and exhibiting an excellent light transmittance. The lens is characteristic in that a first recess (102) in a lower substrate (100) is coated with a conductive ink to form a first auxiliary electrode layer (104), a lower electrode pattern (105) is formed on the first auxiliary electrode layer (104) by vacuum deposition, a second recess (202) in an upper substrate (200) is coated with a conductive ink to form a second auxiliary electrode layer (204), an upper electrode pattern (205) is formed on the second auxiliary electrode layer (204) by vacuum deposition, the lower and upper substrates (100, 200) are joined with an electric element (300) interposed therebetween, the joined body is cut along the multilayer portion of the first auxiliary electrode layer (104) and the lower electrode pattern (105) and the multilayer portion of the second auxiliary electrode layer (204) and the upper electrode pattern (205) to expose the cut surface.

(57) 要約: レンズの内部に設けられて電気素子に電気エネルギーを供給する電極パターンとしての抵抗値を比較的小さくでき、しかも光透過率が良好な電子メガネ用レンズを提供することを目的として、下基板（１００）の第１の凹部（

[続葉有]

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添付公開書類:
— 国際調査報告書

１０２）に導電性インクでコーティングして第１の補助電極層（１０４）を形成し、その上に下部電極パターン（１０５）を蒸着して形成し、上基板（２００）の第２の凹部（２０２）に導電性インクでコーティングして第２の補助電極層（２０４）を形成し、その上に上部電極パターン（２０５）を蒸着して形成し、下基板（１００）と上基板（１００）の間に電気素子（３００）を挟んで貼り合わせ、第１の補助電極層（１０４）と下部電極パターン（１０５）との積層部分、第２の補助電極層（２０４）と上部電極パターン（２０５）との積層部分に掛かる位置でカットして切断面を露出させたことを特徴とする。

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明　細　書

電子メガネ用レンズの製造方法と電子メガネ用レンズおよび電子メガネ

技術分野

[0001] 本発明は、電子メガネにおけるレンズ部の電気素子の電気配線に関するものであり、特に電気接続の信頼性を向上させることのできる構造を提案するものである。

背景技術

[0002] 電子メガネは、レンズ表面若しくはレンズ内部にエレクトロクロミック（ＥＣ）素子、液晶素子等の電気素子を形成し、これらの電気素子に電気エネルギーを供給することによりレンズの機能を変化させる電子メガネが提案されている。

[0003] 一例としてはＥＣ素子を用いたものがある。

[0004] この例においては、ＥＣ素子を駆動させるための電極配線方法として、図４３のレンズ断面に示す様に、基板レンズ６０１の上に下部ＩＴＯ透明電極６０２、Ir_2O_3／SnO_2層６０３、Ta_2O_5層６０４、WO_3層６０５、上部ＩＴＯ透明電極層６０６からなるＥＣ素子６０７が形成されており、各電極層からの取り出し電極として２層構造のメッキ層６０８ａ，６０８ｂがレンズ外周部（ヤゲン（薬研）の斜面）に形成されており、それぞれ上部ＩＴＯ透明電極層６０６、下部ＩＴＯ透明電極層６０２と電気的に接触している。一方、メガネのフレームは図４４に示されるよう電流通路を兼用する金属製の上部リム６０９ａ、下部リム６０９ｂから構成されている。上部リム６０９ａ、下部リム６０９ｂを結合する場合には薄いプラスティックシートなどの絶縁体を介して結合する。

[0005] 前記レンズとリムの結合及び制御部とＥＣ素子６０７の結線においては、前記レンズ外周部に形成される電極６０８ａ，６０８ｂと、上部リム６０９ａ、下部リム６０９ｂがそれぞれ接触した状態とし、さらに上部リム６０９

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ａ、下部リム６０９ｂ末端にて制御部からの端子を挟み込む形にてリムロック６０９ａ１によって締め込む方法が示されている（例えば、特許文献１参照）。

特許文献1：実開平２－１３８７２０号公報

発明の開示

発明が解決しようとする課題

[0006] しかしながら、従来の構成では、レンズ外周部の電極である下部ＩＴＯ透明電極６０２，上部ＩＴＯ透明電極層６０６が、リムである上部リム６０９ａ、下部リム６０９ｂとの接触によってのみ導通を得ているため、例えばリムロック６０９ａ１を締め込むねじ（図示せず）が緩んだりした場合に導通不良が起こる。

[0007] この導通不良を改善するには、ＩＴＯ透明電極層の膜厚を厚くする必要があるが、蒸着などのドライプロセスでは膜厚を厚くすることが出来ない。そのため、ウェットプロセスを用いてＩＴＯ透明電極層の形成を行う。ところが、ウェットプロセスでは、ＩＴＯ粒子をインク溶媒に分散して塗布するため、ＩＴＯ透明電極層の電気抵抗値が高くなり、レンズ内部の素子の動作特性を損なうという課題を有している。

[0008] 本発明は、前記従来の課題を解決するもので、電子メガネにおけるレンズ内部の素子の動作特性を損なうことなく、レンズ外部の電子回路との電気接続信頼性を高めた電子メガネを提供することを目的とする。また、この電子メガネ用レンズを効率よく製造することができる製造方法を提供することを目的とする。

課題を解決するための手段

[0009] 本発明の電子メガネ用レンズの製造方法は、下基板と上基板の間に電気素子を内蔵したレンズを作製するに際し、下基板の作製は、下基板の前記上基板との対向面にレンズ部電極パッド用の第１の凹部を形成し、前記第１の凹部に導電性インクでコーティングして透明の第１の補助電極層を形成し、前記下基板の電気素子形成部と前記第１の補助電極層ならびに電気素子形成部

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と前記第１の補助電極層を接続する透明の下部電極パターンを蒸着法にて形成し、上基板の作製は、上基板の前記下基板との対向面にレンズ部電極パッド用の第２の凹部を形成し、前記第２の凹部に導電性インクでコーティングして透明の第２の補助電極層を形成し、前記上基板の前記電気素子形成部に対応する部分と前記第２の補助電極層ならびに前記電気素子形成部に対応する部分と前記第２の補助電極層を接続する透明の上部電極パターンを蒸着法にて形成し、前記下基板の電気素子形成部と前記上基板との間に電気素子を挟んで前記下基板と前記上基板を貼り合わせることを特徴とする。

[0010] また、本発明の電子メガネ用レンズの製造方法は、下基板と上基板の間に電気素子を内蔵したレンズを作製するに際し、下基板の作製は、下基板の前記上基板との対向面にレンズ部電極パッド用の第１の凹部を形成し、前記下基板の電気素子形成部と前記第１の凹部ならびに電気素子形成部と前記第１の凹部を接続する下部電極パターンを形成し、前記第１の凹部の前記下部電極パターンの上を導電性インクでコーティングして透明の第１の補助電極層を形成し、上基板の作製は、前記上基板の前記電気素子形成部に対応する部分とレンズ部電極パッド用の第２の凹部ならびに前記電気素子形成部に対応する部分と前記第２の凹部を接続する透明の上部電極パターンを蒸着法にて形成し、前記第２の凹部の前記上部電極パターンの上を導電性インクでコーティングして透明の第２の補助電極層を形成し、前記下基板の電気素子形成部と前記上基板との間に電気素子を挟んで前記下基板と前記上基板を貼り合わせることを特徴とする。

[0011] 前記下基板と前記上基板を貼り合わせた後に、前記第１，第２の凹部に掛かる位置でカットして、レンズ端部に前記第１，第２の凹部の切断面を露出させることを特徴とする。

[0012] 前記下基板と前記上基板を貼り合わせた後に、前記第１，第２の凹部に掛かる位置でカットして、レンズ端部に前記第１，第２の凹部の切断面を露出させ、露出した前記第１，第２の凹部にそれぞれ導電性ペーストを形成して、第１の補助電極層と下部電極パターンの引き出し電極としてのレンズ部電

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極パッド，第２の補助電極層と上部電極パターンの引き出し電極としてのレンズ部電極パッドを形成することを特徴とする。

[0013] 本発明の電子メガネ用レンズは、２枚の基板の間に電気素子を内蔵したレンズであって、前記電気素子に電圧を印加する電極の一端のレンズ部電極パッドがレンズ端部において露出し、かつ前記レンズ部電極パッドが、前記２枚の基板のうちの一方の基板の他方の基板との貼り合わせ面に形成された凹部の内部に、導電性インクで形成した補助電極層と蒸着法で形成した下部電極パターンとの積層によって形成された電極が形成されていることを特徴とする。

[0014] 前記凹部の前記レンズ端部において露出した形状が、曲面に形成されていることを特徴とする。

[0015] また、本発明の電子メガネ用レンズの製造方法は、下基板と上基板の間に電気素子を内蔵したレンズを作製するに際し、下基板の作製は、下基板の前記上基板との対向面に導電性インクでコーティングしてレンズ部電極パッド用の透明の第１の補助電極層を形成し、前記下基板の電気素子形成部と前記第１の補助電極層ならびに電気素子形成部と前記第１の補助電極層を接続する透明の下部電極パターンを蒸着法にて形成し、上基板の作製は、上基板の前記下基板との対向面に導電性インクでコーティングして前記レンズ部電極パッド用の透明の第２の補助電極層を形成し、前記上基板の前記電気素子形成部に対応する部分と前記第２の補助電極層ならびに前記電気素子形成部に対応する部分と前記第２の補助電極層を接続する透明の上部電極パターンを蒸着法にて形成し、前記下基板の電気素子形成部と前記上基板との間に電気素子を挟んで前記下基板と前記上基板を貼り合わせることを特徴とする。

[0016] また、本発明の電子メガネ用レンズの製造方法は、下基板と上基板の間に電気素子を内蔵したレンズを作製するに際し、下基板の作製は、前記下基板の電気素子形成部に信号を印加する透明の下部電極パターンを蒸着法にて形成し、前記下部電極パターンの端部の上を導電性インクでコーティングして透明の第１の補助電極層を形成し、上基板の作製は、前記上基板の前記電気

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素子形成部に対応する部分に信号を印加する透明の上部電極パターンを蒸着法にて形成し、前記上部電極パターンの端部の上を導電性インクでコーティングして透明の第２の補助電極層を形成し、前記下基板の電気素子形成部と前記上基板との間に電気素子を挟んで前記下基板と前記上基板を貼り合わせることを特徴とする。

[0017] 前記下基板と前記上基板を貼り合わせた後に、前記第１の補助電極層と前記下部電極パターンとの積層部分、前記第２の補助電極層と前記上部電極パターンとの積層部分に掛かる位置でカットして切断面を露出させることを特徴とする。

[0018] 前記下基板と前記上基板を貼り合わせた後に、前記第１の補助電極層と前記下部電極パターンとの積層部分、前記第２の補助電極層と前記上部電極パターンとの積層部分に掛かる位置でカットして切断面を露出させ、露出した前記前記第１の補助電極層と前記下部電極パターンとの積層部分、前記第２の補助電極層と前記上部電極パターンとの積層部分にそれぞれ導電性ペーストを形成して、前記第１の補助電極層と前記下部電極パターンの引き出し電極としてのレンズ部電極パッド，前記第２の補助電極層と前記上部電極パターンの引き出し電極としてのレンズ部電極パッドを形成することを特徴とする。

[0019] また、本発明の電子メガネ用レンズは、２枚の基板の間に電気素子を内蔵したレンズであって、前記電気素子に電圧を印加する電極の一端がレンズ端部において露出し、かつ前記電極の一端が導電性インクで形成した補助電極層と蒸着法で形成した下部電極パターンとの積層によって形成されていることを特徴とする。

[0020] また、本発明の電子メガネ用レンズの製造方法は、下基板と上基板の間に電気素子を内蔵したレンズを作製するに際し、下基板の作製は、前記下基板の電気素子形成部に信号を印加する透明の下部電極パターンを蒸着法にて形成し、前記下基板の電気素子形成部と下部電極パターンの上で後に第１の補助電極層が形成される部分を除いて下部絶縁層パターンを形成し、前記下部

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絶縁層パターンの孔に導電性インクを入れてコーティングして透明の第１の補助電極層を形成し、上基板の作製は、前記上基板の前記電気素子形成部に対応する部分に信号を印加する透明の上部電極パターンを蒸着法にて形成し、前記上基板の前記電気素子形成部に対応する部分と上部電極パターンで後に第２の補助電極層が形成される部分を除いて上部絶縁層パターンを形成し、前記上部絶縁層パターンの孔に導電性インクを入れてコーティングして透明の第２の補助電極層を形成し、前記下基板の電気素子形成部と前記上基板との間に電気素子を挟んで前記下基板と前記上基板を貼り合わせることを特徴とする。

[0021] また、本発明の電子メガネ用レンズの製造方法は、下基板と上基板の間に電気素子を内蔵したレンズを作製するに際し、下基板の作製は、下基板の前記上基板との対向面にレンズ部電極パッド用の第１の凹部を形成し、前記下基板の電気素子形成部と前記第１の凹部ならびに電気素子形成部と前記第１の凹部を接続する下部電極パターンを形成し、前記下基板の電気素子形成部と下部電極パターンの上で後に第１の補助電極層が形成される部分を除いて下部絶縁層パターンを形成し、前記下部絶縁層パターンの孔に導電性インクを入れてコーティングして透明の第１の補助電極層を形成し、上基板の作製は、前記上基板の前記電気素子形成部に対応する部分とレンズ部電極パッド用の第２の凹部ならびに前記電気素子形成部に対応する部分と前記第２の凹部を接続する透明の上部電極パターンを蒸着法にて形成し、前記上基板の前記電気素子形成部に対応する部分と上部電極パターンの上で後に第２の補助電極層が形成される部分を除いて上部絶縁層パターンを形成し、前記上部絶縁層パターンの孔に導電性インクを入れてコーティングして透明の第２の補助電極層を形成し、前記下基板の電気素子形成部と前記上基板との間に電気素子を挟んで前記下基板と前記上基板を貼り合わせることを特徴とする。

[0022] また、本発明の電子メガネは、電気素子を内蔵したレンズをメガネフレームにセットした電子メガネであって、前記レンズは、レンズ端部に前記電気素子に電圧を印加する電極の一端のレンズ部電極パッドが露出しており、前

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記メガネフレームは、前記電気素子を制御する制御部に一端が接続され、他端の配線部電極パッドが前記レンズの前記レンズ部電極パッドに対応した位置に配置された電気接続手段を有しており、前記電気接続手段の前記配線部電極パッドと前記レンズの前記レンズ部電極パッドとの間に異方導電性ゴムが介在していることを特徴とする。

[0023] また、前記メガネフレームのリムの内側に前記電気接続手段が位置するリム側ザグリを設け、前記レンズのレンズ端部に前記異方導電性ゴムが位置するレンズ側ザグリを設けたことを特徴とする。

[0024] また、前記電気接続手段を、前記メガネフレームのリムロックの間を通りリムの内側に敷設し、前記メガネフレームの前記リムの内側に配線部電極パッドを設置したことを特徴とする。

発明の効果

[0025] この構成によると、電子メガネ用レンズは、レンズ端部において露出たレンズ部電極パッドが、ＩＴＯインクで形成された補助電極層とＩＴＯをスパッタリングした下部電極パターンとの積層によって形成された電極が形成されているため、電極パターンの電極としての体積抵抗率を比較的小さくでき、しかも光透過率が良好で目障りになるような事態を回避できる。

[0026] また、メガネフレームは、配線部電極パッドがレンズのレンズ部電極パッドに対応した位置に配置された電気接続手段を有しており、前記配線部電極パッドと前記レンズのレンズ部電極パッドとの間に異方導電性ゴムが介在しているため、レンズ締結部の緩みや電気配線のずれによる断線と、漏電によるショート等電気的トラブルを防ぐことができる。

図面の簡単な説明

[0027] [図1]本発明の実施の形態１における電子メガネ要部の拡大図

[図2]同実施の形態における電子メガネ要部の拡大図

[図3]本発明の実施の形態２ザグリを形成した電子メガネ要部の拡大図

[図4]同実施の形態におけるザグリを形成した電子メガネ要部の拡大図

[図5]電子メガネの上面図と利用者の側から見た拡大図

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[図6]本発明の実施の形態３における完成したレンズ１を分解して図示したイメージ図

[図7]同実施の形態における下基板の加工の工程を示す斜視図

[図8]同実施の形態における下基板の加工の工程を示す断面図

[図9]同実施の形態における上基板の加工の工程を示す斜視図

[図10]同実施の形態における上基板の加工の工程を示す断面図

[図11]同実施の形態におけるレンズを第１の補助電極層１０４を通る位置で切り欠いた拡大斜視図

[図12]同実施の形態におけるレンズを第１の補助電極層１０４を通る位置で切断した断面図

[図13]同実施の形態における同実施の形態におけるレンズを第２の補助電極層２０４を通る位置で切り欠いた拡大斜視図

[図14]同実施の形態におけるレンズを第２の補助電極層２０４を通る位置で切断した断面図

[図15]同実施の形態におけるレンズをカットする位置を示す平面図

[図16]同実施の形態におけるカットしたレンズのレンズ端面を示す拡大斜視図

[図17]同実施の形態における要部の拡大図

[図18]同実施の形態におけるメガネフレームの概略図とその智の部分の拡大斜視図と構成図

[図19]同実施の形態におけるレンズがメガネフレームにセットされた状態の構成図

[図20]同実施の形態におけるレンズのレンズ端面に銀ペーストを付けた別の実施例の拡大斜視図

[図21]同実施の形態におけるレンズがメガネフレームにセットされた状態の別の実施例の構成図

[図22]本発明の実施の形態４における完成したレンズ１を分解して図示したイメージ図

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[図23]同実施の形態における下基板の加工の工程を示す断面図

[図24]同実施の形態におけるレンズを第１の補助電極層１０４を通る位置で切り欠いた拡大斜視図

[図25]同実施の形態におけるレンズを第２の補助電極層２０４を通る位置で切断した断面図

[図26]本発明の実施の形態５における完成したレンズ１を分解して図示したイメージ図

[図27]同実施の形態における下基板の加工の工程を示す斜視図

[図28]同実施の形態における下基板の加工の工程を示す断面図

[図29]同実施の形態における上基板の加工の工程を示す斜視図

[図30]同実施の形態における上基板の加工の工程を示す断面図

[図31]同実施の形態におけるレンズを第１の凹部１０２を通る位置で切り欠いた拡大斜視図

[図32]同実施の形態におけるレンズを第１の凹部１０２を通る位置で切断した断面図

[図33]同実施の形態における同実施の形態におけるレンズを第２の凹部２０２を通る位置で切り欠いた拡大斜視図

[図34]同実施の形態におけるレンズを第２の凹部２０２を通る位置で切断した断面図

[図35]同実施の形態におけるレンズをカットする位置を示す平面図

[図36]同実施の形態におけるカットしたレンズのレンズ端面を示す拡大斜視図

[図37]本発明の実施の形態６における完成したレンズ１を分解して図示したイメージ図

[図38]同実施の形態における下基板の加工の工程を示す断面図

[図39]同実施の形態におけるレンズを第１の凹部１０２を通る位置で切り欠いた拡大斜視図

[図40]同実施の形態におけるレンズを第２の凹部２０２を通る位置で切断し

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た断面図

[図41]本発明の実施の形態７における完成したレンズ１を分解して図示したイメージ図

[図42]本発明の実施の形態８における完成したレンズ１を分解して図示したイメージ図

[図43]従来の電子メガネを示す図

[図44]従来の電子メガネを示す図

発明を実施するための最良の形態

[0028] 以下に、本発明の電子メガネの実施の形態を図面とともに詳細に説明する。

[0029] （実施の形態１）

図５（ａ）（ｂ）に電子メガネを示す。

[0030] 図１は図５（ａ）のＡ－Ａ断面図で、本発明の第１の実施の形態におけるレンズ部電極パッドと配線部電極パッドの接続部断面を示す。

[0031] 同様に図２は図５（ｂ）のＢ－Ｂ断面図で、レンズ部電極パッドと配線部電極パッドの接続部のイメージ図を示す。

[0032] 本発明の電子メガネは、メガネフレーム１１と、液晶やエレクトロクロミックなどの電気素子（図示せず）を有し前記メガネフレーム１１のリム８にセットされたレンズ１と、メガネフレーム１１の側に設けられレンズ１の前記電気素子を駆動するために電気信号を発生する制御部５と、メガネフレーム１１の側に設けられ制御部５からの信号を伝達する電気接続手段４と、レンズ１とリム８の間に挟まれた異方導電性ゴム７と、リム８の上下のリムロック９，９を締め込むネジ１０などから構成されている。

[0033] なお、レンズ１はリム８の内側に形成されている溝８ａに嵌め込まれており、レンズ１には、前記電気素子に電気信号を送る電極パターン２ａ，２ｂと、電極パターン２ａ，２ｂの端部で電極パターン２ａ，２ｂの接触面積を向上させるためのレンズ部電極パッド３ａ，３ｂがヤゲン（薬研）１ａに形成されている。

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[0034] メガネフレーム１１の側の電気接続手段４の一端部には、電極パッド６ａ，６ｂが形成されており、異方導電性ゴム７によってレンズ部電極パッド３ａ，３ｂと電極パッド６ａと６ｂとの間が電気接続されている。

[0035] 電極パターン２ａ，２ｂはＩＴＯに代表される非常に薄い透明電極により形成されており、その電極パターン２ａ，２ｂはレンズ１の外周側壁部のヤゲン１ａにて外部に露出されている。ここで電極パターン２ａ，２ｂの膜厚は１０ｎｍ～４０ｎｍ程度しかなく、外部へ露出した電極パターン２ａ，２ｂは非常に細い１０ｎｍ～４０ｎｍ程度の線幅のライン状である。そのために異方導電性ゴム７との電気接触がうまく行かない場合が有る。そのためこの実施の形態１では、レンズ１の外部に露出した電極パターン２ａ，２ｂに対して、銀ペーストやナノ粒子などを用い電極部を拡大するためにレンズ部電極パッド３ａ，３ｂをヤゲン１ａの１つの平面上に形成している。

[0036] このとき、電極パターン２ａ，２ｂは、レンズ厚み方向における間隔が前記電気素子の厚さにほぼ等しい数μｍ程度しかなく、レンズ部電極パッド３ａ，３ｂを電極パターン２ａ，２ｂに対し個別に形成するためには、レンズ端部において電極パターン２ａ，２ｂがレンズ厚み方向に重ならないようにしておく必要がある。

[0037] 電源やＩＣ（集積回路）などから構成される制御部５から発生した電気信号は、フレキシブル基板などの電気接続手段４を介してレンズ部電極パッド３ａ，３ｂに対応した形状の配線部電極パッド６ａ，６ｂに伝達され、異方導電性ゴム７を挟んでレンズ部電極パッド３ａ，３ｂに伝達される。

[0038] レンズ部電極パッド３ａ，３ｂと配線部電極パッド６ａ，６ｂ間に設置される異方導電性ゴム７は、側壁面をシリコーンなどのゴム材料にてコートされた一般的な異方導電性ゴムを用いる。異方導電性ゴム７は、リムロック９をねじ１０で締め込みレンズを取り付ける際、弾性体である異方導電性ゴム７が十分に圧縮（変形）し、導通部の露出する面が浮いた状態にならないようにその形状を設定する。

[0039] このように電子メガネを構成することにより、リムロック９のネジ１０に

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よる締め込みが多少緩んでも、異方導電性ゴム７の弾性変形があるため電気接続が完全に断線することも無く使用することが可能となる。

[0040] また、レンズ部電極パッド３ａ，３ｂと配線部電極パッド６ａ，６ｂを異方導電性ゴム７の圧縮変形によりシールすることが可能となり、雨などに濡れてもショートすることなく使用することが可能となる。

[0041] （実施の形態２）

レンズ１の外周部は、図２に示す様レンズ外周部にヤゲン１ａといわれる山型の突起が形成され、メガネフレーム１１の側のリム８の内周部には図２にも示した谷状の溝８ａが形成されている。

[0042] レンズ１のメガネフレームへの取り付けは、ヤゲン１ａと溝８ａを係合させて固定する方法が最も一般的で有る。しかしながらこの構造では、リムロック９をねじ１０で締め込む際に異方導電性ゴム７と電気接続手段４に対し斜めに力が加わってしまうこととなり、それぞれが所定位置からずれてしまい組み立て（レンズ嵌め込み）や電気接続うまく出来ないことがある。

[0043] そこで、この実施の形態２では図３と図４に示すように構成することによって、組み立て時に異方導電性ゴム７と電気接続手段４に対し斜め方向の力が作用しないように改善されている。

[0044] 図３は、電子メガネのレンズ部電極パッドと配線部電極パッドの接続部断面のイメージ図で、図５（ａ）に示す上部から見た電子メガネのＡ－Ａ断面に相当するものである。同様に図４は、電子メガネのレンズ部電極パッドと配線部電極パッドの接続部のイメージ図で、図５（ｂ）に示す正面から見た電子メガネのＢ－Ｂ断面に相当するものである。

[0045] 図３と図４に示すように、レンズ１の側のレンズ部電極パッド３ａ，３ｂの周辺部には、異方導電性ゴム７用のレンズ側ザグリ１ｂが形成されている。さらに、メガネフレーム１１の側には、リム８の内側の電気接続手段４が設置される部分にリム側ザグリ８ｂが形成されている。

[0046] このように異方導電性ゴム７と電気接続手段４をそれぞれザグリ部１ｂ，８ｂに設置することによって、リムロック９をネジ１０で締め込んでも異方

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導電性ゴム７、電気接続手段４がずれにくく、安定して組み立てることが出来るようになり、電気配線のずれによる断線を防ぐことできる。

[0047] さらに具体的には、レンズ側ザグリ１ｂとリム側ザグリ８ｂの形状を、リムロック９，９をネジ１０で締め込む際にレンズ側ザグリ１ｂ、リム側のザグリ８ｂそれぞれの底面に対し垂直方向に荷重がかかるように形成されており、この構成によると安定して組み立てることができ、電気配線のずれによる断線を防ぐことができる。

[0048] 上記の各実施の形態において、電気接続手段４は一端が制御部５に接続され、他端部の配線部電極パッド６ａ，６ｂがリム８の溝８ａにおいてレンズ部電極パッド３ａ，３ｂに対向する部分に設置されるよう取り回しすればよく、例えばリムロック９やリム８の外周に電気接続手段４を設置するように構成することもできる。

[0049] ここではさらに安定的に電気接続を達成するために、図１，図２，図３，図４に示すように電気接続手段４をリムロック９の間を通し、リム８の内側の溝８ａまたはザグリ８ｂに設置することを例として挙げる。このように電気接続手段４をリムロック間に設置することにより、組み立て時の電気接続手段４の位置ずれを防ぎ、さらに電気接続手段４が外れにくい形とすることが可能である。

[0050] 具体的なリムロック９間への電気接続手段４の取り回しは、リムロック９自身で挟み込んで固定しても良いし、リムロック９に電気接続手段４の溝を形成しても良い。さらにはリムロック９に電気接続手段４の位置決めピンを設ける、またはねじ１０を位置決めピンとして用いたり、溝を形成するものであれば、溝パターン自体を位置決め手段として用いれば電気接続手段４が位置ずれしにくく外れにくい構成とすることができる。

[0051] さらに電気接続手段４をリムロック９の間に通すことによる付加的な効果としては、電気接続手段４が外部に露出しないため見た目にもすっきりしており、メガネ自体のデザイン性を乱すことが無い。

[0052] なお、本実施の形態においては、制御部５の設置位置は限定しないが、メ

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ガネを構成するテンプルの内側や、よろいの部分に固定されるようにすれば良く、リムロックの近くであれば電気接続手段４を短くすることができる。

[0053] （実施の形態３）

図６～図１９は電子メガネ用レンズ１の製造方法を示す。

[0054] 図６は製造工程がわかりやすくするために、完成したレンズ１を分解して図示したイメージ図で、下基板１００と上基板２００の間に電気素子としての液晶３００を内蔵している。４００は下基板１００と上基板２００を張り合わせしている接着層である。

[0055] 図７と図８は下基板１００の加工の工程を示している。

[0056] 図７（ａ）では、図８（ａ）に示すように下基板１００の上基板２００との対向面１０１に、後に前記液晶４００が配置される電気素子形成部１０３を形成する。

[0057] 図７（ｂ）では、図８（ｂ）に示すように表面が平滑な下基板１００に導電性インクで部分的にコーティングして第１の補助電極層１０４を形成する。具体的には、導電性インクとしてのＩＴＯインクを使用する。ＩＴＯインクの物性は導電性粒子が分散しており、ＩＴＯスパッタリングで形成した導電膜の体積抵抗率６～２×１０$^{-4}$Ω・ｃｍ程度に比べて体積抵抗率が２．４×１０^{0}Ω・ｃｍ程度と大きい反面、ＩＴＯインクによる１μｍの膜厚の分光透過率とスパッタによる膜厚３０ｎｍのＩＴＯの分光透過率はほぼ同じ値を示している。従って同じ膜厚における透明度はスパッタリングで形成したＩＴＯ導電膜に比べＩＴＯインクで形成した導電膜のほうが優れている。ＩＴＯインクは１μｍの膜厚であっても８０%程度の透過率を得ることができる。ＩＴＯインクのコーティング方法は、インクジェット、ディスペンサーを用いれば良い。また、テープなどによりマスキングした状態にて必要な場所にスピンコートやディッピングすることによっても可能である。ＩＴＯインクで形成する第１の補助電極層１０４の膜厚は１μｍ以上あればよい。

[0058] 図７（ｃ）では、図８（ｃ）に示すように電気素子形成部１０３と第１の補助電極層１０４ならびに電気素子形成部１０３と第１の補助電極層１０４

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を接続する下部電極パターン１０５を形成する。具体的には、電気素子形成部１０３と第１の補助電極層１０４をつなぐマスクパターンを用いてＩＴＯスパッタリングを行う。下部電極パターン１０５の膜厚は１０ｎｍ～４０ｎｍ程度である。

[0059] 図７（ｄ）では、図８（ｄ）に示すように電気素子形成部１０３と下部電極パターン１０５の上に下部絶縁層パターン１０６を形成する。具体的には、図７（ｃ）でのＩＴＯスパッタ後、チャンバから下基板１００を取り出すことなく（大気開放することなく）SiO_2を連続的にスパッタする。一つのチャンバ内に複数のターゲットがあるスパッタ装置であれば実施が可能で、特殊な装置ではない。

[0060] 図７（ｅ）では、液晶３００を注入する部分に配向膜１０７を塗布し、ラビング処理を行う。

[0061] 図９と図１０は上基板２００の加工の工程を示している。

[0062] 図９（ａ）のように表面が平滑な上基板２００に、図９（ｂ）では、図１０（ｂ）に示すように導電性インクでコーティングして第２の補助電極層２０４を形成する。コーティング方法は、インクジェット、ディスペンサーを用いれば良い。また、テープなどによりマスキングした状態にて必要な場所にスピンコートやディッピングすることによっても可能である。第２の補助電極層２０４の膜厚は１μｍ以上あればよい。

[0063] 図９（ｃ）では、図１０（ｃ）に示すように下基板１００の側の電気素子形成部１０３に対応する部分２０３と第２の補助電極層２０４ならびに前記部分２０３と第２の補助電極層２０４を接続する上部電極パターン２０５を形成する。具体的には、前記部分２０３と第２の補助電極層２０４をつなぐマスクパターンを用いてＩＴＯスパッタリングを行う。上部電極パターン２０５の膜厚は１０ｎｍ～４０ｎｍ程度である。

[0064] 図９（ｄ）では、図１０（ｄ）に示すように上部電極パターン２０５の上に上部絶縁層パターン２０６を形成する。具体的には、図９（ｃ）でのＩＴＯスパッタ後、チャンバ装置から上基板２００を取り出すことなく（大気開

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放することなく）SiO_2を連続的にスパッタする。一つのチャンバ内に複数のターゲットがあるスパッタ装置であれば実施が可能で、特殊な装置ではない。

[0065] 図９（ｅ）では、上部電極パターン２０５のうちの前記部分２０３の上の個所に配向膜２０７を塗布し、ラビング処理を行う。このようにして作製した下基板１００の電気素子形成部１０３と前記上基板２００との間に前記電気素子としての液晶３００を挟んで下基板１００と上基板２００を接着層４００によって貼り合わせる。具体的には、ディスペンサーやインクジェットなどにより液晶３００を注入する。この液晶３００の注入後、外周部分に接着剤（封止剤）を充填し、下基板１００と上基板２００を接着層４００によって貼り合わせる。

[0066] 図１１は貼り合わせた下基板１００と上基板２００を、第１の補助電極層１０４の端部と第２の補助電極層２０４を通る位置で切り欠いた拡大斜視図を示す。図１２は図１１の要部の拡大図である。図１３は貼り合わせた下基板１００と上基板２００を、第２の補助電極層２０４を通る位置で切り欠いた拡大斜視図を示す。図１４は図１３の要部の拡大図である。

[0067] このように張り合わせが完了した下基板１００と上基板２００を、前記メガネフレーム１１のリムの形状に応じて図１５に示すように第１の補助電極層１０４の端部と第２の補助電極層２０４の端部を通る切断線３０１でカットする。このカットによって、レンズ端部３０２に図１６に示すように、第１の補助電極層１０４と下部電極パターン１０５との重ね合わせ部分の端面と、第２の補助電極層２０４と上部電極パターン２０５との重ね合わせ部分の端面とを露出させる。図１７に示すように、下基板１００の側では、第１の補助電極層１０４と下部電極パターン１０５の端面が露出している。上基板２００の側では、第２の補助電極層２０４と上部電極パターン２０５の端面が露出している。

[0068] この図１６のレンズを用いて、図１８と図１９に示すようにしてメガネフレーム１１にレンズ１がセットされた電子メガネを構成できる。

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[0069] 図１８（ａ）に示すメガネフレーム１１の智３０４の部分には、電気接続手段４としてのフレキシブル配線３０５ａ，３０５ｂが敷設されている。フレキシブル配線３０５ａ，３０５ｂの一端は前記制御部５に接続され、フレキシブル配線３０５ａ，３０５ｂの他端には配線部電極パッド３０６ａ，３０６ｂが形成されている。この配線部電極パッド３０６ａ，３０６ｂは図１８（ｂ）に示すようにメガネフレーム１１のリム３０７の内部にセットされている。

[0070] このリム３０７にレンズ１をセットする際には、配線部電極パッド３０６ａ，３０６ｂとレンズ１の側の第１の補助電極層１０４と下部電極パターン１０５、第２の補助電極層２０４と上部電極パターン２０５との間に、図１９に示すように異方導電性ゴム３０８を介装した状態にして、ネジ１０を締めてレンズ１をリム３０７で支持することによって、配線部電極パッド３０６ａは異方導電性ゴム３０８を介してレンズ側の下部電極パターン１０５と確実に導通する。また、配線部電極パッド３０６ｂは異方導電性ゴム３０８を介してレンズ側の上部電極パターン２０５と確実に導通する。これは、第１の補助電極層１０４を下部電極パターン１０５上に形成しているため、異方導電性ゴム３０８との間の接触面積が増え、電気的導通が良くなるからである。第２の補助電極層２０４も同様の効果を与える。このようにして、前記制御部５から液晶３００を駆動するに必要な電圧をレンズ１の下部電極パターン１０５と上部電極パターン２０５の間に印加することができる。

[0071] 下部電極パターン１０５の膜厚を厚くして第１の補助電極層１０４を設けない場合、上部電極パターン２０５の膜厚を厚くして第２の補助電極層２０４を設けない場合を、この実施の形態と比較すると、第１，第２の補助電極層１０４，２０４を設けなかった場合には、電極としての抵抗値は小さくできるけれども、電子メガネで重要である光の透過が低下するため、下部電極パターン１０５と上部電極パターン２０５を目視で容易に確認できるようになって目障りになる。これに対して実施の形態３のように下部電極パターン１０５の膜厚を薄くして第１の補助電極層１０４を重ね合わせて膜厚を厚く

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し、上部電極パターン２０５の膜厚を薄くして第２の補助電極層２０４を重ね合わせて膜厚を厚くすることによって、電極としての抵抗値を比較的小さくでき、しかも下部電極パターン１０５と上部電極パターン２０５が目障りになるような事態を回避することができるので、第１，第２の補助電極層１０４，２０４の重ね合わせ構造は非常に有効である。

[0072] また、下基板１００と上基板２００に第１，第２の補助電極層１０４，２０４をコーティングしてから下部電極パターン１０５，上部電極パターン２０５を形成する工程を採用した場合には、下部電極パターン１０５，上部電極パターン２０５の上に、下部絶縁層パターン１０６，上部絶縁層パターン２０６を形成する工程を、前述のように、チャンバを大気開放して下基板１００，上基板２００を取り出すことなく連続的にスパッタして実施することができる。

[0073] 具体的には、下基板１００と上基板２００に下部電極パターン１０５，上部電極パターン２０５を形成してから第１，第２の補助電極層１０４，２０４をコーティングする後付け処理工程を採用した場合には、下部電極パターン１０５，上部電極パターン２０５をスパッタ形成して、スパッタ装置を大気開放して下基板１００と上基板２００を取り出しマスクパターンを変更してから下部絶縁層パターン１０６，上部絶縁層パターン２０６を形成することが必要になって、スパッタ装置の真空引きを二度も行うことになって加工プロセスが複雑になる。

[0074] これに対してこの実施の形態３のように第１，第２の補助電極層１０４，２０４を下基板１００と上基板２００に先付け処理で形成した場合は、下基板１００への下部電極パターン１０５の形成と下部絶縁層パターン１０６の形成をスパッタ装置を大気開放することなく実施でき、上基板２００への上部電極パターン２０５の形成と上部絶縁層パターン２０６の形成をスパッタ装置を大気開放することなく実施できるため、加工プロセスの簡略化が可能である。

[0075] さらに、図２０と図２１に示すように導電ペーストを第１の補助電極層１

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０４と第２の補助電極層２０４の上に付けると、接触面積が増えるので、さらに良い。つまり、図２０に示すように露出した第１の補助電極層１０４と下部電極パターン１０５との重ね合わせ部分の端面と、第２の補助電極層２０４と上部電極パターン２０５との重ね合わせ部分の端面とにそれぞれ導電性ペーストとしての銀ペースト３０３ａ，３０３ｂを付着させる。レンズ端部３０２に形成された銀ペースト３０３ａは、理想的には下部電極パターン１０５だけでなく第１の補助電極層１０４とも電気的に導通している。この実施の形態では、レンズ端部３０２に薄肉の下部電極パターン１０５が露出しているだけではなく、下部電極パターン１０５に比べて厚肉の第１の補助電極層１０４が露出しているため、レンズ端部３０２での下部電極パターン１０５の露出が不十分であっても、銀ペースト３０３ａは厚肉の第１の補助電極層１０４を介して確実に下部電極パターン１０５と導通することができる。

[0076] 同様に、レンズ端部３０２に形成された銀ペースト３０３ｂは、理想的には上部電極パターン２０５だけでなく第２の補助電極層２０４とも電気的に導通している。この実施の形態では、レンズ端部３０２に薄肉の上部電極パターン２０５が露出しているだけではなく、上部電極パターン２０５に比べて厚肉の第２の補助電極層２０４が露出しているため、レンズ端部３０２での上部電極パターン２０５の露出が不十分であっても、銀ペースト３０３ｂは厚肉の第２の補助電極層２０４を介して確実に上部電極パターン２０５と導通することができる。

[0077] （実施の形態４）

図２２～図２５は本発明の実施の形態４を示す。

[0078] 実施の形態３では、下基板１００に第１の補助電極層１０４をコーティングしてから下部電極パターン１０５を形成し、また、上基板２００に第２の補助電極層２０４をコーティングしてから上部電極パターン２０５を形成したが、この実施の形態４では、第１，第２の補助電極層１０４，２０４を後付けする点だけが異なっている。その他は実施の形態３と同じである。

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[0079] 図２２は製造工程がわかりやすくするために、完成したレンズ１を分解して図示したイメージ図である。

[0080] 図２３（ａ）では、下基板１００の電気素子形成部１０３から下基板１００の外周部の近傍の一部分に掛けて下部電極パターン１０５を形成する。

[0081] 図２３（ｂ）では、下部電極パターン１０５の端部の上にだけ導電性インクでコーティングして第１の補助電極層１０４を形成し、次に、電気素子形成部１０３の上と、下部電極パターン１０５から第１の補助電極層１０４の上に下部絶縁層パターン１０６を形成する。更に、図２２に示すように下部絶縁層パターン１０６の上には電気素子形成部１０３の位置に対応して配向膜１０７を形成する。

[0082] この場合の上基板２００も図２３（ａ）（ｂ）と同様に形成する。つまり図２２に示すように、下基板１００の側の電気素子形成部１０３に対応する部分と、上基板２００の外周部の近傍の一部分とに掛けて上部電極パターン２０５を形成し、上基板２００の外周部の近傍の上部電極パターン２０５の上にだけ導電性インクでコーティングして第２の補助電極層２０４を形成する。そして上部絶縁層パターン２０６を形成する。さらに、配向膜２０７を形成する。

[0083] そして、下部電極パターン１０５に第１の補助電極層１０４を後付けした下基板１００と、上部電極パターン２０５に第２の補助電極層２０４を後付けした上基板２００との間に、液晶３００を挟んで接着層４００によって図２３（ｃ）のように貼り合わせる。図２４は貼り合わせた下基板１００と上基板２００を、第１の補助電極層１０４を通る位置で切り欠いた拡大斜視図を示す。図２５は貼り合わせた下基板１００と上基板２００を、上部電極パターン２０５を通る位置で切り欠いた拡大断面図を示す。

[0084] このように第１，第２の補助電極層１０４，２０４を後付けした場合であっても、図１５に示したように切断線３０１でカットすることによって、実施の形態３と同様にレンズ１のレンズ端部３０２に、下基板１００の側では、第１の補助電極層１０４と下部電極パターン１０５の端面が露出し、上基

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板２００の側では、第２の補助電極層２０４と上部電極パターン２０５の端面が露出する。その他は実施の形態３と同じである。

[0085] また、下部絶縁パターン１０６と上部絶縁パターン２０６は、全面に形成すれば良いため、マスクを用いずにスパッタにより下部絶縁パターン１０６と上部絶縁パターン２０６を形成できる。

[0086] （実施の形態５）

実施の形態３では下基板１００の平滑な表面に第１の補助電極層１０４を形成し、上基板２００の平滑な表面に第２の補助電極層２０４を形成したが、この実施の形態５では、濡れ性の高いＩＴＯインクを使用した場合であっても正確に所定位置に第１，第２の補助電極層１０４，２０４をパターニングできるよう、図２６に示すように下基板１００の表面１０１に第１の凹部１０２を形成し、上基板２００の表面２０１に第２の凹部２０２を形成している。

[0087] 図２６～図３６は電子メガネ用レンズ１の製造方法を示す。

[0088] 図２６は製造工程がわかりやすくするために、完成したレンズ１を分解して図示したイメージ図で、下基板１００と上基板２００の間に電気素子としての液晶３００を内蔵している。４００は下基板１００と上基板２００を張り合わせしている接着層である。

[0089] 図２７と図２８は下基板１００の加工の工程を示している。

[0090] 図２７（ａ）では、図２８（ａ）に示すように下基板１００の上基板２００との対向面１０１に第１の凹部１０２と後に前記液晶４００が配置される電気素子形成部１０３を形成する。第１の凹部１０２は、下基板１００を樹脂成形する型に凸部を形成しておき、この凸部を転写することによって形成する。成型後に加工しても形成できる。おおよその寸法は幅０．５ｍｍ～２ｍｍ×長さ１０ｍｍ～２０ｍｍ程度であればよい。第１の凹部１０２の深さは数１０μｍ～数１００μｍ程度である。

[0091] 図２７（ｂ）では、図２８（ｂ）に示すように第１の凹部１０２に導電性インクでコーティングして第１の補助電極層１０４を形成する。第１の補助

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電極層１０４の膜厚は１μｍ以上あればよい。具体的には、第１の凹部１０２に導電性インクとしてのＩＴＯインクを充填する。コーティング方法は、インクジェット、ディスペンサーを用いれば良い。下基板１００の表面１０１に形成された第１の凹部１０２の表面をＩＴＯインクでコーティングして第１の補助電極層１０４としているので、濡れ性の高いＩＴＯインクを使用した場合であっても下基板１００の所定位置に第１の補助電極層１０４を正確にパターニングできる。

[0092] また、第１の凹部１０２以外をテープなどによりマスキングした状態にてスピンコートやディッピングすることにより第１補助電極層１０４を形成することもできる。

[0093] 図２７（ｃ）では、図２８（ｃ）に示すように電気素子形成部１０３と第１の補助電極層１０４ならびに、第１の補助電極層１０４の上を覆うように電気素子形成部１０３と第１の補助電極層１０４を接続する下部電極パターン１０５を形成する。具体的には、電気素子形成部１０３と第１の凹部１０２をつなぐマスクパターンを用いてＩＴＯスパッタリングを行う。下部電極パターン１０５の膜厚は１０ｎｍ～４０ｎｍ程度である。

[0094] 図２７（ｄ）では、図２８（ｄ）に示すように電気素子形成部１０３と下部電極パターン１０５の上に下部絶縁層パターン１０６を形成する。具体的には、図２７（ｃ）でのＩＴＯスパッタ後、チャンバから下基板１００を取り出すことなく（大気開放することなく）SiO_2を連続的にスパッタする。一つのチャンバ内に複数のターゲットがあるスパッタ装置であれば実施が可能で、特殊な装置ではない。

[0095] 図２７（ｅ）では、液晶３００を注入する部分に配向膜１０７を塗布し、ラビング処理を行う。

[0096] 図２９と図３０は上基板２００の加工の工程を示している。

[0097] 図２９（ａ）では、図３０（ａ）に示すように上基板２００の下基板１００との対向面２０１に第２の凹部２０２を形成する。第２の凹部２０２は、上基板２００を樹脂成形する型に凸部を形成しておき、この凸部を転写する

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ことによって形成する。成型後に加工しても形成できる。おおよその寸法は幅０．５ｍｍ～２ｍｍ×長さ１０ｍｍ～２０ｍｍ程度であればよい。第２の凹部２０２の深さは数１０μｍ～数１００μｍ程度である。

[0098] 図２９（ｂ）では、図３０（ｂ）に示すように第２の凹部２０２に導電性インクでコーティングして第２の補助電極層２０４を形成する。第２の補助電極層２０４の膜厚は１μｍ以上あればよい。具体的には、第２の凹部２０２に導電性インクとしてのＩＴＯインクを充填する。コーティング方法は、インクジェット、ディスペンサーを用いれば良い。上基板２００の表面２０１に形成された第２の凹部２０２の表面をＩＴＯインクでコーティングして第２の補助電極層２０４としているので、濡れ性の高いＩＴＯインクを使用した場合であっても上基板２００の所定位置に第２の補助電極層２０４を正確にパターニングできる。

[0099] また、第２の凹部２０２以外をテープなどによりマスキングした状態にてスピンコートやディッピングすることにより第２の補助電極層２０４を形成することによっても第２の補助電極層２０４を形成できる。

[0100] 図２９（ｃ）では、図３０（ｃ）に示すように下基板１００の側の電気素子形成部１０３に対応する部分２０３と第２の補助電極層２０４ならびに、第２の補助電極層２０４の上を覆うように前記部分２０３と第２の補助電極層２０４を接続する上部電極パターン２０５を形成する。具体的には、前記部分２０３と第２の凹部２０２をつなぐマスクパターンを用いてＩＴＯスパッタリングを行う。上部電極パターン２０５の膜厚は１０ｎｍ～４０ｎｍ程度である。

[0101] 図２９（ｄ）では、図３０（ｄ）に示すように上部電極パターン２０５の上に上部絶縁層パターン２０６を形成する。具体的には、図２９（ｃ）でのＩＴＯスパッタ後、チャンバ装置から上基板２００を取り出すことなく（大気開放することなく）SiO_2を連続的にスパッタする。一つのチャンバ内に複数のターゲットがあるスパッタ装置であれば実施が可能で、特殊な装置ではない。

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[0102] 図２９（ｅ）では、上部電極パターン２０５のうちの前記部分２０３の上の個所に配向膜２０７を塗布し、ラビング処理を行う。

[0103] このようにして作製した下基板１００の電気素子形成部１０３と前記上基板２００との間に前記電気素子としての液晶３００を挟んで下基板１００と上基板２００を接着層４００によって貼り合わせる。具体的には、ディスペンサーやインクジェットなどにより液晶３００を注入する。この液晶３００の注入後、外周部分に接着剤（封止剤）を充填し、下基板１００と上基板２００を接着層４００によって貼り合わせる。

[0104] 図３１は貼り合わせた下基板１００と上基板２００を、第１の凹部１０２を通る位置で切り欠いた拡大斜視図を示す。図３２は図３１の要部の拡大図である。図３３は貼り合わせた下基板１００と上基板２００を、第２の凹部２０２を通る位置で切り欠いた拡大斜視図を示す。図３４は図３３の要部の拡大図である。

[0105] このように張り合わせが完了した下基板１００と上基板２００を、前記メガネフレーム１１のリム８の形状に応じて図１５と同様に切断線３０１で下基板１００と上基板２００をカットする。このときには、第１，第２の凹部１０２，２０２に掛かる位置でカットして、レンズ端部３０２に図３５に示すように第１，第２の凹部１０２，２０２の切断面を露出させる。この露出した第１，第２の凹部１０２，２０２の切断面には、図３６に示すように、下基板１００の側では、第１の補助電極層１０４と下部電極パターン１０５の端面が露出している。上基板２００の側では、第２の補助電極層２０４と上部電極パターン２０５の端面が露出している。

[0106] この図３５のレンズを用いて、図１８と図１９に示すようにメガネフレーム１１にレンズ１をセットすることで、電子メガネを構成することが出来る。

[0107] このようにして、前記制御部５から液晶３００を駆動するに必要な電圧をレンズ１の下部電極パターン１０５と上部電極パターン２０５の間に印加することができる。

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[0108] また、第１，第２の凹部１０２，２０２に第１，第２の補助電極層１０４，２０４をコーティングしてから下部電極パターン１０５，上部電極パターン２０５を形成する工程を採用した場合には、下部電極パターン１０５，上部電極パターン２０５の上に、下部絶縁層パターン１０６，上部絶縁層パターン２０６を形成する工程を、前述のように、チャンバを大気開放して下基板１００，上基板２００を取り出すことなく連続的にスパッタして実施することができる。

[0109] 具体的には、第１，第２の凹部１０２，２０２に下部電極パターン１０５，上部電極パターン２０５を形成してから第１，第２の補助電極層１０４，２０４をコーティングする後付け処理工程を採用した場合には、第１，第２の凹部１０２，２０２に下部電極パターン１０５，上部電極パターン２０５をスパッタ形成して、スパッタ装置を大気開放して下基板１００、上基板２００を取り出しマスクパターンを変更してから下部絶縁層パターン１０６，上部絶縁層パターン２０６を形成する工法と、第１、第２の凹部１０２，２０２に下部電極パターン１０５上部電極パターン２０５をスパッタにより形成して、スパッタ装置を大気開放して下基板１００、上基板２００を取り出し第１の補助電極１０４、第２の補助電極２０４を形成した後に再びスパッタする工法がある。しかしながらいずれの工法においてもスパッタ装置の真空引きを二度行うことになって加工プロセスが複雑になる。

[0110] これに対してこの実施の形態の第１，第２の補助電極層１０４，２０４を先付け処理では、下基板１００への下部電極パターン１０５の形成と下部絶縁層パターン１０６の形成をスパッタ装置を大気開放することなく実施でき、上基板２００への上部電極パターン２０５の形成と上部絶縁層パターン２０６の形成をスパッタ装置を大気開放することなく実施できため、加工プロセスの簡略化が可能である。

[0111] さらに、図２０と図２１に示した場合と同様に、導電ペーストとしての銀ペースト３０３ａ，３０３ｂを第１の補助電極層１０４と第２の補助電極層２０４の上に付着させると、接触面積が増えるので、さらに良い点について

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は、先の各実施の形態と同じである。

[0112] （実施の形態６）

実施の形態４では下基板１００の平滑な表面に第１の補助電極層１０４を形成し、上基板２００の平滑な表面に第２の補助電極層２０４を形成したが、この実施の形態６では、濡れ性の高いＩＴＯインクを使用した場合であっても正確に所定位置に第１，第２の補助電極層１０４，２０４をパターニングできるよう、図３７に示すように下基板１００の表面１０１に第１の凹部１０２を形成し、上基板２００の表面２０１に第２の凹部２０２を形成している。

[0113] 図３７～図４０は本発明の実施の形態６を示す。

[0114] 実施の形態５では、第１の凹部１０２に第１の補助電極層１０４をコーティングしてから下部電極パターン１０５を形成し、また、第２の凹部２０２に第２の補助電極層２０４をコーティングしてから上部電極パターン２０５を形成したが、この実施の形態６では、第１，第２の補助電極層１０４，２０４を後付けする点だけが異なっている。その他は実施の形態５と同じである。

[0115] 図３７は製造工程がわかりやすくするために、完成したレンズ１を分解して図示したイメージ図である。

[0116] 図３８（ａ）では、下基板１００の電気素子形成部１０３から第１の凹部１０２に掛けて下部電極パターン１０５を形成する。

[0117] 図３８（ｂ）では、第１の凹部１０２をコーティングしている下部電極パターン１０５の上にだけ導電性インクでコーティングして第１の補助電極層１０４を形成し、さらに第１の補助電極層１０４の上と下部電極パターン１０５と電気素子形成部１０３とを覆うように下部絶縁層パターン１０６を形成する。下部絶縁層パターン１０６の上には電気素子形成部１０３の位置に対応して図３７に示すように配向膜１０７を形成する。

[0118] この場合の上基板２００も図３８（ａ）（ｂ）と同様に形成する。つまり図３７に示すように、下基板１００の側の電気素子形成部１０３に対応する

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部分と第２の凹部２０２ならびにこの両者をつなぐ部分に上部電極パターン２０５を形成し、その後に、第２の凹部２０２をコーティングしている上部電極パターン２０５の上にだけ導電性インクでコーティングして第２の補助電極層２０４を形成し、さらに第２の補助電極層２０４の上と上部電極パターン２０５とを覆うように上部絶縁層パターン２０６を形成する。さらに、配向膜２０７を形成する。

[0119] そして、第１の凹部１０２に下部電極パターン１０５に第１の補助電極層１０４を後付けした下基板１００と、第２の凹部２０２に上部電極パターン２０５に第２の補助電極層２０４を後付けした上基板２００との間に、液晶３００を挟んで接着層４００によって図３８（ｃ）のように貼り合わせる。図３９は貼り合わせた下基板１００と上基板２００を、第１の凹部１０２を通る位置で切り欠いた拡大斜視図を示す。図４０は貼り合わせた下基板１００と上基板２００を、第２の凹部２０２を通る位置で切り欠いた拡大断面図を示す。

[0120] このように第１，第２の凹部１０２，２０２に第１，第２の補助電極層１０４，２０４を後付けした場合であっても、図３５と同じように前記切断線３０１でカットすることによって、実施の形態５と同様にレンズ１のレンズ端部３０２に、下基板１００の側では、第１の補助電極層１０４と下部電極パターン１０５の端面が露出し、上基板２００の側では、第２の補助電極層２０４と上部電極パターン２０５の端面が露出する。その他は実施の形態５と同じである。

[0121] この実施の形態６の場合には、第１の凹部１０２に設けた下部電極パターン１０５の窪みに第１の補助電極層１０４を形成し、第２の凹部２０２に設けた上部電極パターン２０５の窪みに第２の補助電極層２０４を形成しているので、濡れ性の高いＩＴＯインクを使用した場合であっても下基板１００と上基板２００の所定位置に第１，第２の補助電極層１０４，２０４を正確にパターニングできる。

[0122] また、下部絶縁パターン１０６と上部絶縁パターン２０６は全面に形成す

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れば良いため、マスクを用いずにスパッタにより絶縁層を形成できる。

[0123] （実施の形態７）

実施の形態４では下基板１００に第１の補助電極層１０４を形成してから下部絶縁層パターン１０６を形成し、上基板２００に第２の補助電極層２０４を形成してから上部絶縁層パターン２０６を形成したが、下部絶縁層パターン１０６には孔１０６ｂ（図４１を参照）を形成し、上部絶縁層パターン２０６には孔２０６ｂ（図４１を参照）を形成するとともに、第１の補助電極層１０４よりも下部絶縁層パターン１０６を先に形成し、第２の補助電極層２０４よりも上部絶縁層パターン２０６を先に形成する点だけが異なっている。

[0124] この実施の形態７では、下部電極パターン１０５の上に形成された下部絶縁層パターン１０６の孔１０６ｂに導電性インクを入れて下部電極パターン１０５の一部をコーティングするので、濡れ性の高いＩＴＯインクを使用した場合であっても正確に所定位置に第１の補助電極層１０４をパターニングできる。同様に、上部電極パターン２０５の上に形成された上部絶縁層パターン２０６の孔２０６ｂに導電性インクを入れて上部電極パターン２０５の一部をコーティングするので、濡れ性の高いＩＴＯインクを使用した場合であっても正確に所定位置に第２の補助電極層２０４をパターニングできる。その他は実施の形態４と同じである。

[0125] （実施の形態８）

実施の形態６では下基板１００に第１の補助電極層１０４を形成してから下部絶縁層パターン１０６を形成し、上基板２００に第２の補助電極層２０４を形成してから上部絶縁層パターン２０６を形成したが、下部絶縁層パターン１０６には孔１０６ｂ（図４２を参照）を形成し、上部絶縁層パターン２０６には孔２０６ｂ（図４２を参照）を形成するとともに、第１の補助電極層１０４よりも下部絶縁層パターン１０６を先に形成し、第２の補助電極層２０４よりも上部絶縁層パターン２０６を先に形成する点だけが異なっている。

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[0126] この実施の形態８では、下部電極パターン１０５の上に形成された下部絶縁層パターン１０６の孔１０６ｂに導電性インクを入れて下部電極パターン１０５の一部をコーティングするので、濡れ性の高いＩＴＯインクを使用した場合であっても正確に所定位置に第１の補助電極層１０４をパターニングできる。同様に、上部電極パターン２０５の上に形成された上部絶縁層パターン２０６の孔２０６ｂに導電性インクを入れて上部電極パターン２０５の一部をコーティングするので、濡れ性の高いＩＴＯインクを使用した場合であっても正確に所定位置に第２の補助電極層２０４をパターニングできる。その他は実施の形態６と同じである。

[0127] 上記の実施の形態５，実施の形態６，実施の形態８では、第１，第２の凹部１０２，２０２を設けたため、濡れ性の高いインクを所定位置にパターニングすることができ、上下基板の貼り合わせ面へ導電性インクとしてのＩＴＯインクがはみ出さないようにできる。

[0128] さらに、実施の形態３，実施の形態４，実施の形態７のように第１，第２の凹部１０２，２０２を設けずに下基板１００，上基板２００の面に直接にパターニングを行った場合には、導電性インクとしてのＩＴＯインクの膜厚のために上下基板の貼り合わせにおいてギャップが発生しレンズ１の歪みを発生させてしまうが、実施の形態５，実施の形態６，実施の形態８ではより歪み少ない良好なレンズ１を作製できる。

[0129] 実施の形態５，実施の形態６，実施の形態８において、第１，第２の凹部１０２，２０２の断面形状が平面により構成される場合は、面と面の交わる直線部にインクが溜まりやすく、平面部分よりインク膜厚が厚い部分が形成されてしまう。このような液の溜まり易い部分においては、乾燥状態の相違からか導電性インクとしてのＩＴＯインク膜の表面に割れ（クラック）が発生しやすく、ＩＴＯインクにより形成される透明導電膜の抵抗値を増加させる要因となる。この問題を解決するために、実施の形態５，実施の形態６，実施の形態８の第１，第２の凹部１０２，２０２の断面形状を曲面に形成している。第１，第２の凹部１０２，２０２の断面形状を曲面に形成せずに面

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と面の接合で形成する場合には、面と面の交わる部分にはＲ加工を行うことによって、ほぼ同様の効果を期待できる。

[0130] 上記の実施の形態３～実施の形態８では、透明の第１，第２の補助電極層１０４，２０４を導電性インクとしてのＩＴＯインクのコーティングによって形成し、透明の下部電極パターン１０５と上部電極パターン２０５をスパッタリングで形成したが、下部電極パターン１０５と上部電極パターン２０５の形成方法は、スパッタリング以外の蒸着方法であっても同様に実施できる。スパッタリング以外の蒸着方法としては、抵抗加熱蒸着，電子ビーム蒸着，分子線エピタキシー法（Molecular Beam Epitaxy），イオンメッキ（ion plating），イオンビームデポジションなどのＰＶＤ（Physical Vapor Deposition）や、熱ＣＶＤ（thermal Chemical Vapor Deposition），プラズマＣＶＤ（plasma-enhanced chemical vapor deposition），光ＣＶＤ，エピタキシャルＣＶＤ，アトミックレイヤーＣＶＤなどのＣＶＤを挙げることができる。

[0131] また、透明な第１，第２の補助電極層１０４，２０４、下部電極パターン１０５，上部電極パターン２０５の材料として、ＩＴＯ（酸化インジウムスズ）の場合を例に挙げて説明したが、チタンを主成分としてインジウムを含まないニオブ添加二酸化チタン（$Ti_{1-x}Nb_xO_2$：ＴＮＯ）、ＺｎＯなどをＩＴＯ代替透明電極材料として使用することもできる。

[0132] 上記の実施の形態３～実施の形態８では、下部絶縁層パターン１０６と上部絶縁層パターン２０６が設けられていたが、接着層４００の単独によって下部電極パターン１０５と上部電極パターン２０５との電気絶縁を維持することができる場合には、下部絶縁層パターン１０６と上部絶縁層パターン２０６の少なくとも一方を省くことができる。

産業上の利用可能性

[0133] 本発明にかかる電子メガネは、電気回路の接続を確実に行い、その信頼性を向上するものであり、液晶素子、エレクトロクロミック素子などの電気素子が用いられるメガネ、サングラスなどに有用である。

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請求の範囲

[1] 下基板と上基板の間に電気素子を内蔵したレンズを作製するに際し、

下基板の作製は、

下基板の前記上基板との対向面にレンズ部電極パッド用の第１の凹部を形成し、

前記第１の凹部に導電性インクでコーティングして透明の第１の補助電極層を形成し、

前記下基板の電気素子形成部と前記第１の補助電極層ならびに電気素子形成部と前記第１の補助電極層を接続する透明の下部電極パターンを蒸着法にて形成し、

上基板の作製は、

上基板の前記下基板との対向面にレンズ部電極パッド用の第２の凹部を形成し、

前記第２の凹部に導電性インクでコーティングして透明の第２の補助電極層を形成し、

前記上基板の前記電気素子形成部に対応する部分と前記第２の補助電極層ならびに前記電気素子形成部に対応する部分と前記第２の補助電極層を接続する透明の上部電極パターンを蒸着法にて形成し、

前記下基板の電気素子形成部と前記上基板との間に電気素子を挟んで前記下基板と前記上基板を貼り合わせる

電子メガネ用レンズの製造方法。

[2] 下基板と上基板の間に電気素子を内蔵したレンズを作製するに際し、

下基板の作製は、

下基板の前記上基板との対向面にレンズ部電極パッド用の第１の凹部を形成し、

前記下基板の電気素子形成部と前記第１の凹部ならびに電気素子形成部と前記第１の凹部を接続する下部電極パターンを形成し、

前記第１の凹部の前記下部電極パターンの上を導電性インクでコーティン

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グして透明の第１の補助電極層を形成し、

上基板の作製は、

前記上基板の前記電気素子形成部に対応する部分とレンズ部電極パッド用の第２の凹部ならびに前記電気素子形成部に対応する部分と前記第２の凹部を接続する透明の上部電極パターンを蒸着法にて形成し、

前記第２の凹部の前記上部電極パターンの上を導電性インクでコーティングして透明の第２の補助電極層を形成し、

前記下基板の電気素子形成部と前記上基板との間に電気素子を挟んで前記下基板と前記上基板を貼り合わせる

電子メガネ用レンズの製造方法。

[3] 前記下基板と前記上基板を貼り合わせた後に、前記第１，第２の凹部に掛かる位置でカットして、レンズ端部に前記第１，第２の凹部の切断面を露出させる

請求項１または請求項２記載の電子メガネ用レンズの製造方法。

[4] 前記下基板と前記上基板を貼り合わせた後に、前記第１，第２の凹部に掛かる位置でカットして、レンズ端部に前記第１，第２の凹部の切断面を露出させ、

露出した前記第１，第２の凹部にそれぞれ導電性ペーストを形成して、第１の補助電極層と下部電極パターンの引き出し電極としてのレンズ部電極パッド，第２の補助電極層と上部電極パターンの引き出し電極としてのレンズ部電極パッドを形成する

請求項１または請求項２記載の電子メガネ用レンズの製造方法。

[5] ２枚の基板の間に電気素子を内蔵したレンズであって、

前記電気素子に電圧を印加する電極の一端のレンズ部電極パッドがレンズ端部において露出し、かつ前記レンズ部電極パッドが、前記２枚の基板のうちの一方の基板の他方の基板との貼り合わせ面に形成された凹部の内部に、導電性インクで形成した補助電極層と蒸着法で形成した下部電極パターンとの積層によって形成された電極が形成されている

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電子メガネ用レンズ。

[6] 前記凹部の前記レンズ端部において露出した形状が、曲面に形成されている

請求項５記載の電子メガネ用レンズ。

[7] 下基板と上基板の間に電気素子を内蔵したレンズを作製するに際し、

下基板の作製は、

下基板の前記上基板との対向面に導電性インクでコーティングしてレンズ部電極パッド用の透明の第１の補助電極層を形成し、

前記下基板の電気素子形成部と前記第１の補助電極層ならびに電気素子形成部と前記第１の補助電極層を接続する透明の下部電極パターンを蒸着法にて形成し、

上基板の作製は、

上基板の前記下基板との対向面に導電性インクでコーティングして前記レンズ部電極パッド用の透明の第２の補助電極層を形成し、

前記上基板の前記電気素子形成部に対応する部分と前記第２の補助電極層ならびに前記電気素子形成部に対応する部分と前記第２の補助電極層を接続する透明の上部電極パターンを蒸着法にて形成し、

前記下基板の電気素子形成部と前記上基板との間に電気素子を挟んで前記下基板と前記上基板を貼り合わせる

電子メガネ用レンズの製造方法。

[8] 下基板と上基板の間に電気素子を内蔵したレンズを作製するに際し、

下基板の作製は、

前記下基板の電気素子形成部に信号を印加する透明の下部電極パターンを蒸着法にて形成し、

前記下部電極パターンの端部の上を導電性インクでコーティングして透明の第１の補助電極層を形成し、

上基板の作製は、

前記上基板の前記電気素子形成部に対応する部分に信号を印加する透明の

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上部電極パターンを蒸着法にて形成し、

前記上部電極パターンの端部の上を導電性インクでコーティングして透明の第２の補助電極層を形成し、

前記下基板の電気素子形成部と前記上基板との間に電気素子を挟んで前記下基板と前記上基板を貼り合わせる

電子メガネ用レンズの製造方法。

[9] 前記下基板と前記上基板を貼り合わせた後に、前記第１の補助電極層と前記下部電極パターンとの積層部分、前記第２の補助電極層と前記上部電極パターンとの積層部分に掛かる位置でカットして切断面を露出させる

請求項７または請求項８記載の電子メガネ用レンズの製造方法。

[10] 前記下基板と前記上基板を貼り合わせた後に、前記第１の補助電極層と前記下部電極パターンとの積層部分、前記第２の補助電極層と前記上部電極パターンとの積層部分に掛かる位置でカットして切断面を露出させ、

露出した前記前記第１の補助電極層と前記下部電極パターンとの積層部分、前記第２の補助電極層と前記上部電極パターンとの積層部分にそれぞれ導電性ペーストを形成して、前記第１の補助電極層と前記下部電極パターンの引き出し電極としてのレンズ部電極パッド，前記第２の補助電極層と前記上部電極パターンの引き出し電極としてのレンズ部電極パッドを形成する

請求項７または請求項８記載の電子メガネ用レンズの製造方法。

[11] ２枚の基板の間に電気素子を内蔵したレンズであって、

前記電気素子に電圧を印加する電極の一端がレンズ端部において露出し、かつ前記電極の一端が導電性インクで形成した補助電極層と蒸着法で形成した下部電極パターンとの積層によって形成されている

電子メガネ用レンズ。

[12] 下基板と上基板の間に電気素子を内蔵したレンズを作製するに際し、

下基板の作製は、

前記下基板の電気素子形成部に信号を印加する透明の下部電極パターンを蒸着法にて形成し、

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前記下基板の電気素子形成部と下部電極パターンの上で後に第１の補助電極層が形成される部分を除いて下部絶縁層パターンを形成し、

前記下部絶縁層パターンの孔に導電性インクを入れてコーティングして透明の第１の補助電極層を形成し、

上基板の作製は、

前記上基板の前記電気素子形成部に対応する部分に信号を印加する透明の上部電極パターンを蒸着法にて形成し、

前記上基板の前記電気素子形成部に対応する部分と上部電極パターンで後に第２の補助電極層が形成される部分を除いて上部絶縁層パターンを形成し、

前記上部絶縁層パターンの孔に導電性インクを入れてコーティングして透明の第２の補助電極層を形成し、

前記下基板の電気素子形成部と前記上基板との間に電気素子を挟んで前記下基板と前記上基板を貼り合わせる

電子メガネ用レンズの製造方法。

[13] 下基板と上基板の間に電気素子を内蔵したレンズを作製するに際し、

下基板の作製は、

下基板の前記上基板との対向面にレンズ部電極パッド用の第１の凹部を形成し、

前記下基板の電気素子形成部と前記第１の凹部ならびに電気素子形成部と前記第１の凹部を接続する下部電極パターンを形成し、

前記下基板の電気素子形成部と下部電極パターンの上で後に第１の補助電極層が形成される部分を除いて下部絶縁層パターンを形成し、

前記下部絶縁層パターンの孔に導電性インクを入れてコーティングして透明の第１の補助電極層を形成し、

上基板の作製は、

前記上基板の前記電気素子形成部に対応する部分とレンズ部電極パッド用の第２の凹部ならびに前記電気素子形成部に対応する部分と前記第２の凹部

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を接続する透明の上部電極パターンを蒸着法にて形成し、

前記上基板の前記電気素子形成部に対応する部分と上部電極パターンの上で後に第２の補助電極層が形成される部分を除いて上部絶縁層パターンを形成し、

前記上部絶縁層パターンの孔に導電性インクを入れてコーティングして透明の第２の補助電極層を形成し、

前記下基板の電気素子形成部と前記上基板との間に電気素子を挟んで前記下基板と前記上基板を貼り合わせる

電子メガネ用レンズの製造方法。

[14] 電気素子を内蔵したレンズをメガネフレームにセットした電子メガネであって、

前記レンズは、レンズ端部に前記電気素子に電圧を印加する電極の一端のレンズ部電極パッドが露出しており、

前記メガネフレームは、前記電気素子を制御する制御部に一端が接続され、他端の配線部電極パッドが前記レンズの前記レンズ部電極パッドに対応した位置に配置された電気接続手段を有しており、

前記電気接続手段の前記配線部電極パッドと前記レンズの前記レンズ部電極パッドとの間に異方導電性ゴムが介在している

電子メガネ。

[15] 前記メガネフレームのリムの内側に前記電気接続手段が位置するリム側ザグリを設け、

前記レンズのレンズ端部に前記異方導電性ゴムが位置するレンズ側ザグリを設けた

請求項１４記載の電子メガネ。

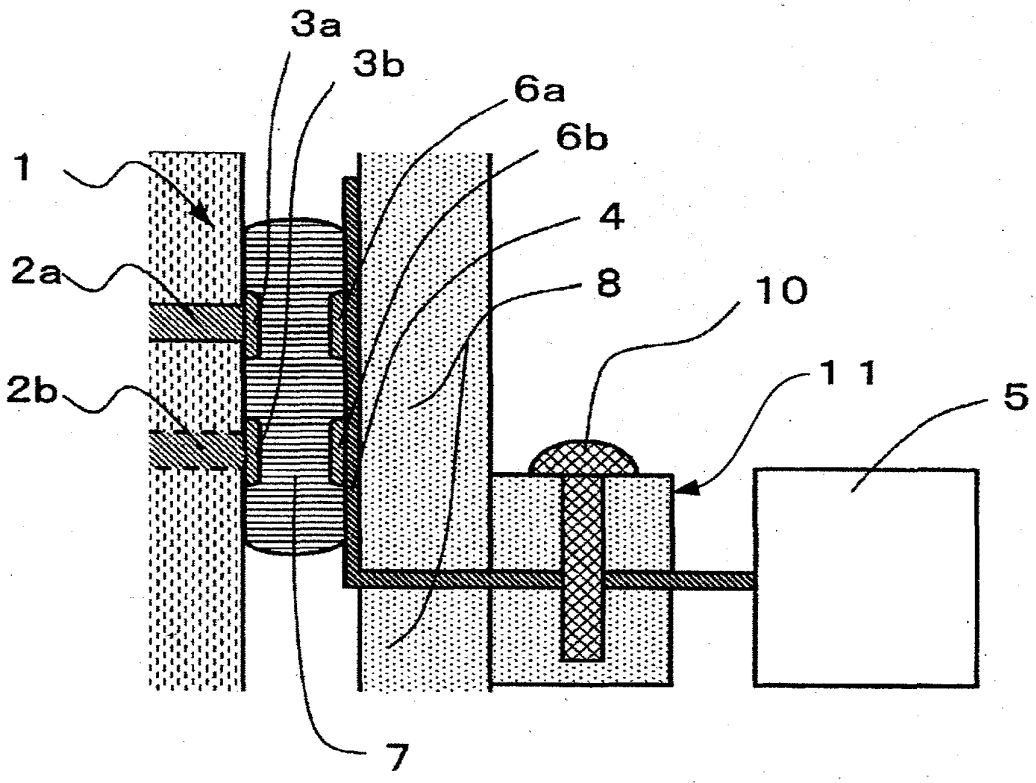
[16] 前記電気接続手段を、前記メガネフレームのリムロックの間を通りリムの内側に敷設し、

前記メガネフレームの前記リムの内側に配線部電極パッドを設置した

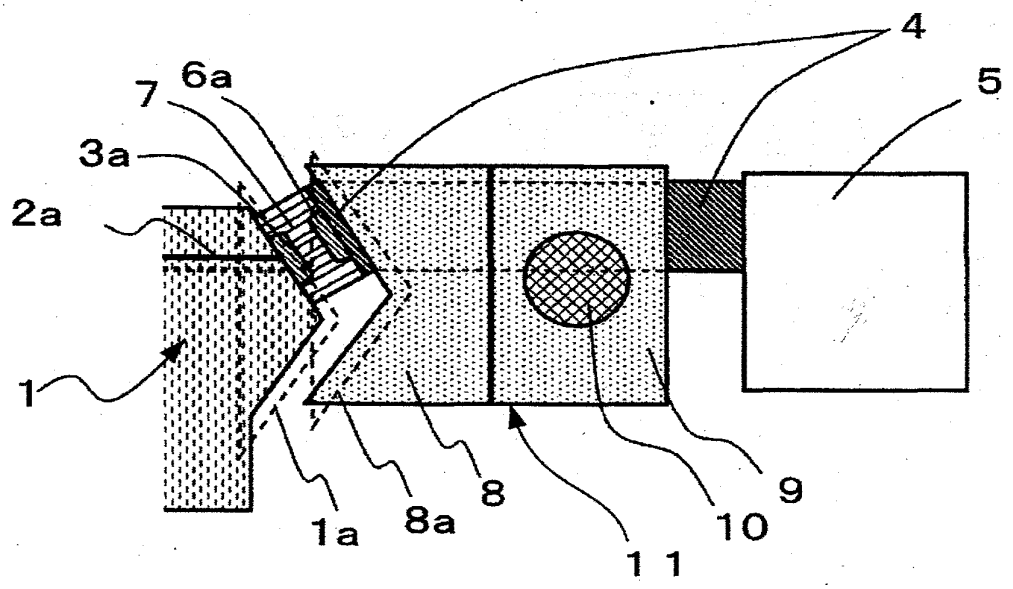
請求項１４または請求項１５記載の電子メガネ。

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[図1]

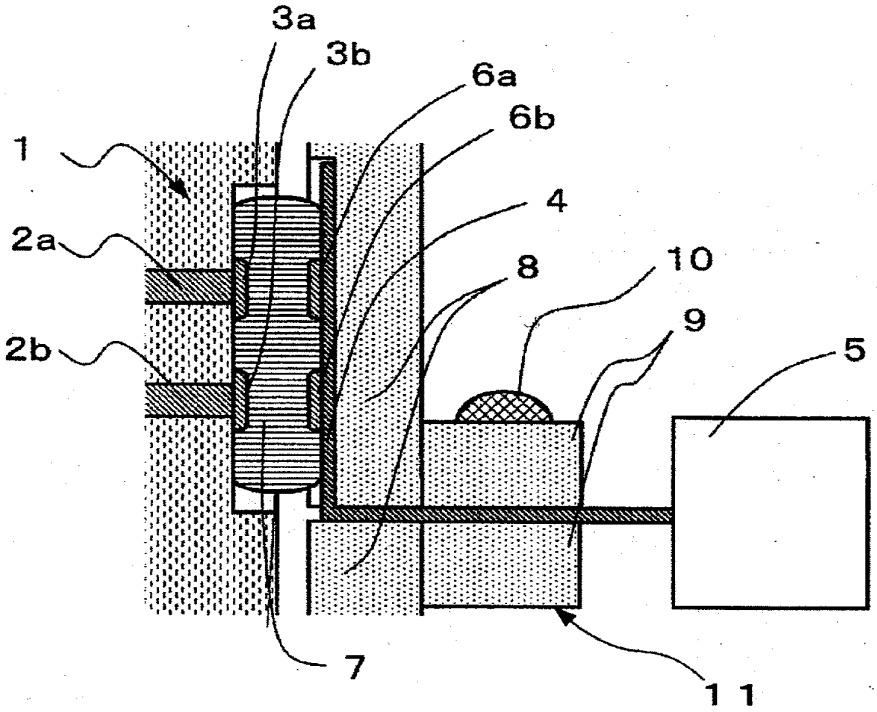


[図2]

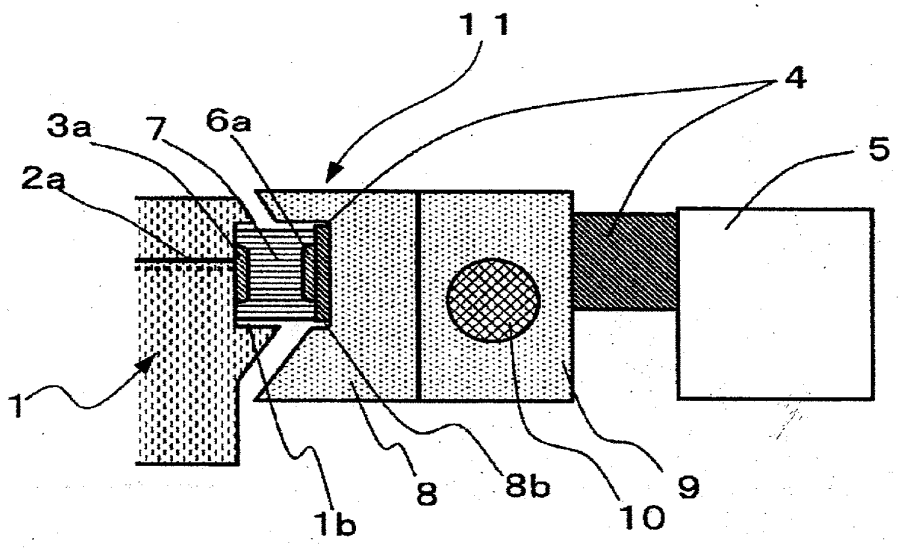


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[図3]

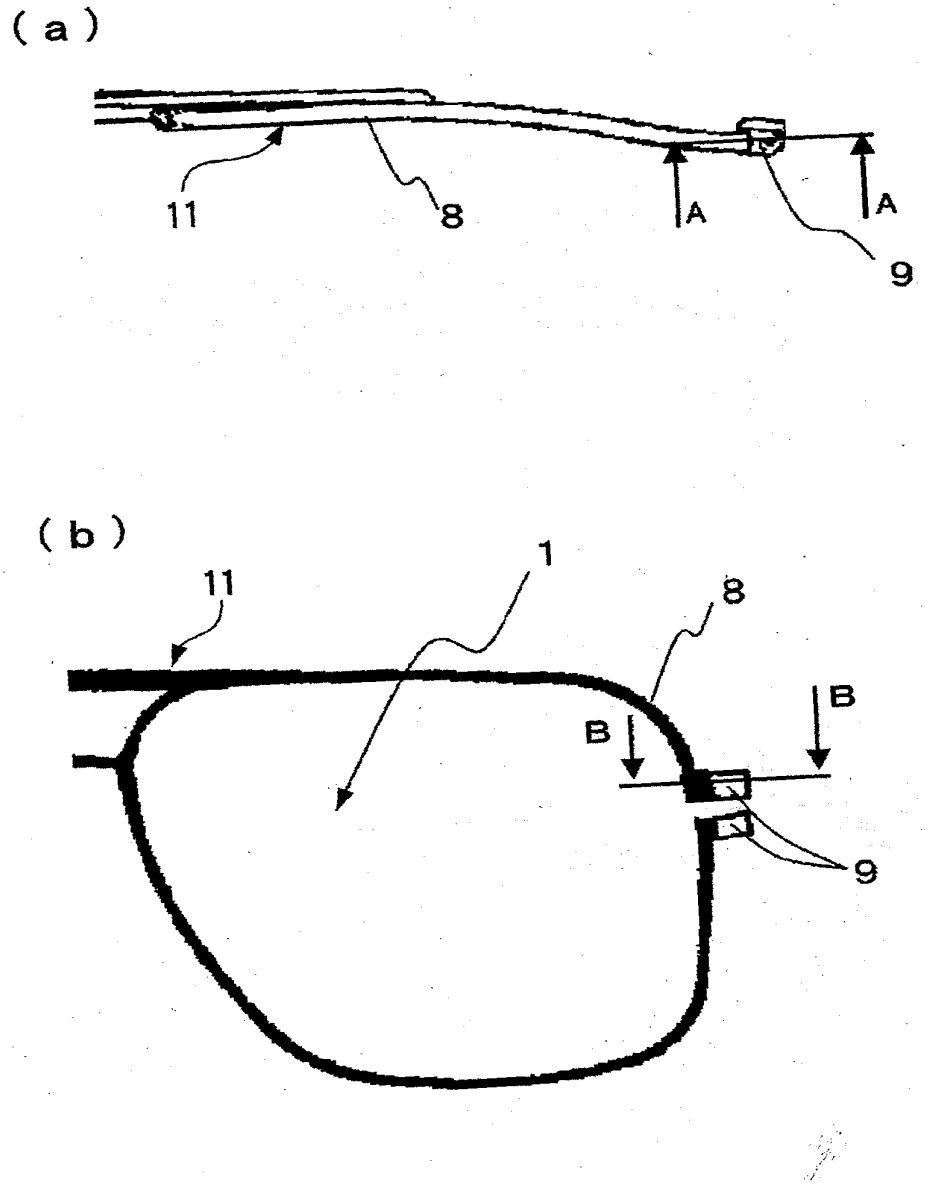


[図4]



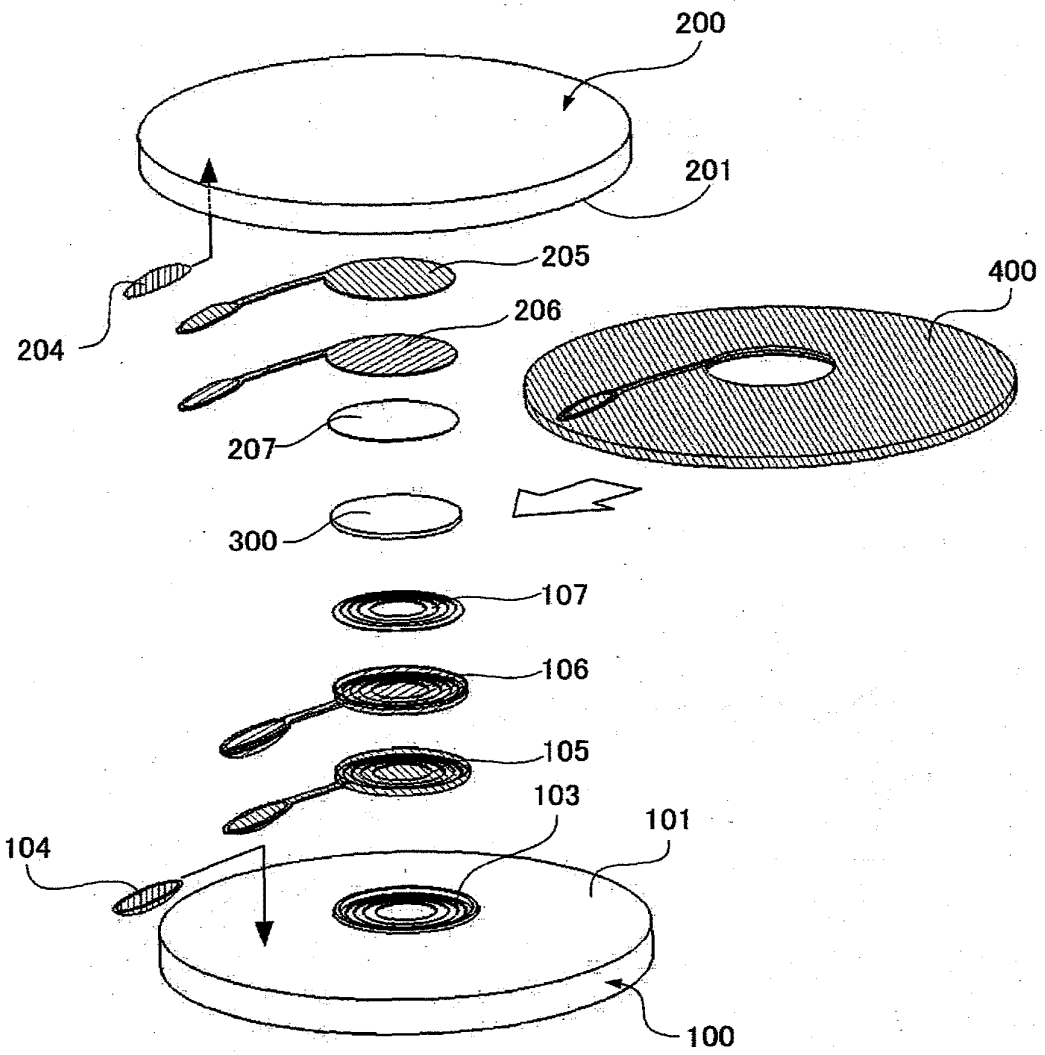
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[図5]



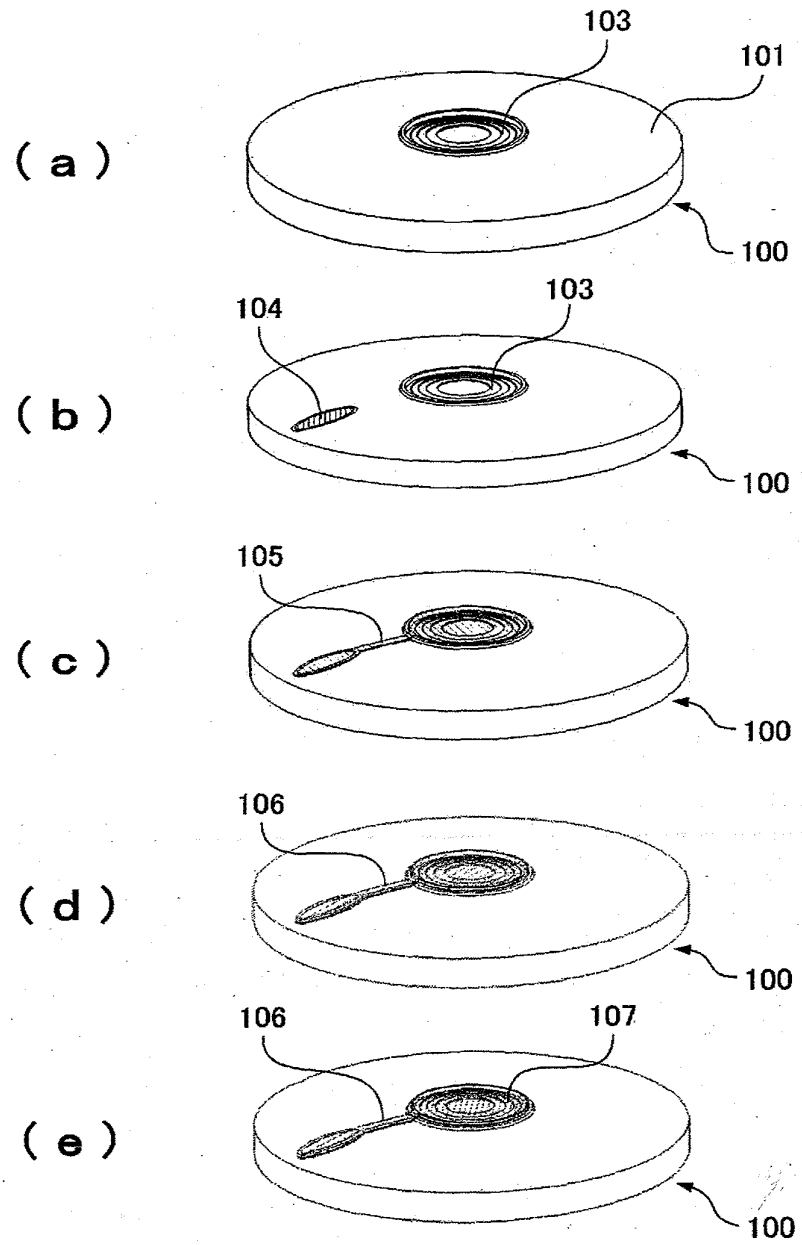
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[図6]



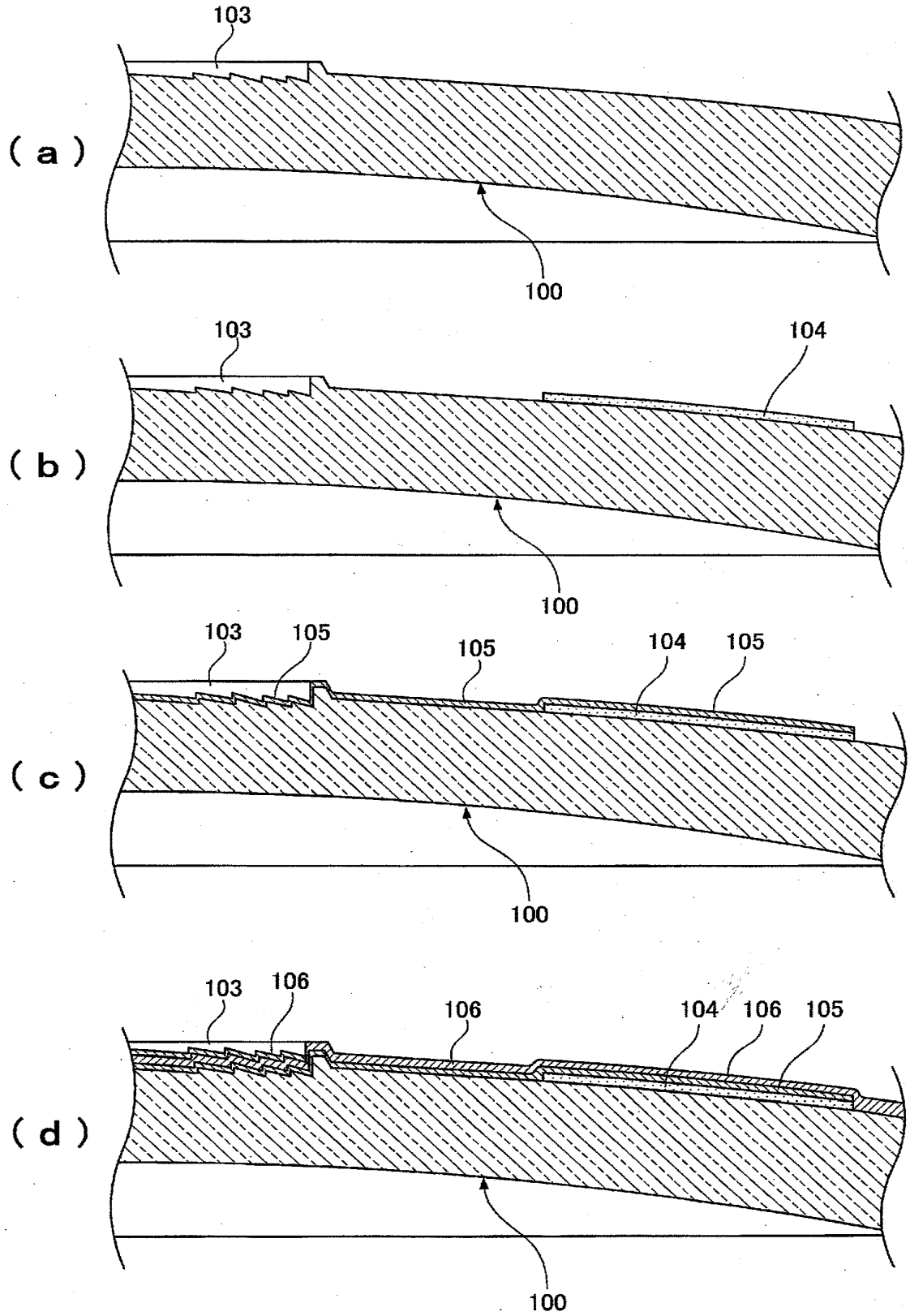
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[図7]



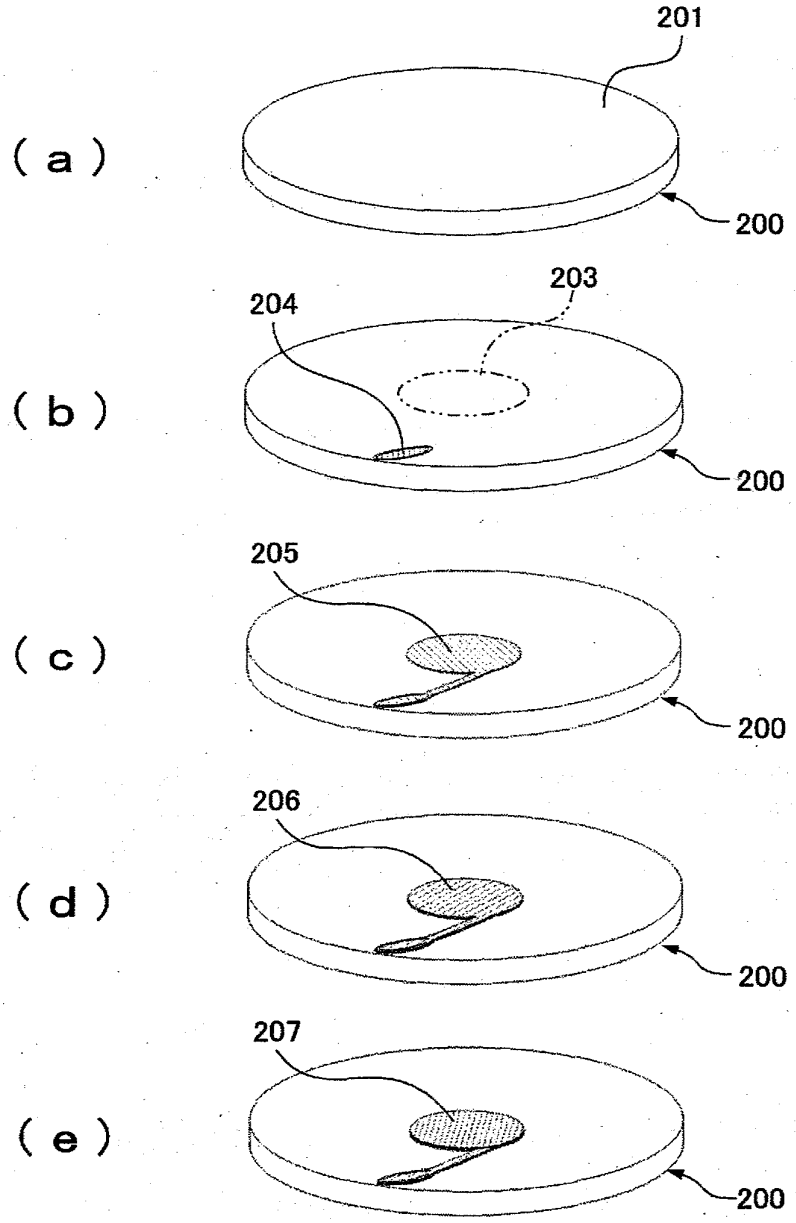
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[図8]



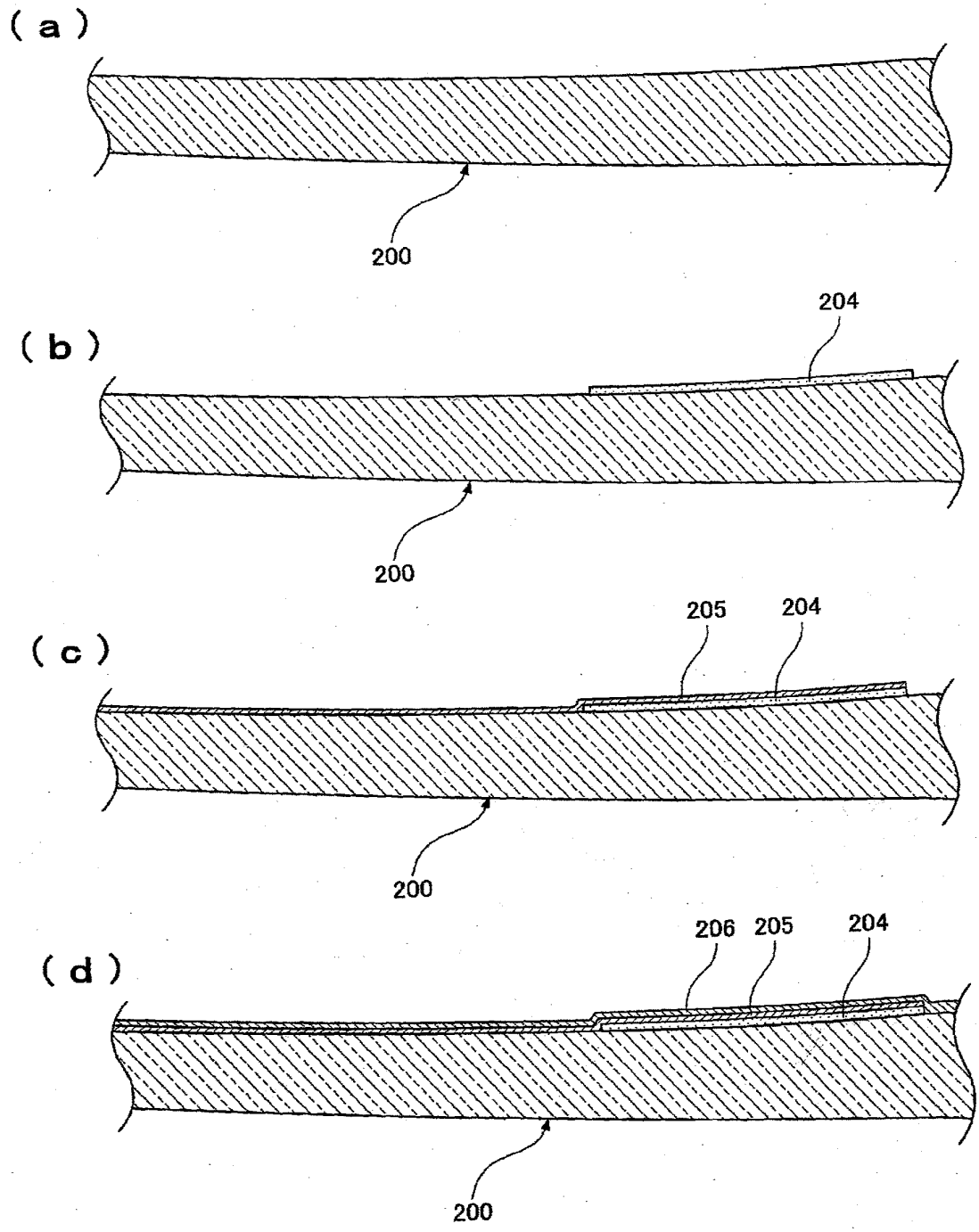
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[図9]



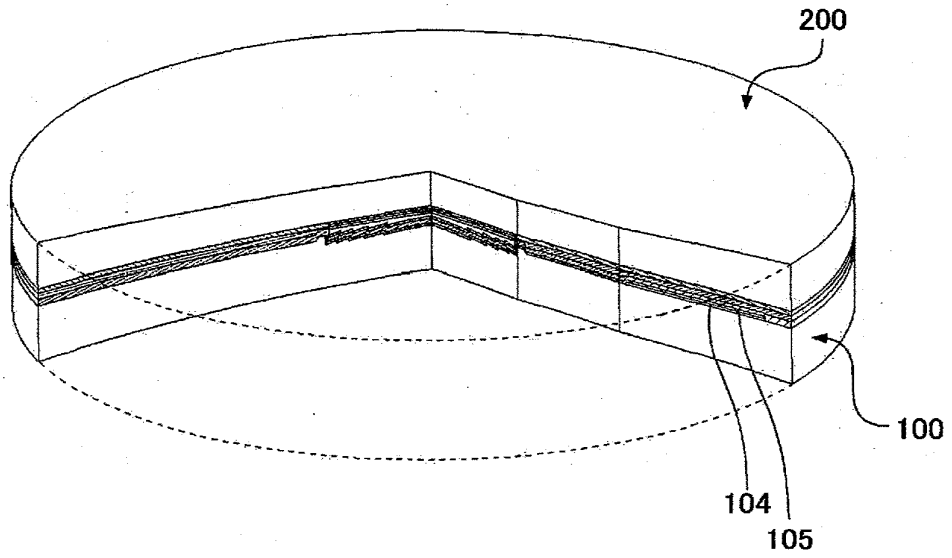
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[図10]

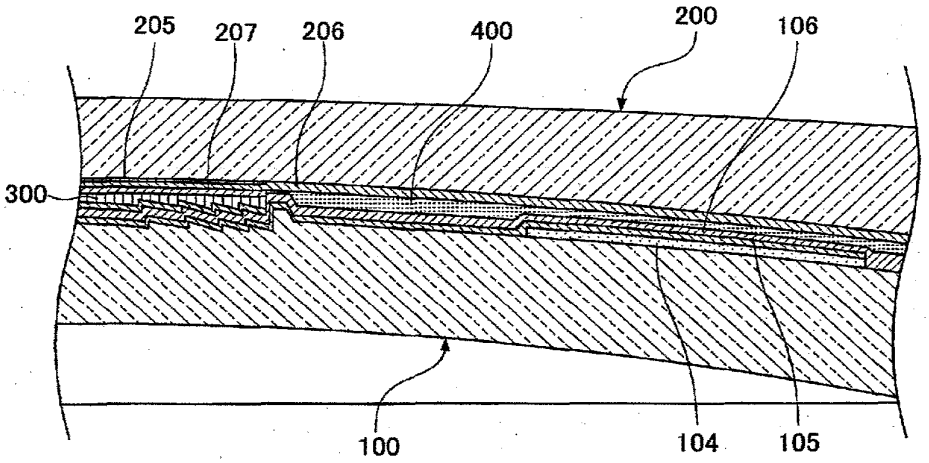


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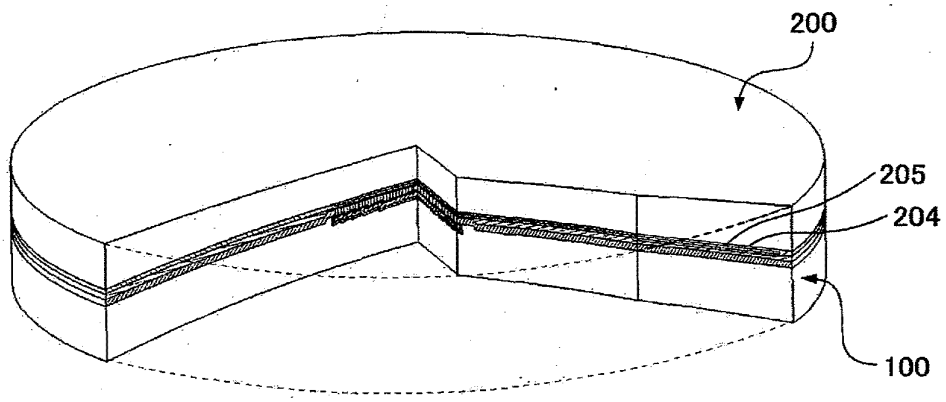
[図11]



[図12]

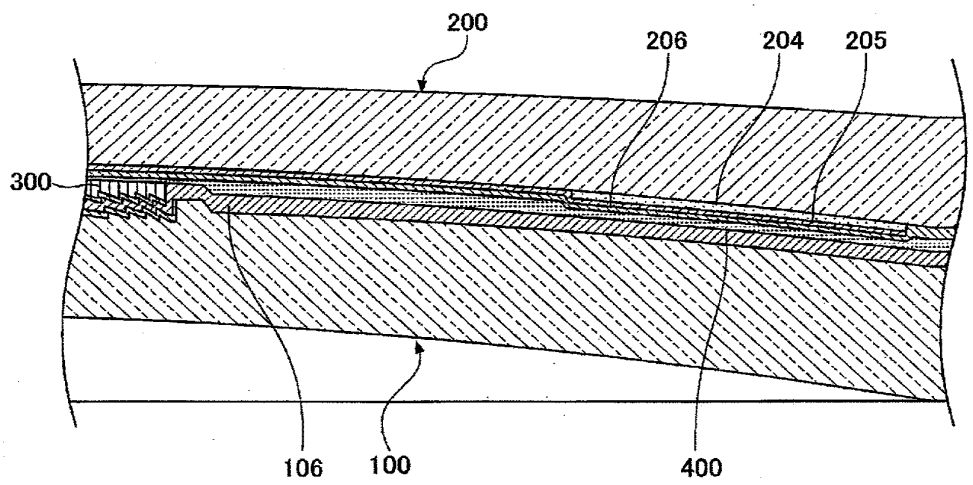


[図13]

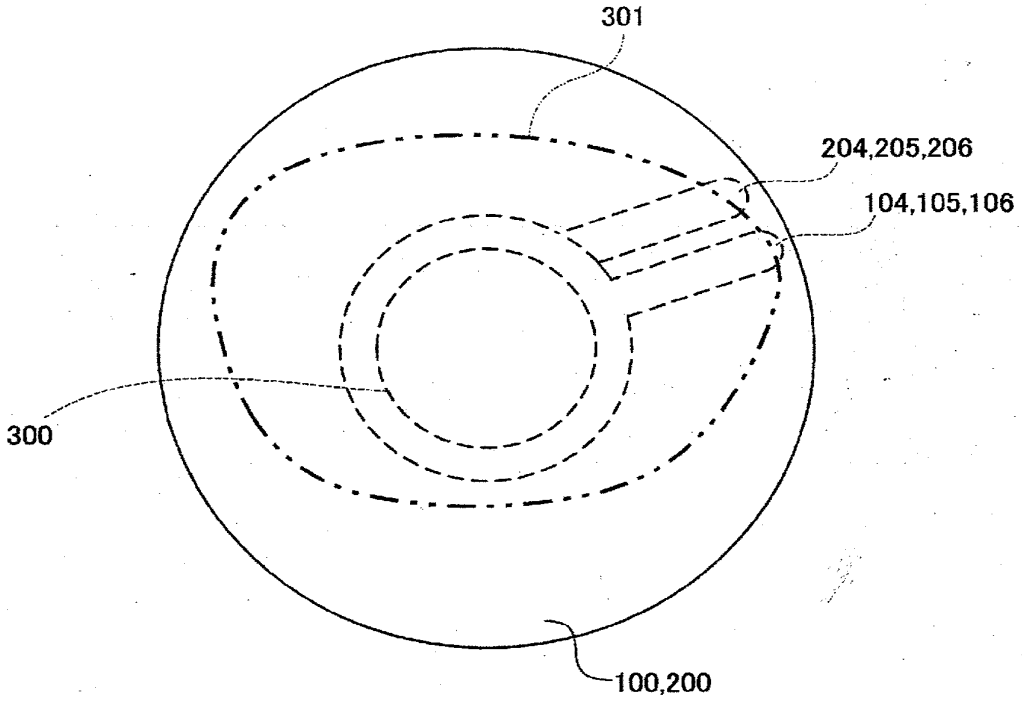


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[図14]

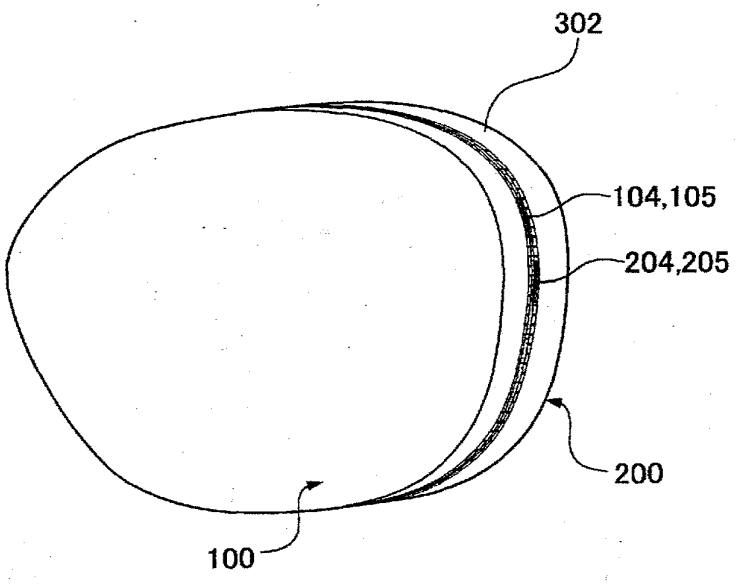


[図15]

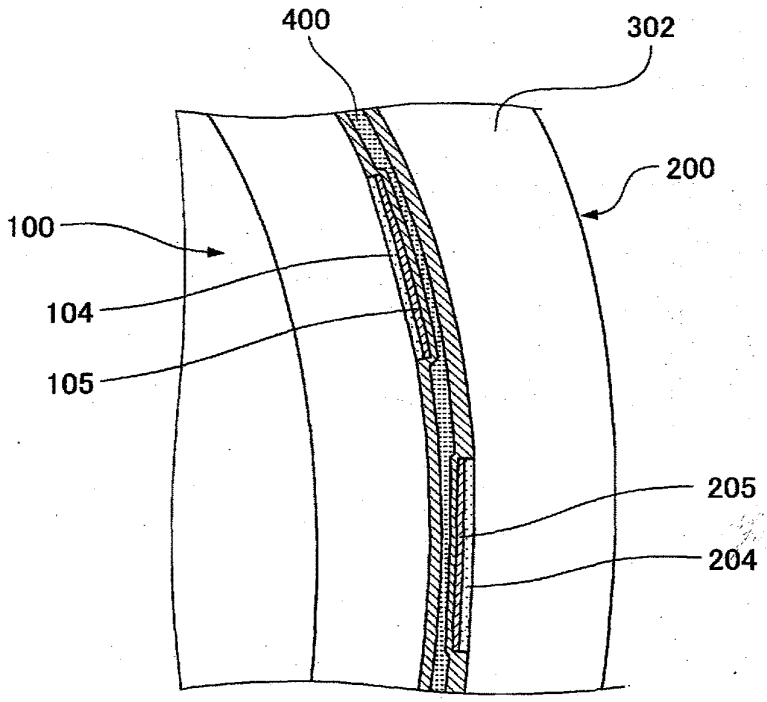


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[図16]

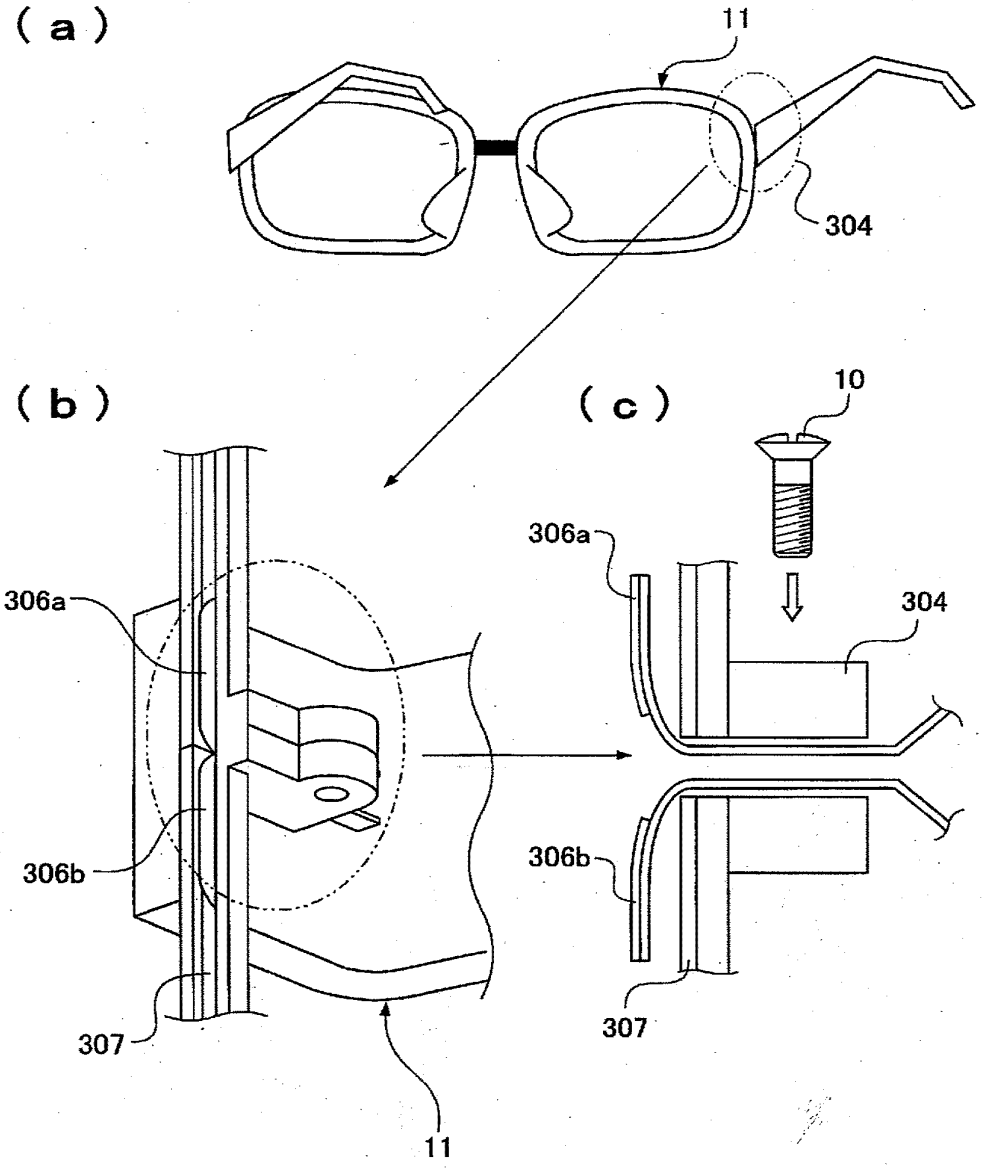


[図17]



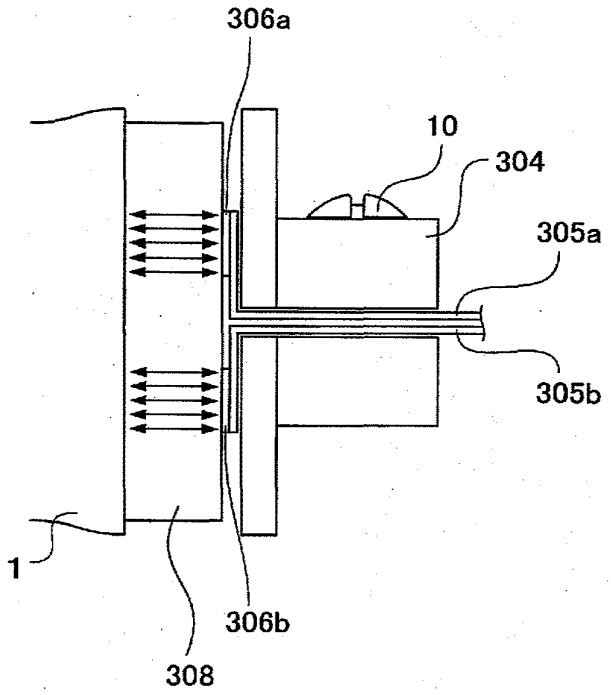
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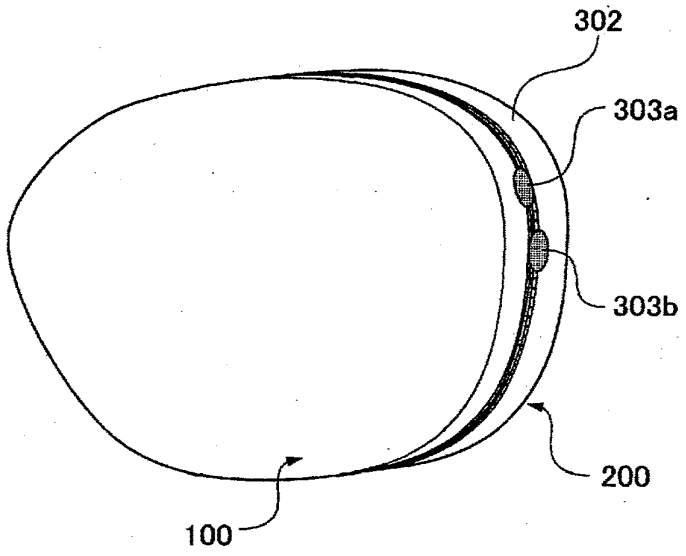


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[図19]

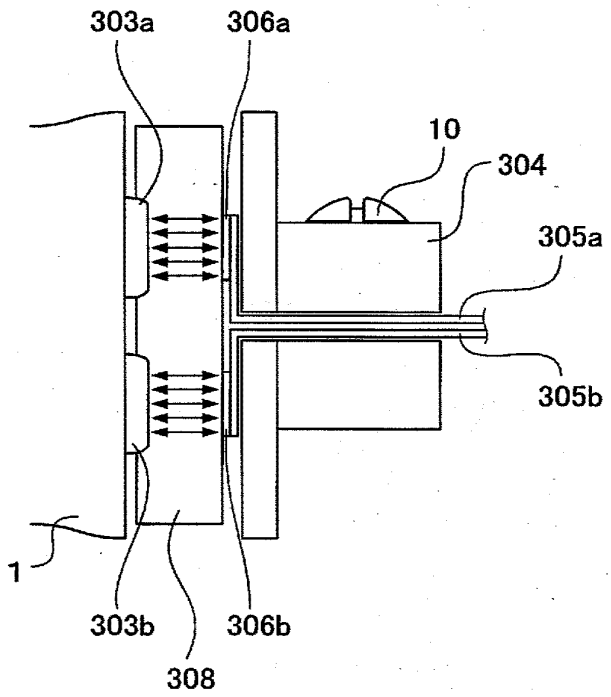


[図20]



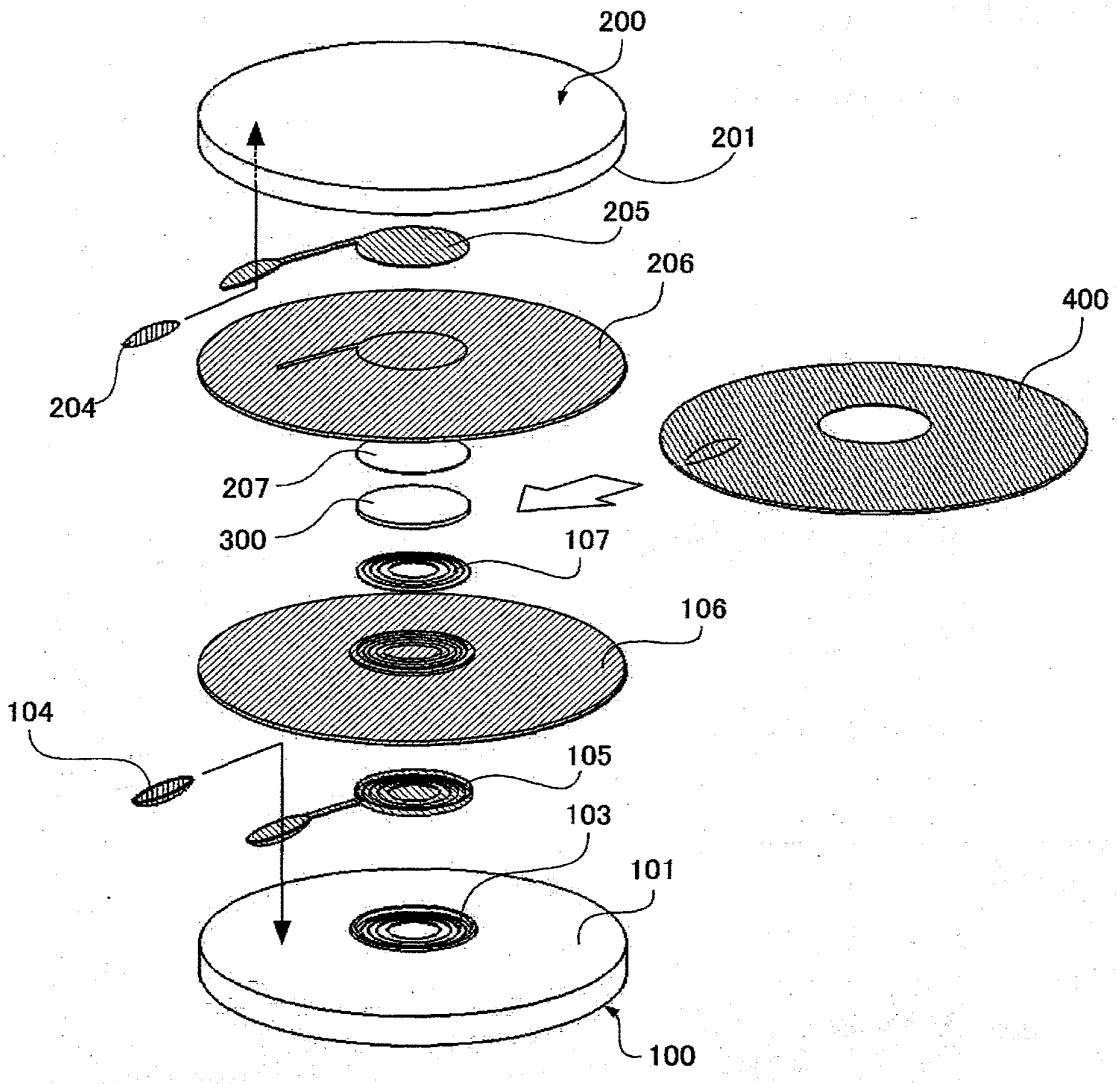
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[図21]



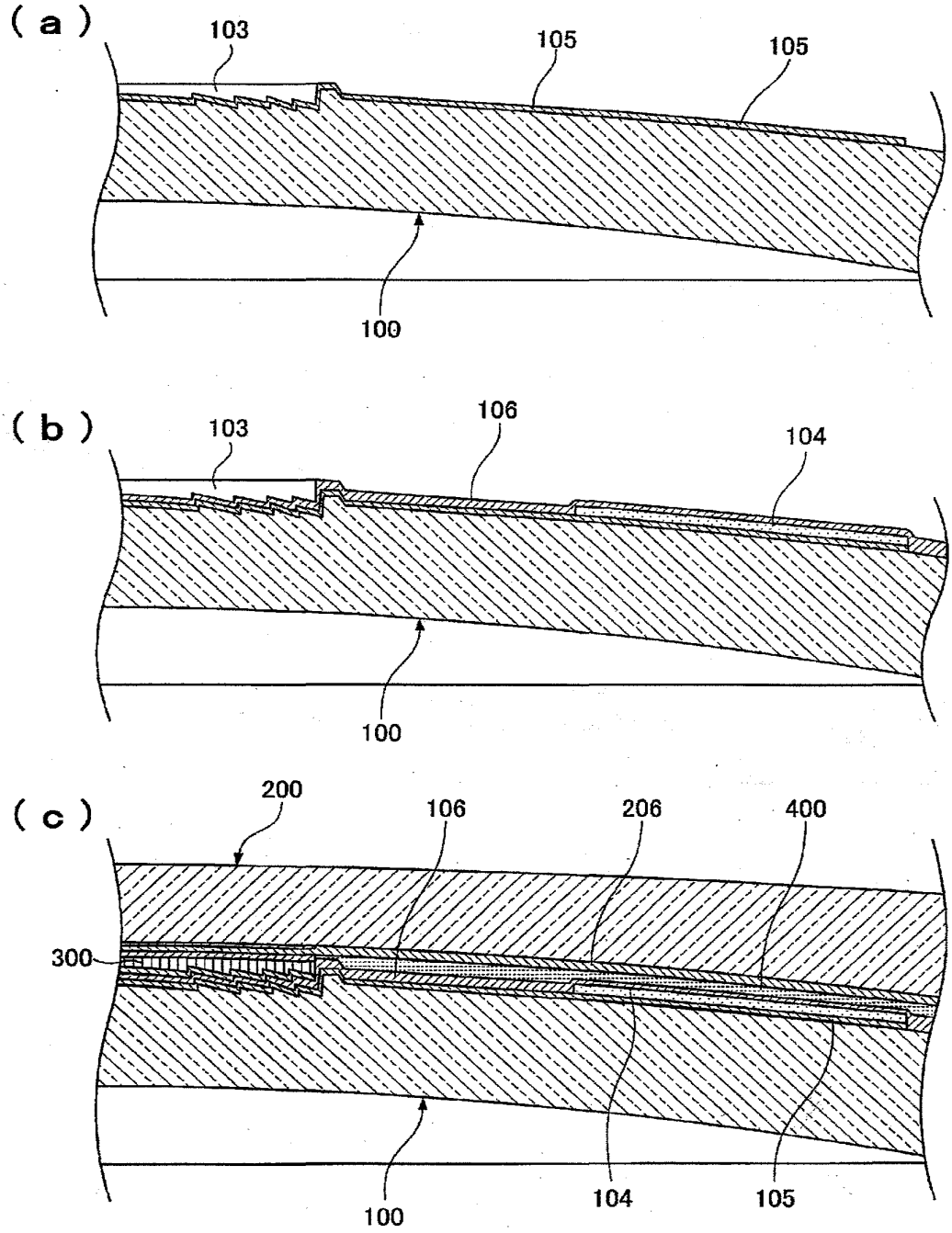
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[図22]



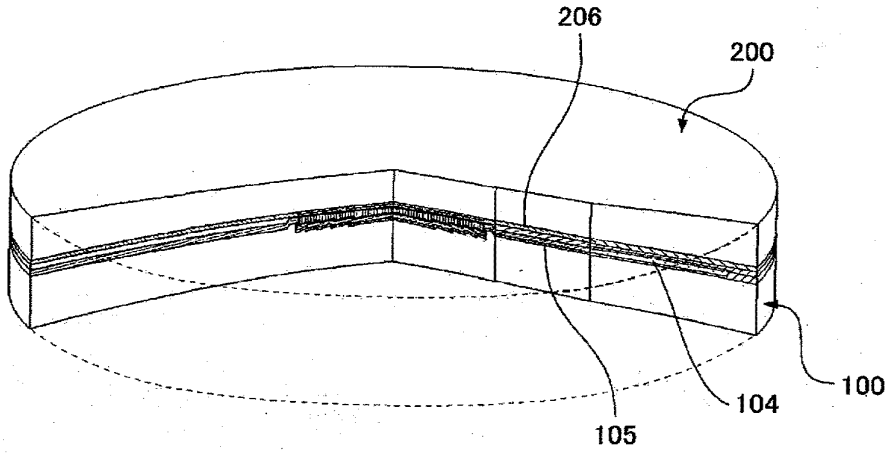
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[図23]

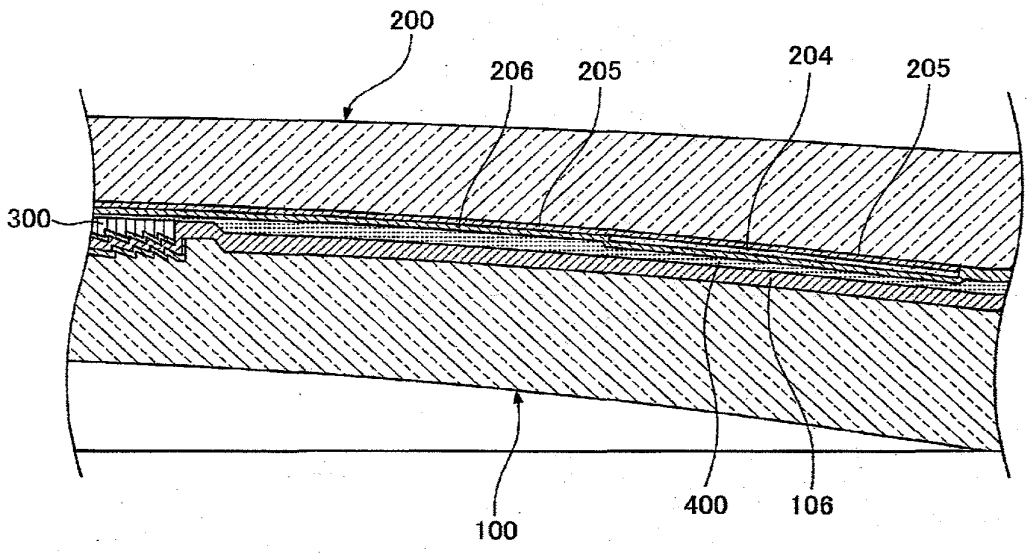


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[図24]

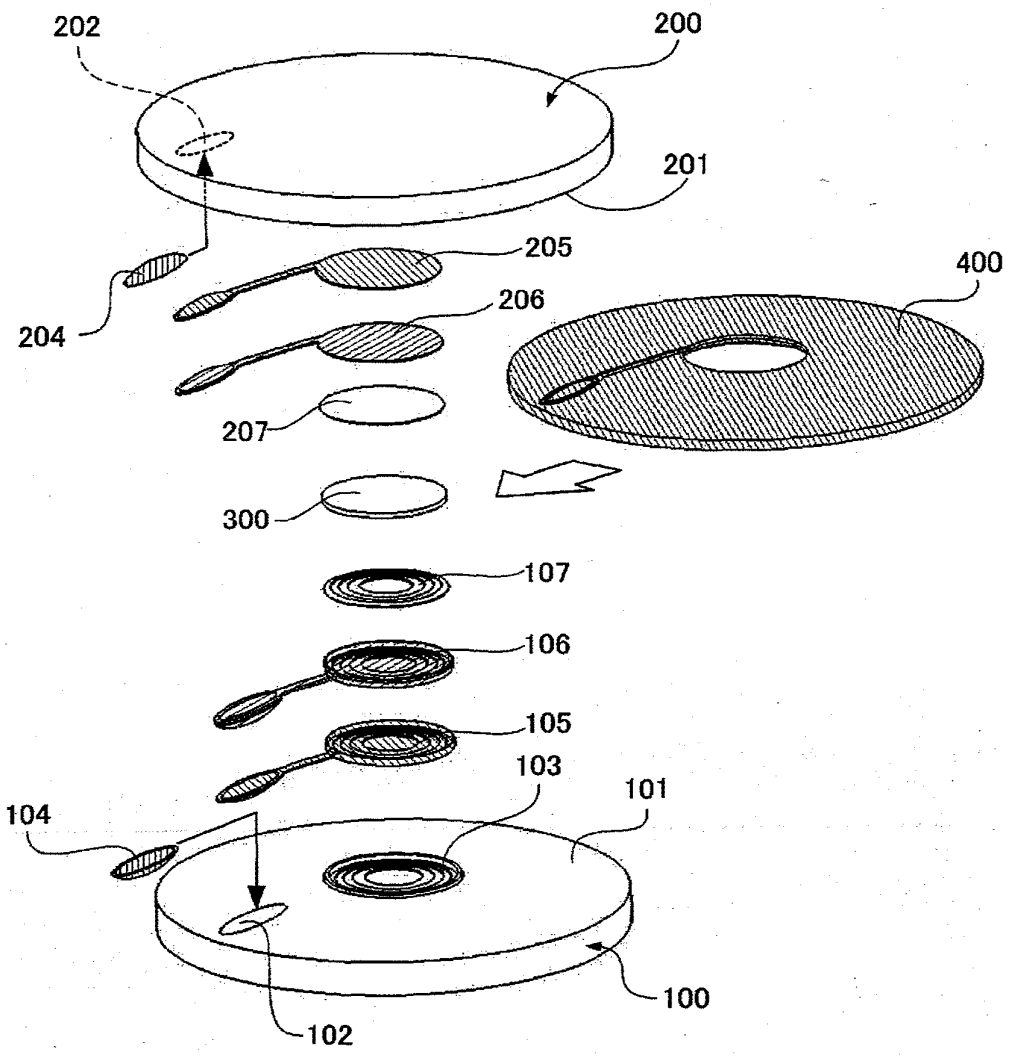


[図25]



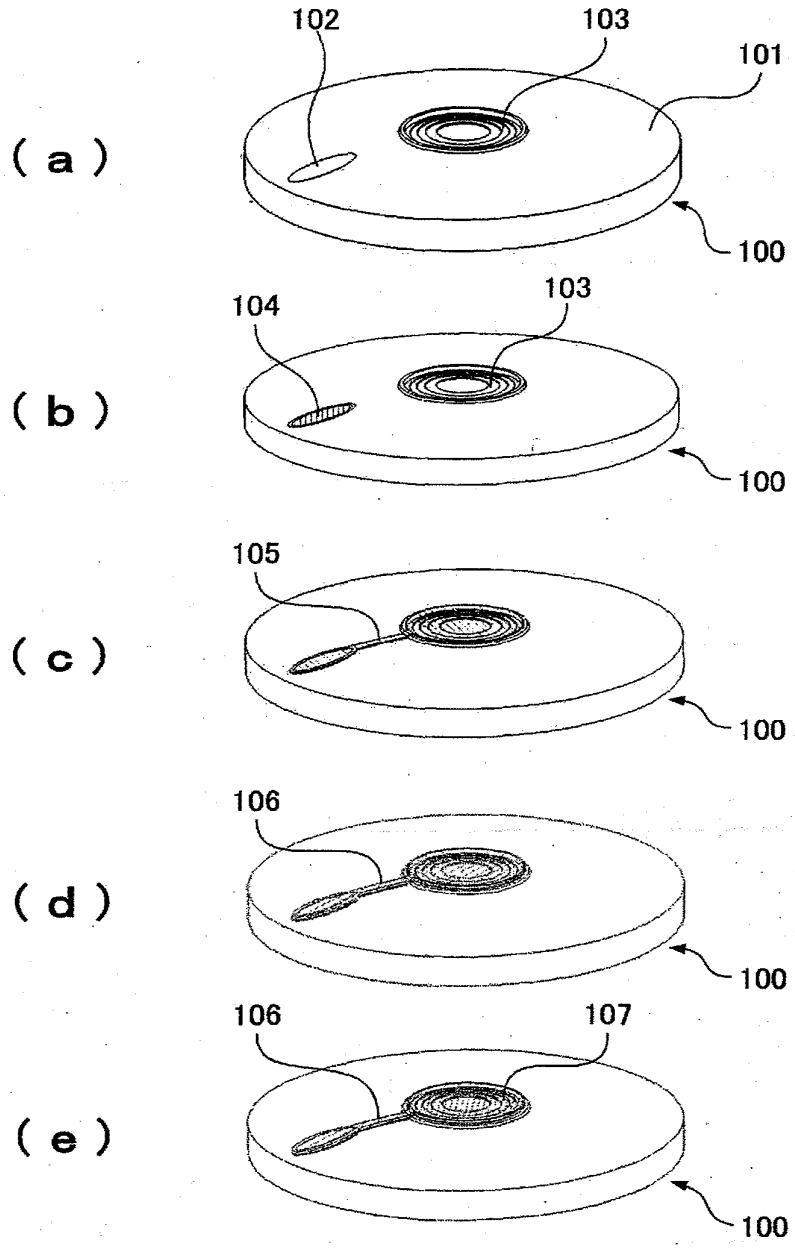
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[図26]



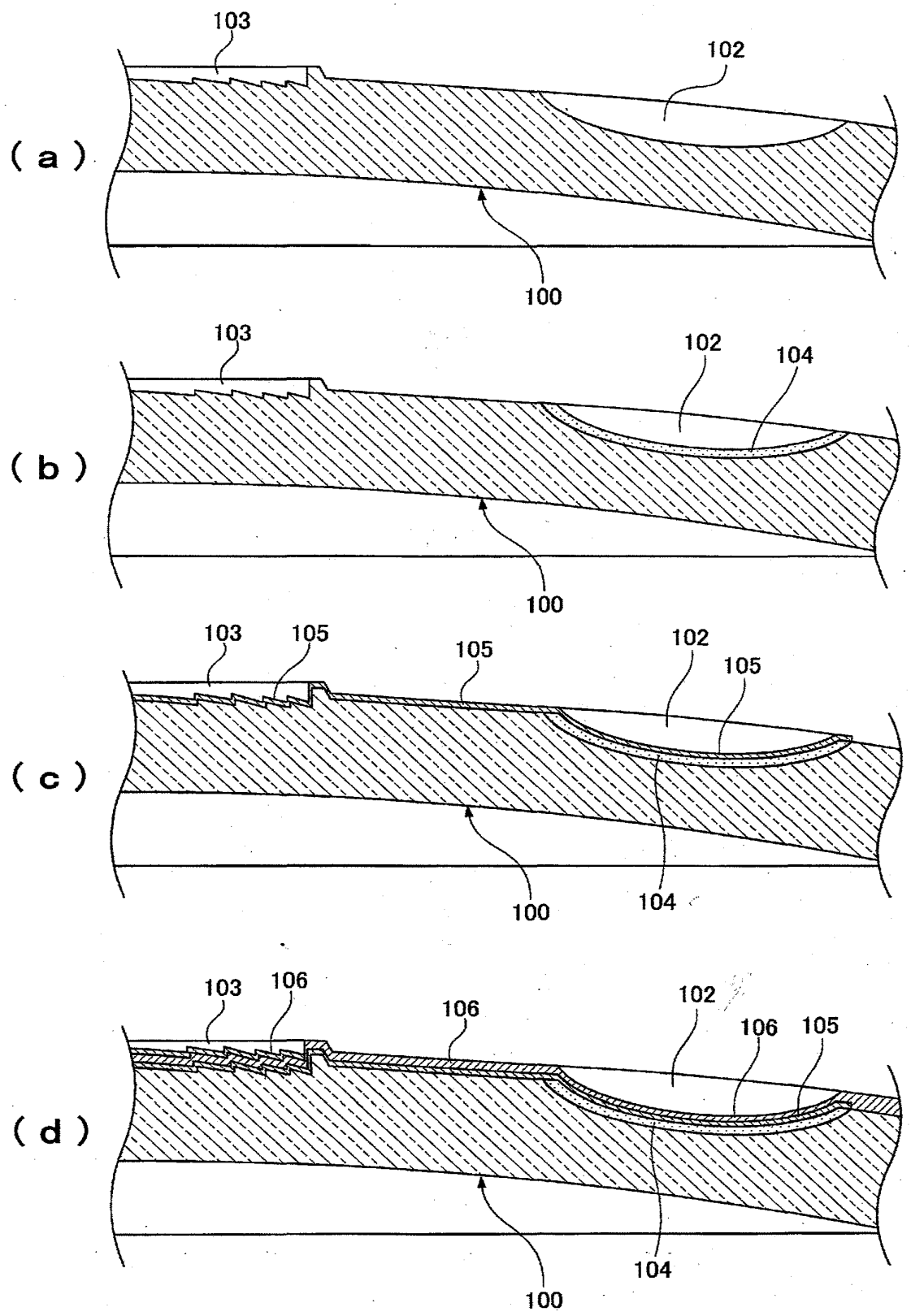
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[図27]



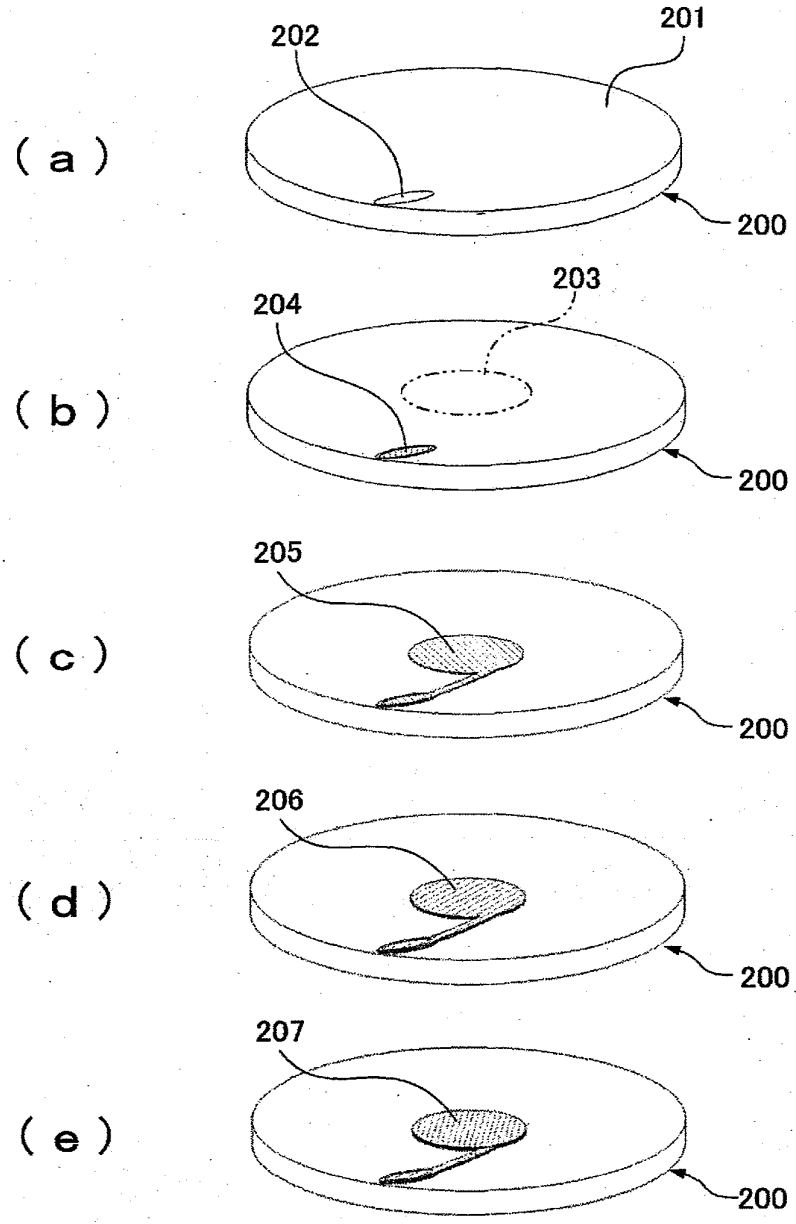
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[図28]



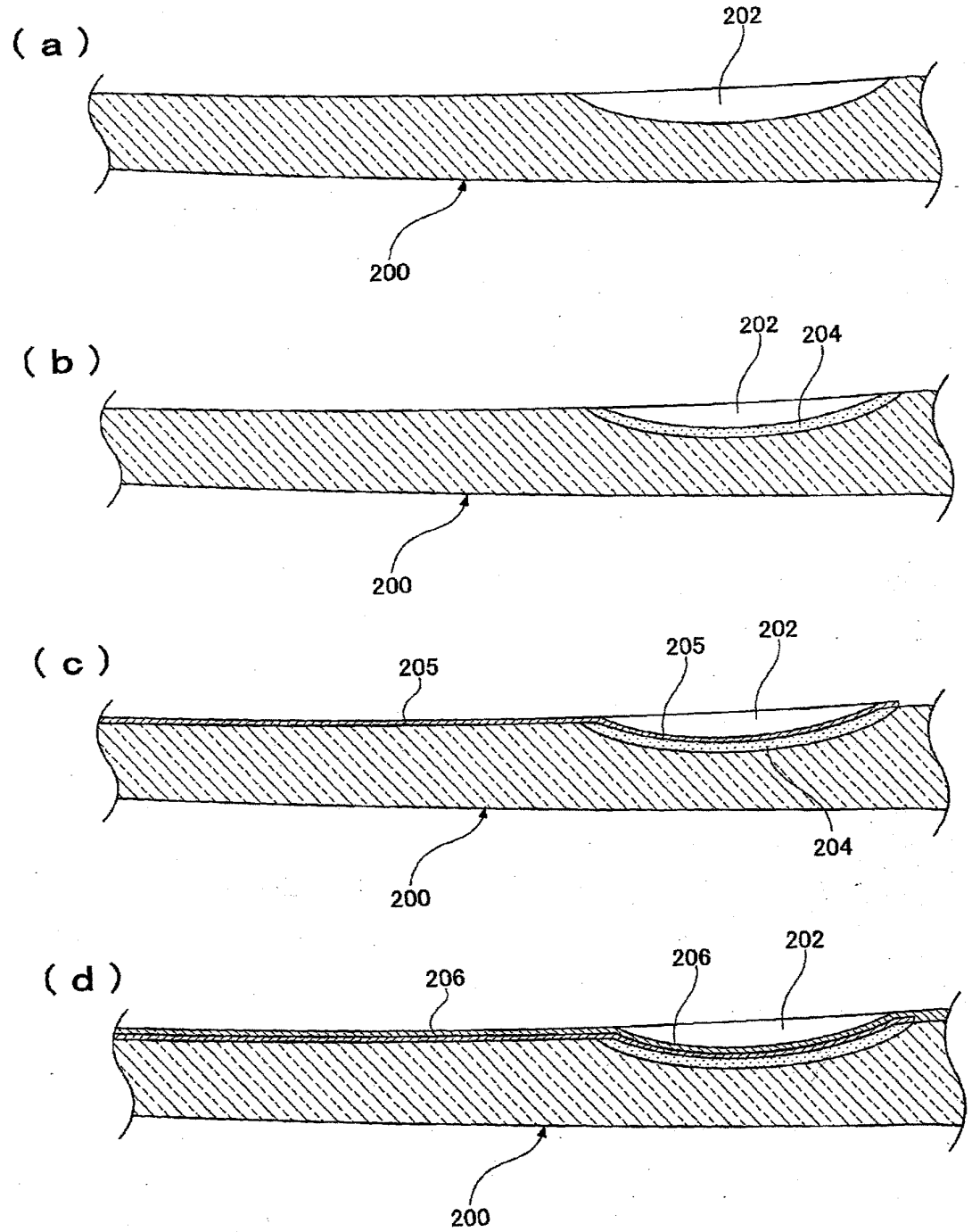
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[図29]



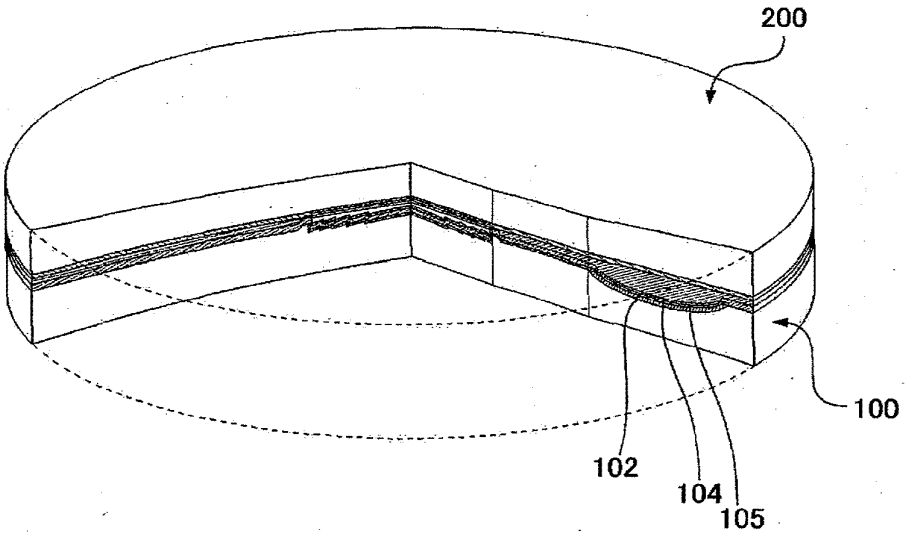
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[図30]

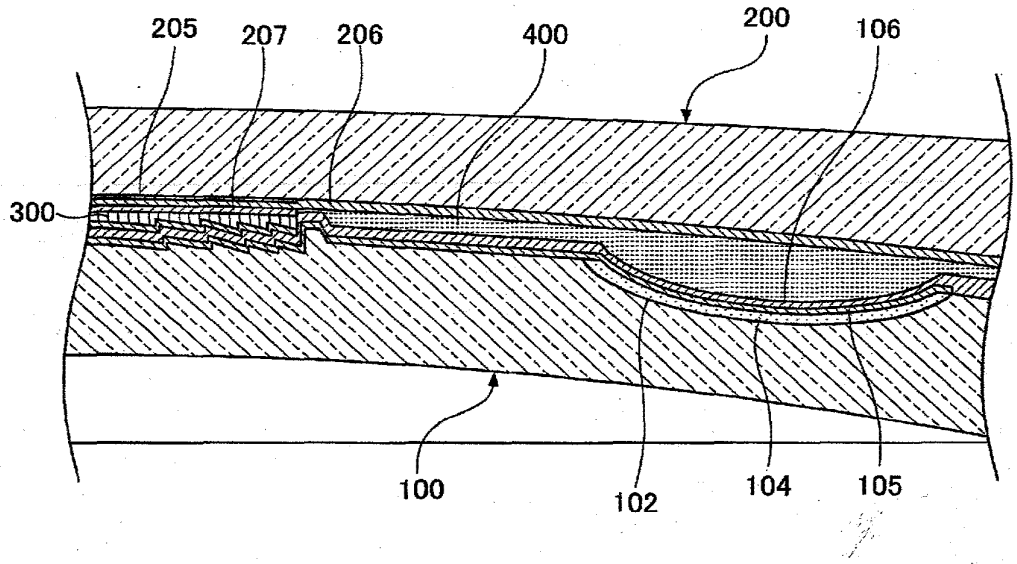


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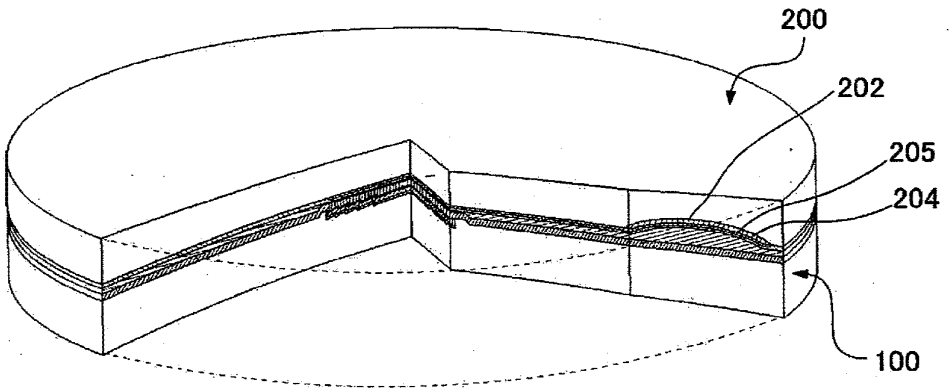


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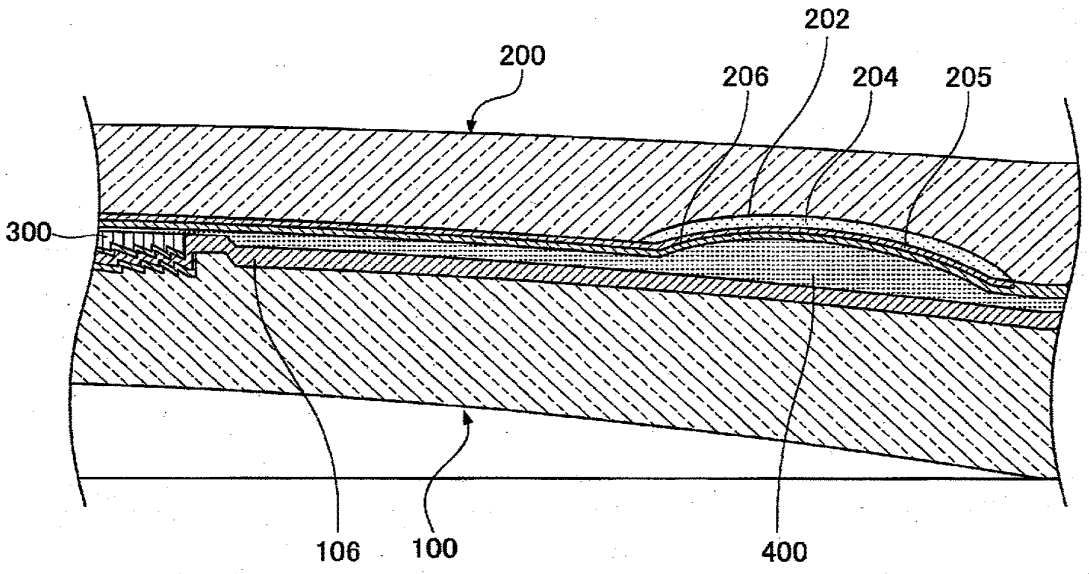


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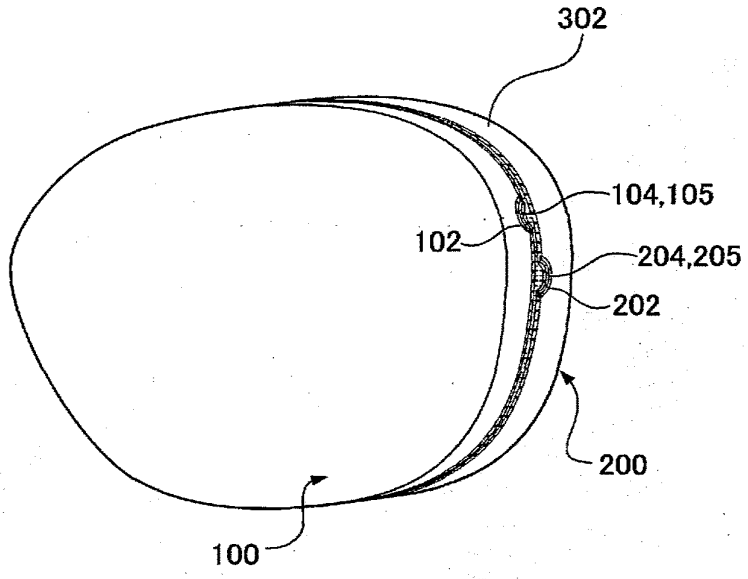


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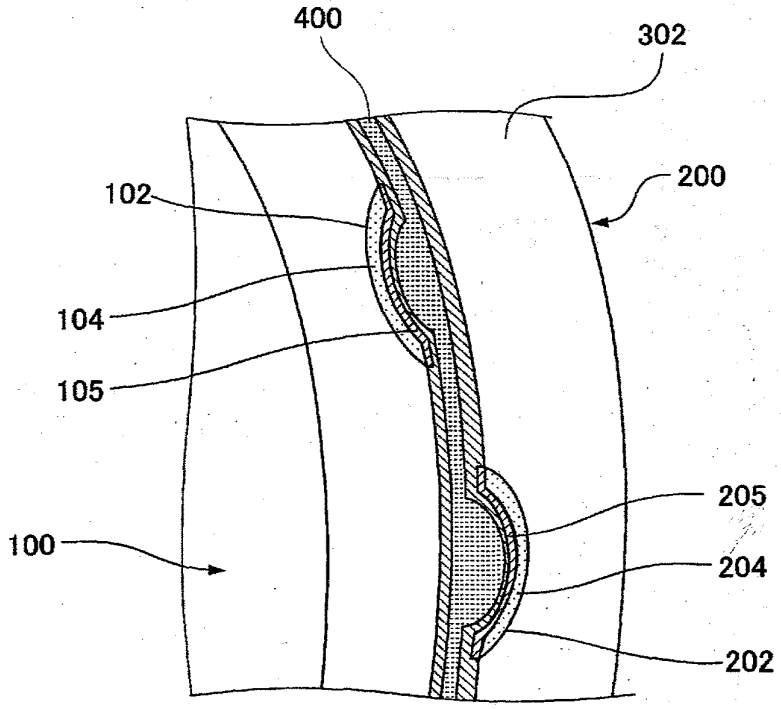


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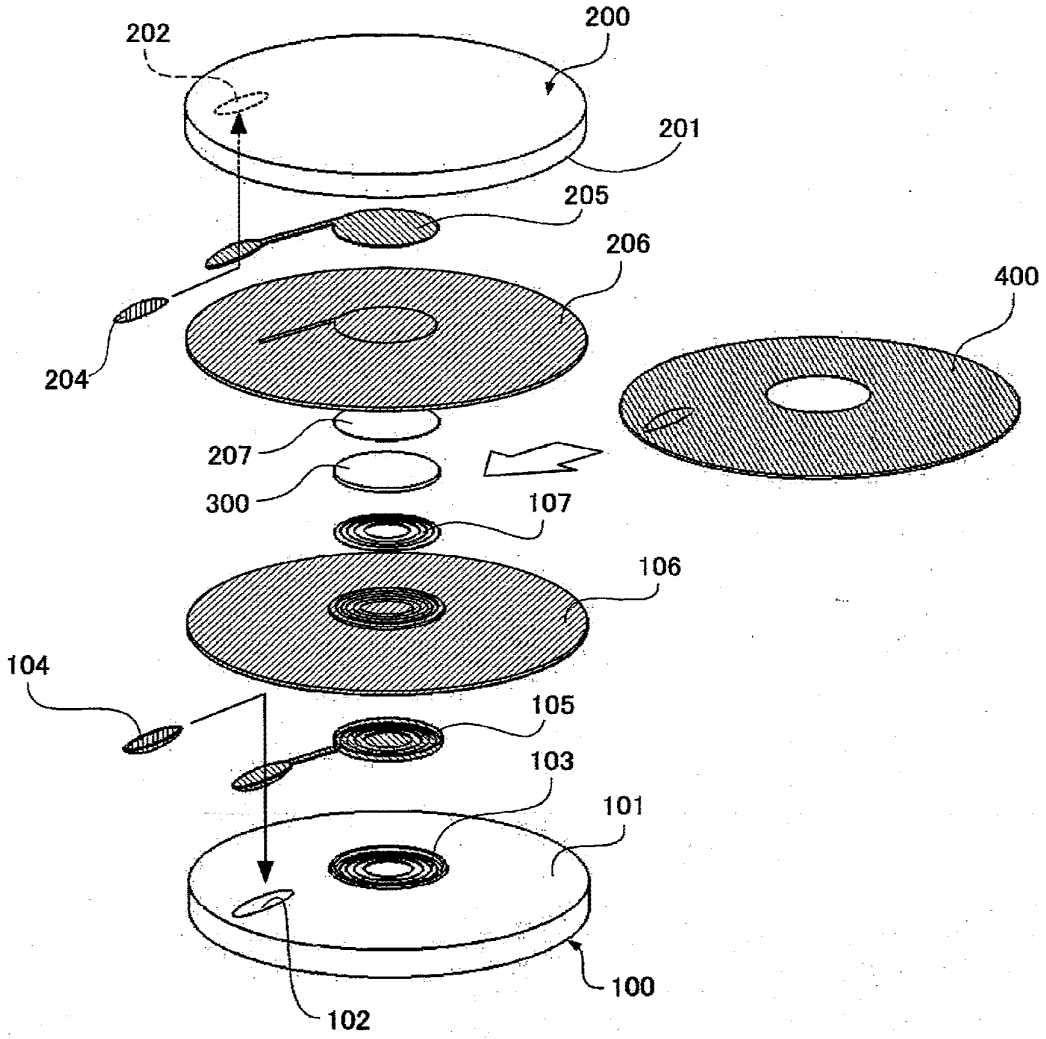


[図36]



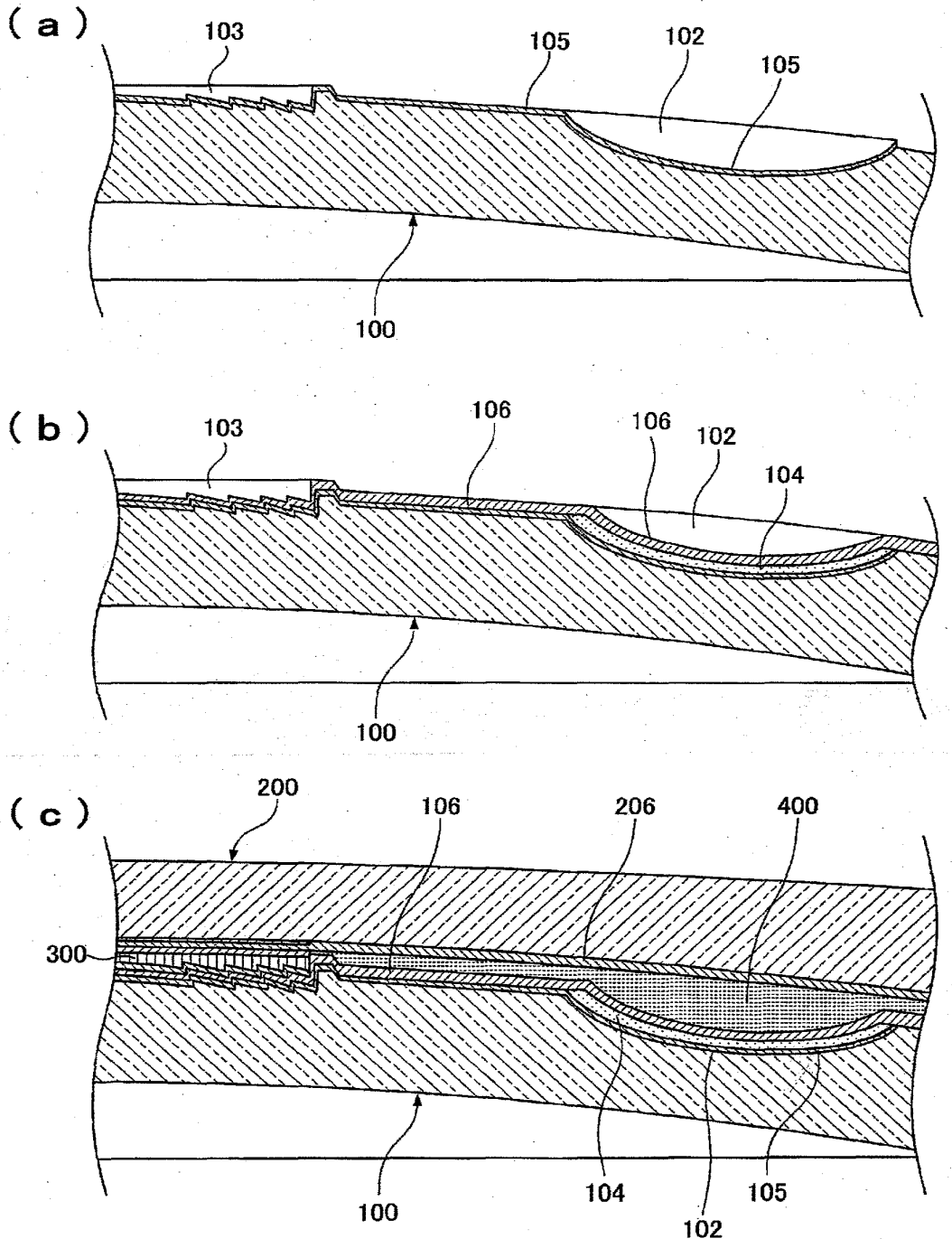
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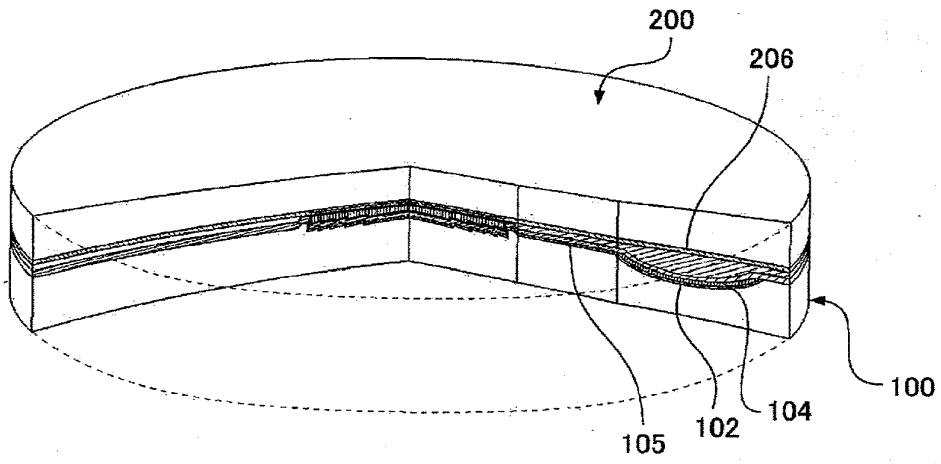
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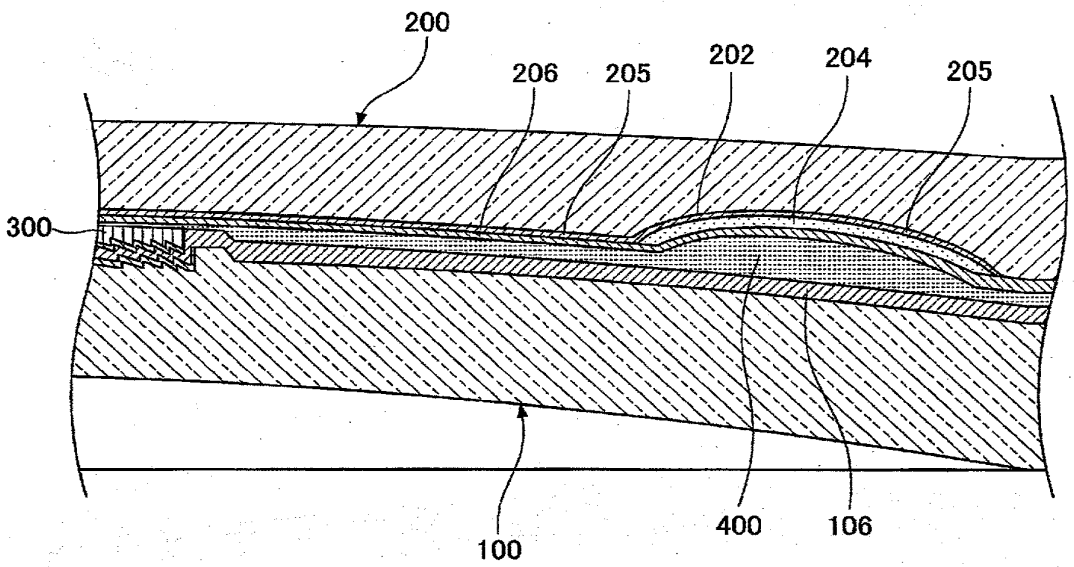


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[図39]

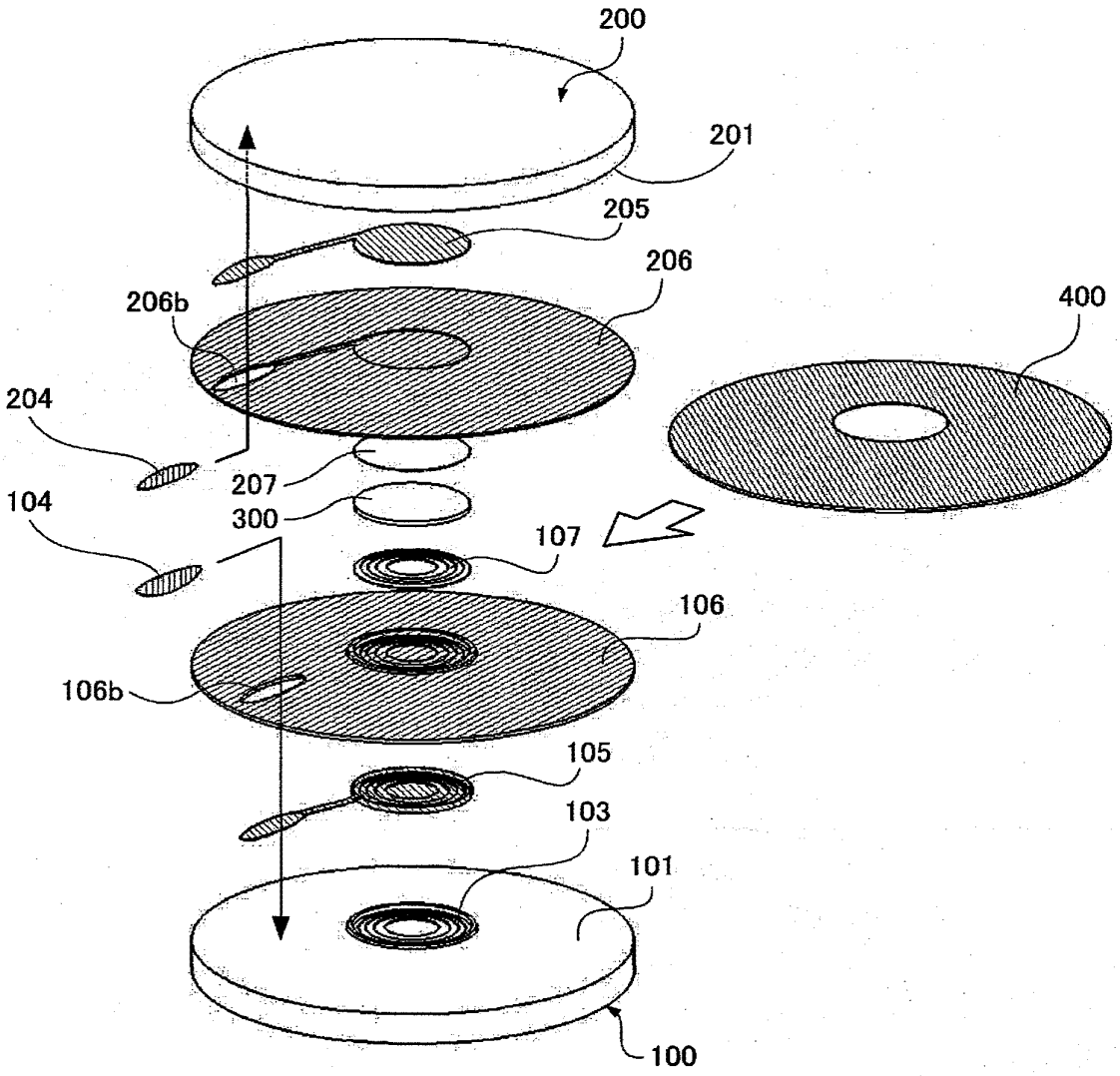


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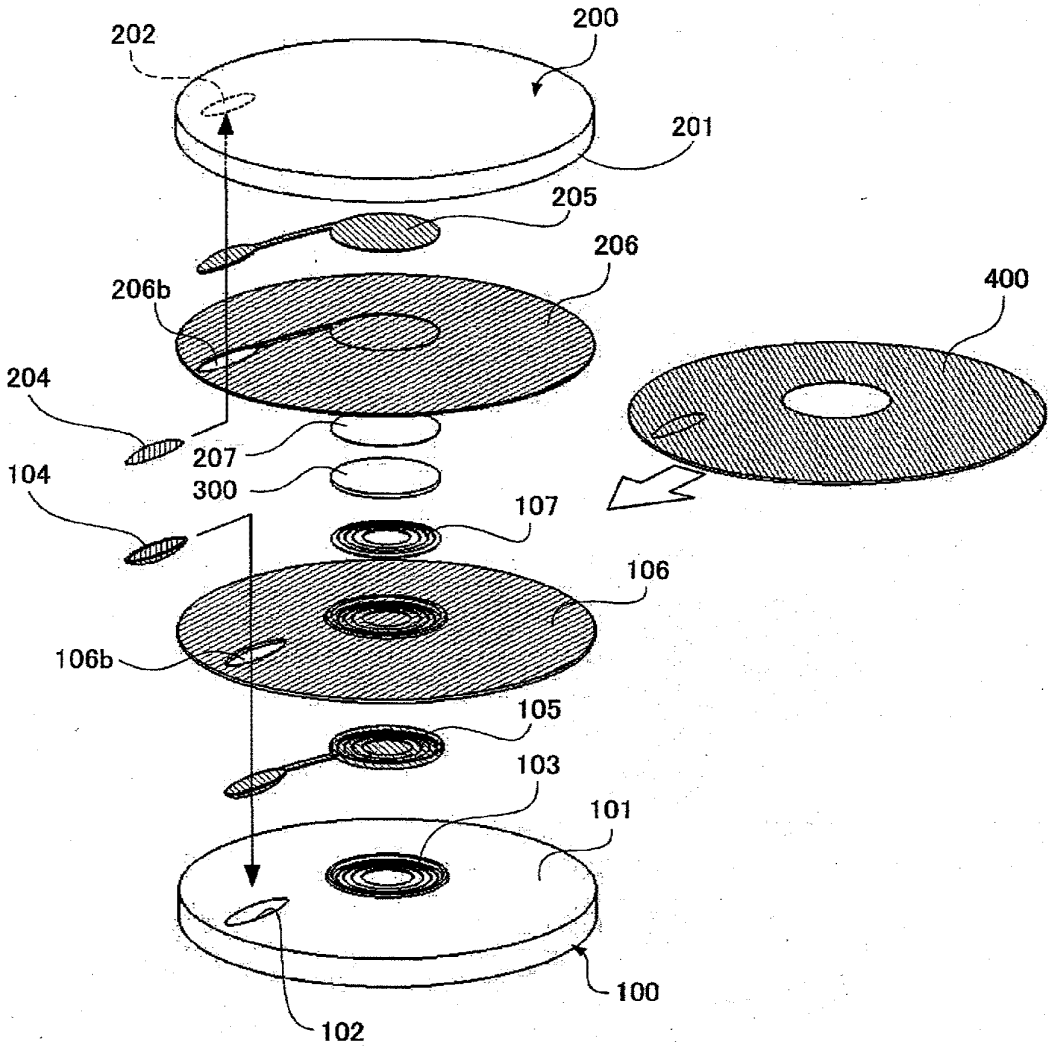
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[図41]



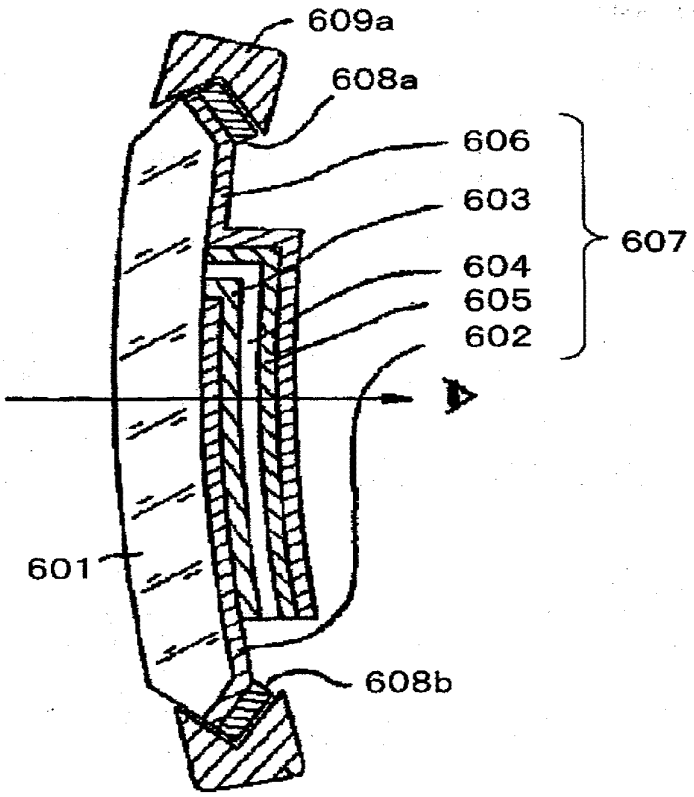
BNSDOCID: <WO_____2009081542A1_I_>

[図42]

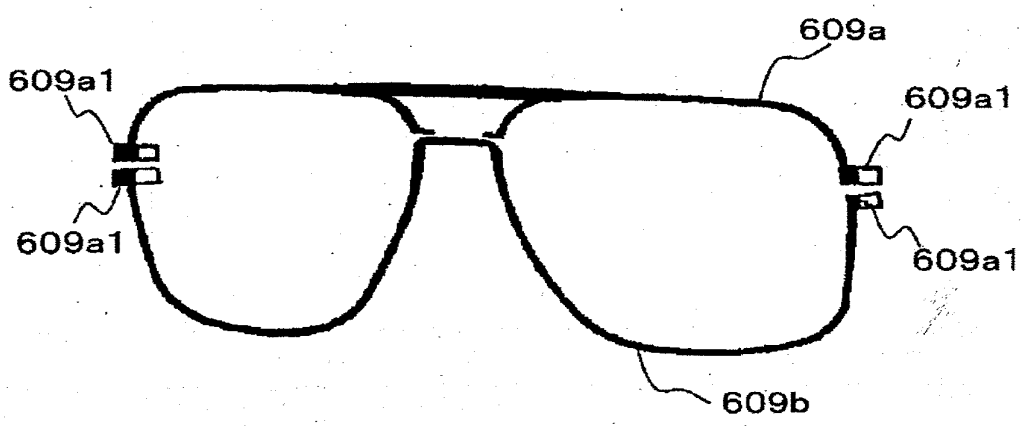


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[図43]



[図44]



BNSDOCID: <WO_____2009081542A1_I_>

INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2008/003799

A. CLASSIFICATION OF SUBJECT MATTER
G02C7/02(2006.01)i, *G02C1/00*(2006.01)i, *G02F1/13*(2006.01)i, *G02F1/1345*(2006.01)i, *G02F1/15*(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
G02C7/02, G02C1/00, G02F1/13, G02F1/1345, G02F1/15

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Jitsuyo Shinan Koho 1922-1996 Jitsuyo Shinan Toroku Koho 1996-2009
Kokai Jitsuyo Shinan Koho 1971-2009 Toroku Jitsuyo Shinan Koho 1994-2009

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 109554/1988(Laid-open No. 30921/1990) (Nikon Corp.), 27 February, 1990 (27.02.90), Full text; all drawings (Family: none)	1-16
A	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 106972/1989(Laid-open No. 45515/1991) (Seiko Epson Corp.), 26 April, 1991 (26.04.91), Full text; all drawings (Family: none)	1-16

☒ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
24 March, 2009 (24.03.09)	07 April, 2009 (07.04.09)
Name and mailing address of the ISA/ Japanese Patent Office	Authorized officer
Facsimile No.	Telephone No.

Form PCT/ISA/210 (second sheet) (April 2007)

BNSDOCID: <WO_____2009081542A1_I_>

INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2008/003799

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 185147/1987(Laid-open No. 88927/1989) (Seiko Epson Corp.), 12 June, 1989 (12.06.89), Full text; all drawings (Family: none)	1-16

BNSDOCID: <WO_____2009081542A1_I_>

国際調査報告

国際出願番号　ＰＣＴ／ＪＰ２００８／００３７９９

Ａ．　発明の属する分野の分類（国際特許分類（ＩＰＣ））

Int.Cl.　G02C7/02(2006.01)i, G02C1/00(2006.01)i, G02F1/13(2006.01)i, G02F1/1345(2006.01)i, G02F1/15(2006.01)i

Ｂ．　調査を行った分野

調査を行った最小限資料（国際特許分類（ＩＰＣ））

Int.Cl.　G02C7/02, G02C1/00, G02F1/13, G02F1/1345, G02F1/15

最小限資料以外の資料で調査を行った分野に含まれるもの

日本国実用新案公報	１９２２－１９９６年
日本国公開実用新案公報	１９７１－２００９年
日本国実用新案登録公報	１９９６－２００９年
日本国登録実用新案公報	１９９４－２００９年

国際調査で使用した電子データベース（データベースの名称、調査に使用した用語）

Ｃ．　関連すると認められる文献

引用文献のカテゴリー＊	引用文献名　及び一部の箇所が関連するときは、その関連する箇所の表示	関連する請求の範囲の番号
A	日本国実用新案登録出願63-109554号（日本国実用新案登録出願公開2-30921号）の願書に添付した明細書及び図面の内容を撮影したマイクロフィルム（株式会社ニコン）1990.02.27，全文、全図（ファミリーなし）	１－１６
A	日本国実用新案登録出願1-106972号（日本国実用新案登録出願公開3-45515号）の願書に添付した明細書及び図面の内容を撮影したマイクロフィルム（セイコーエプソン株式会社）1991.04.26，全文、全図（ファミリーなし）	１－１６

☑ Ｃ欄の続きにも文献が列挙されている。　☐ パテントファミリーに関する別紙を参照。

＊　引用文献のカテゴリー
「Ａ」特に関連のある文献ではなく、一般的技術水準を示すもの
「Ｅ」国際出願日前の出願または特許であるが、国際出願日以後に公表されたもの
「Ｌ」優先権主張に疑義を提起する文献又は他の文献の発行日若しくは他の特別な理由を確立するために引用する文献（理由を付す）
「Ｏ」口頭による開示、使用、展示等に言及する文献
「Ｐ」国際出願日前で、かつ優先権の主張の基礎となる出願の日の後に公表された文献
「Ｔ」国際出願日又は優先日後に公表された文献であって出願と矛盾するものではなく、発明の原理又は理論の理解のために引用するもの
「Ｘ」特に関連のある文献であって、当該文献のみで発明の新規性又は進歩性がないと考えられるもの
「Ｙ」特に関連のある文献であって、当該文献と他の１以上の文献との、当業者にとって自明である組合せによって進歩性がないと考えられるもの
「＆」同一パテントファミリー文献

国際調査を完了した日 ２４．０３．２００９	国際調査報告の発送日 ０７．０４．２００９
国際調査機関の名称及びあて先 日本国特許庁（ＩＳＡ／ＪＰ） 郵便番号１００－８９１５ 東京都千代田区霞が関三丁目４番３号	特許庁審査官（権限のある職員）　２Ｏ　９２２５ 藤岡　善行 電話番号　０３－３５８１－１１０１　内線　３２７１

様式ＰＣＴ／ＩＳＡ／２１０（第２ページ）（２００７年４月）

BNSDOCID: <WO_____2009081542A1_I_>

Ｃ（続き）．　関連すると認められる文献

引用文献のカテゴリー＊	引用文献名　及び一部の箇所が関連するときは、その関連する箇所の表示	関連する請求の範囲の番号
A	日本国実用新案登録出願62-185147号（日本国実用新案登録出願公開1-88927号）の願書に添付した明細書及び図面の内容を撮影したマイクロフィルム（セイコーエプソン株式会社）1989.06.12，全文、全図（ファミリーなし）	１－１６

BNSDOCID: <WO_____2009081542A1_I_>

PATENT SPECIFICATION (11) 1 563 929

1 563 929

(21) Application No. 39174/76 (22) Filed 21 Sept. 1976 (19)
(31) Convention Application No. 625 337 (32) Filed 23 Oct. 1975 in
(33) United States of America (US)
(44) Complete Specification published 2 April 1980
(51) INT. CL.³ G02C 7/10
(52) Index at acceptance
G2F 21C 23E 25A 25C 28M AA
G2J S3A S3X

(72) Inventors DONALD JOSEPH BERETS
and ROBERT HARRISON POSTAL

(54) OPHTHALMIC GLASSES WITH VARIABLE LIGHT TRANSMISSIVE LENSES

(71) We, AMERICAN CYANAMID COMPANY, a corporation organised and existing under the laws of the State of Maine, United States of America, of Berdan Avenue, Township of Wayne, State of New Jersey, United States of America, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to ophthalmic glasses which contain ophthalmic lenses whose light transmissive properties can be selectively varied by application of electricity.

The prior art, e.g. United States Patents 3,521,941, 3,578,843, 3,704,057, 3,708,220 and 3,829,196, discloses electro-optical devices which exhibit a phenomenon termed in the art as persistent electrochromism. This phenomenon is characterized by the alteration of the electro-magnetic radiation absorption characteristics of the persistent electrochromic material by the influence of an electric field. Such devices commonly are employed in sandwich arrangement, with a persistent electrochromic material layer and an ion-conducting layer sandwiched between two electrodes. Coloration is induced by charging the electrochromic layer negative with respect to the counter-electrode, employing an external potential. The counter-electrode can comprise the same material as the persistent electrochromic material or be different. By reversing the original polarity of the field or by applying a new field, the visible coloration can be erased. This procedure of color induction and erasure is defined as cycling.

Prior methods for reducing light transmission through optical lenses employed as eyeglasses are capable of achieving desirable degrees of light reduction. However, these sunglass lenses generally are not adjustable or variable with regard to their light transmissive properties. Recent developments have produced what is known as a photochromic lens which is self-adjustable. A layer within the lens structure is induced by electromagnetic radiation to alter its light absorption properties. An increasing degree of ambient brightness results in darker coloration of the lens, thereby reducing light transmission through the lens. However, such a system suffers from several inherent disadvantages. Photochromic systems with fast switching speeds tend to be unstable, whereas the most stable systems tend to have slow switching speeds. In particular, erasure upon removing a photochromic ophthalmic lens from bright light to relative darkness is quite slow. Accordingly, the use of photochromic lenses in eyewear may on occasion prove hazardous if the wearer suddenly passes from bright to dim light, for example a person stepping from bright sunlight into a building or a driver passing into a tunnel while wearing photochromic glasses would remain "in the dark" for many critical seconds. Also, since colorless photochromic systems can be activated only by a change in electromagnetic radiation in the UV portion of the spectrum, the system is largely inoperative when the wearer is screened by a UV filter such as a glass window. The light-induced coloration of the lenses is entirely outside the control of the wearer. The degree of light transmission cannot be adjusted and depends solely on the degree of ambient electromagnetic radiation.

Hence, for safety, convenience and efficiency, it would be desirable to provide ophthalmic glasses containing optical lenses whose light transmissive properties can be controlled either automatically or independently, with quick cycling speed, and with selective adjustment of the degree of light transmission.

The present invention provides a pair of ophthalmic glasses comprising first and second lens mounted in a frame, each said lens comprising an optical lens (as herein defined)

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carrying successively, a first transparent electrode layer, a solid persistent electrochromic film of WO_3 or MoO_3, an ion-conducting layer and a second transparent electrode layer, and the glasses further comprising means at least partially disposed within said frame for allowing application of direct current voltage to each pair of electrodes carried by each said lens to create an electric potential across the electrochromic film sandwiched therebetween and a potential of opposite polarity, whereby said electrochromic film can be varied in coloration so as to vary the amount of light transmitted through each said lens.

The term "optical lens" is used herein to refer to any optically transparent substrate whether or not it diffracts the light passing therethrough. It is, of course, quite common for protective glasses such as sunglasses to have lenses which do not alter the convergence of divergence of an incident light beam.

The invention will be further described in conjunction with the accompanying drawings in which like reference characters refer to the same parts throughout the different views. The drawings are not necessarily to scale, emphasis instead being placed on illustrating principles of construction:

In the drawings, Figure 1 is a pictorial view of a pair of ophthalmic glasses according to the invention; and

Figure 2 illustrates, in partial cross section, the structure of the lenses employed in the glasses of Fig. 1.

Referring to the drawings, numeral 36 in Figure 1 generally represents a pair of electrochromic eyeglasses which comprises a standard assembly with temple support arms 48 hingedly attached to a lens frame unit 54. The basic appearance of the eyeglasses corresponds to standard commercial eye wear. However, in place of a simple optical lens, a pair of electro-optical lens is inserted. The operation of the variable light transmissive lenses requires the application of an electric field across the electrochromic layer coated on the lens. Miniature battery 34 in the temple support arm provides dc voltage, preferably about 1–5 volts. The battery is connected through conducting wires 42 and 44 to the lens units to control the light absorption thereof. Pushbutton switches 30 and 32 and 50 and 52 are included in the circuit to allow selective operator control of cycling-lens coloration and erasure. Individual sets of pushbutton control switches are provided for each of lenses 38 and 40, so that separate control of each lens is possible. An operator, by depressing the respective coloration or erasure button can readily adjust the light transmission of each lens as desired. Separate controls adapt the glasses to multiple specialized uses. For example, selective darkening of one lens while maintaining maximum transmission to the other eye would prove convenient and beneficial to such as microscopists, photographers and sharpshooters, etc., who are normally required to close or block one eye during operation.

Coloration and erasure also can be accomplished automatically according to ambient light levels by utilization of photocell 46 which is built into the lens frame and integrated into the switching circuitry.

Figure 2 shows a cross section of the layered lens structure which is employed in Fig. 1. Numeral 18 represents the actual optical lens substrate which is coated with light modulating layers. The layers, successively deposited comprise a transparent conductive material 16 such as SnO_2, a persistent electrochromic film 14 of WO_3 or MoO_3, an ion-conducting layer 12 such as SiO_x or β-alumina, and transparent counter-electrode 10 of conductive material such as Au or a transparent oxide. The layers may be deposited by known vacuum deposition techniques. A source of dc potential 22 is coupled to electrodes 16 and 10 through a reversing switch indicated by 20. As shown, with the switch arm in the position to produce coloration, the positive terminal of the source is connected to the outer electrode 10 while the negative terminal is connected to the electrode 16 on the optical lens substrate. Once complete coloration is induced, typically in a matter of seconds, switch 20 may be opened, disconnecting the battery from the device entirely, and the device will remain in its darkened state without further application of power. To erase a previously darkened surface, the switch arm is thrown to the erase contacts, across which is connected a potentiometer 24. As shown, the potentiometer contact or slider is movable from a point at which the electrodes 16 and 10 are short circuited to a point at which full battery voltage, of polarity opposite to the coloration condition, is applied between them. Any number of reverse voltage values may be obtained between the two extremes.

In the position illustrated in the drawing, a "bleach" voltage of a value less than battery voltage is applied across the electrodes, setting up a corresponding electric field. Under the influence of this field, the device returns to its initial uncolored state. The rapidity with which the bleaching occurs is determined by the magnitude of the voltage; the higher the voltage, the faster the bleaching process is completed. At the higher bleaching voltages, it has been found that the bleaching process is even faster than the coloring operation. Once the bleaching is completed, the switch may be opened to disconnect the battery from the device and minimize power drain.

It has also been found that, notwithstanding the absence of an electric field, when the

potentiometer is in its short circuiting position, certain of the persistent electrochromic materials nevertheless will return completely and positively from the colored to the bleached state. The rate at which the bleaching occurs, however, is somewhat slower than when the material us subjected to an electric field.

The persistent electrochromic materials are employed as films, and the thickness thereof desirably will be in the range of from about 0·1–100 microns. However, since a small potential will provide an enormous field strength across very thin films, the latter, i.e. 0·1–10 microns, are preferred over thicker ones. Optimum thickness will also be determined by the nature of the particular compound being laid down as a film and by the film-forming method since the particular compound and film-forming method may place physical (e.g. non-uniform film surface) and economic limitations on manufacture of the devices.

When tungsten oxide is employed as the electrochromic imaging material and an electric field is applied between the electrodes, a blue coloration of the previously transparent electrochromic layer occurs, i.e. the persistent electrochromic layer becomes absorptive of electromagnetic radiation over a band encompassing the red end of the visible spectrum, thereby rendering the imaging layer blue in appearance. Prior to the application of the electric field, the electrochromic imaging layer was essentially non-absorbent and thus transparent.

The ion-conducting layer should be substantially transparent.

One embodiment employs a solution of H_2SO_4 in glycerin. Other suitable ion-conductors are as disclosed in United States Patents 3,704,057 and 3,708,220.

In a preferred embodiment the ion-conducting layer is an inorganic or other solid material as disclosed in United States Patent 3,521,941, e.g. silicon oxide.

Virtually any material exhibiting electrical conductivity may be used for an electrode. The same material may be used for both electrodes or each electrode may be of a different material, or mixtures or alloys of of different materials. Typical electrode materials are the metals, e.g. gold, silver, aluminium, and conducting non-metals such as carbon, suitably doped tin or indium oxide, and the like. As already indicated, both of the electrodes must be transparent. The negative and positive electrodes must also be in electrical contact with the electrochromic film, and they may be formed by known vacuum deposition techniques, as described above, or they may be conducting layers between which the film is inserted.

While the invention has been particularly shown and described with reference to a preferred embodiment thereof, it will be understood by those skilled in the art that various alterations in form and detail may be made therein. For example the circuitry and switching arrangements can be changed to suit ease of operation or cosmetic design. Also, since power application is needed only to color and bleach the device, a source of continuous power within the eyeglass structure is not a necessity. A remote power supply can be utilized to accomplish desired cycling. Such can be portable and, for example, be conveniently incorporated into an eyeglass case. The glasses may take various forms such as welding goggles, laser protective goggles, eyeglasses, sunglasses or special glasses for microscopists, photographers or sharpshooters.

WHAT WE CLAIM IS:—

1. A pair of opthalmic glasses, comprising first and second lens mounted in a frame, each said lens comprising an optical lens (as herein defined) carrying, successively, a first transparent electrode layer, a solid persistent electrochromic film of WO_3 or MoO_3, an ion-conducting layer and a second transparent electrode layer, and the glasses further comprising means at least partially disposed within said frame for allowing application of direct current voltage to each pair of electrodes carried by each said lens to create an electric potential across the electrochromic film sandwiched therebetween and a potential of opposite polarity, whereby said electrochromic film can be varied in coloration so as to vary the amount of light transmitted through each said lens.

2. A pair of glasses according to Claim 1, including a photocell control means adapted to adjust the light transmissive properties of said lenses according to the ambient light.

3. A pair of glasses according to Claim 1 or Claim 2, individual control means for each lens, so that light transmission through each lens can be individually adjusted.

4. A pair of glasses according to any preceding claim, including a direct current power source disposed within said frame.

5. A pair of opthalmic glasses, according to Claim 1 and substantially as hereinbefore described with reference to the accompanying drawings.

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from which copies may be obtained.

BNSDOCID: <GB_____1563929A_I_>

1563929 COMPLETE SPECIFICATION
1 SHEET *This drawing is a reproduction of the Original on a reduced scale*

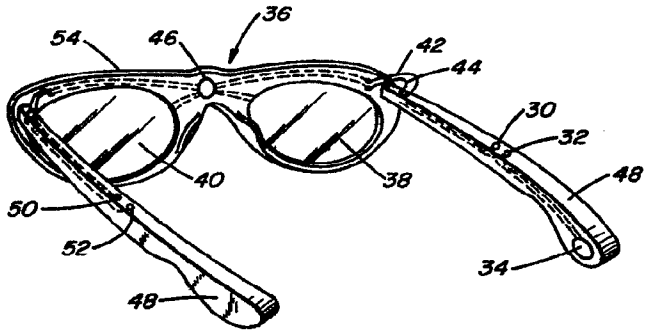


FIG. 1

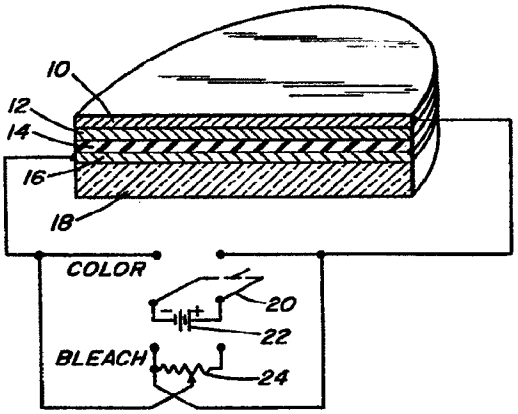


FIG. 2

BNSDOCID: <GB 1563929A >