(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
12 October 2006 (12.10.2006)

PCT

(10) International Publication Number
WO 2006/107151 A1

(51) International Patent Classification:
C23C 14/50 (2006.01)

(21) International Application Number:
PCT/KR2006/000932

(22) International Filing Date: 15 March 2006 (15.03.2006)

(25) Filing Language: Korean

(26) Publication Language: English

(30) Priority Data:
10-2005-0021406 15 March 2005 (15.03.2005) KR

(71) Applicant *(for all designated States except US)*: **WOOWON ELECTRONICS CO., LTD.** [KR/KR]; C-3706, Dongil Techno Town, 889-1, Kwanyang-2-dong, Dongan-gu, Anyang City, Gyeonggi-do 431-060 (KR).

(72) Inventors; and

(75) Inventors/Applicants *(for US only)*: **KIM, In-Jae** [KR/KR]; Room 203, Gadong, Kukdong Villa, 65-76, Hoegi-dong, Dongdaemun-gu, Seoul 130-050 (KR). **HAN, Chang-Seob** [KR/KR]; 101-205, 1 Danji, Dukso Joogong Apt., 110-1, Dukso-ri, Wabu-eup, Namyangju City, Gyeonggi-do 472-727 (KR). **HONG, Tae-Kwon** [KR/KR]; 206-26 Seohyeon-dong, Bundang-gu, Seongnam City, Gyeonggi-do 463-050 (KR). **LEE, Yoon-Soo** [KR/KR]; 394-14, Sinha-ri, Bubal-eup, Icheon City, Gyeonggi-do 467-863 (KR).

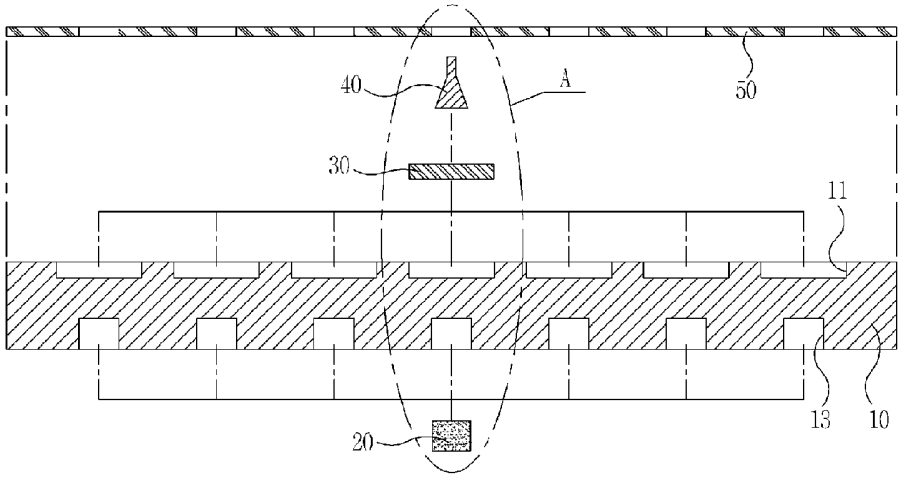
(74) Agents: **KIM, Inhan** et al.; #901 Doorea Bldg. 24 Yeouido-dong, Yeongdeungpo-gu, Seoul 150-877 (KR).

(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KZ, LC, LK, LR, LS, LT, LU, LV, LY, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

[Continued on next page]

(54) Title: AN APPARATUS FOR EVAPORATING ELECTRODE OF LIQUID LENS



(57) Abstract: Disclosed herein is an apparatus for depositing an electrode of a liquid lens, which serves to drive the liquid lens with electric power, and, more particularly, to an apparatus for depositing an electrode of a liquid lens, which has a simple structure operated in such a way of masking a lens part of a liquid lens instrument with a surface-treated metallic lens mask, attaching the surface- treated metallic lens mask to a magnet, and masking a remaining part of the lens instrument outside an electrode deposition part thereof with a sheet mask, followed by depositing the electrode on the lens instrument, thereby easily forming the electrode of the liquid lens. The apparatus comprises a jig of a predetermined shape having an upper surface to mount a liquid lens instrument, and a lower surface to secure a magnet, a metallic lens mask attached to the magnet while masking a lens part at a center of the instrument, and a sheet mask to cover a surface of the instrument outside the lens part thereof such that the electrode is prevented from being deposited on a peripheral edge of the instrument excluding an electrode deposition part of the instrument to be deposited with the electrode of the liquid lens.

WO 2006/107151 A1

Published:
— *with international search report*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

Description

AN APPARATUS FOR EVAPORATING ELECTRODE OF LIQUID LENS

Technical Field

[1] The present invention relates to an apparatus for depositing an electrode of a liquid lens, which serves to drive the liquid lens with electric power applied thereto. More particularly, the present invention relates to an apparatus for depositing an electrode of a liquid lens, which has a simple structure configured to operate in such a way of masking a lens part of a liquid lens instrument with a surface-treated metallic lens mask, attaching the surface-treated metallic lens mask to a magnet, and masking a remaining part of the lens instrument outside an electrode deposition part thereof with a sheet mask, followed by depositing the electrode on the lens instrument, thereby easily forming the electrode of the liquid lens.

Background Art

[2] Recently, cellular camera phones are popular with young people. However, as the cellular camera phones increases in popularity, the cellular camera phones do not satisfy increased demands of consumers by only providing a function to take pictures and transmit the pictures without limitation of places and times.

[3] Moreover, there is a limitation in size reduction of the camera, especially, for a camera lens, in comparison to a size reduction degree of the cellular phone which has been accomplished with a recent technology. Specifically, although consumers generally want to take pictures of subjects while performing focusing operation freely irrespective of distances from the camera to the subjects positioned from a near distance to a far distance, it is difficult to satisfy such a demand since it requires an increase in size of the camera mounted on the cellular phone.

[4] In order to solve the problem of the typical cellular phones as described above, there has been recently developed a liquid lens,which is reduced in size, and allows the focusing operation to be freely performed.

[5] The liquid lens is developed by taking an idea from an eye lens of a person. The thickness of eye lens is regulated by muscles, which are called zonules. When seeing a subject positioned at a near distance, the zonules slacken, and make the lens thick. Since the thick lens has high refractive force (refractive index), light is refracted at a high angle while passing through the lens.

[6] On the other hand, when seeing a subject positioned at a far distance, the zonules shrink, and make the lens thin. Since the thin lens has low refractive force, light is refracted at a low angle while passing through the lens. In this manner, for the eyes of

normal eyesight, the thickness of the lens is automatically regulated so that an image of a subject is always correctly formed on the retina.

[7] The liquid lens, called a fluid-focus lens, is formed of liquid instead of glass or plastic materials, and allows a focus to be regulated by changing the surface shape of the liquid as in the eye lens.

[8] The liquid lens is formed by filling a cylindrical barrel having predetermined diameter and height with water and oil. The inner surface of the barrel is coated with a hydrophobic material, and has an affinity for the oil. Thus, a water droplet is present in an upwardly convex shape at the center thereof on the inner surface of the barrel.

[9] Here, when electric field is applied to the barrel, the hydrophobic property of the inner surface is lowered, and an affinity of the inner surface to water becomes similar to that of the oil so that the water droplet spreads in a flat shape thereon. If the intensity of the electric field increases, the inner surface of the barrel has a greater affinity for water than the oil, thereby causing the oil to be gathered at the center of the barrel, and allowing the water droplet to have a downwardly convex shape. That is, the water droplet serves as the eye lens, and variation of electric field serves as the zonules which regulate the thickness of the eye lens.

[10] As such, since the liquid lens is able to perform automatic focus regulation (auto focusing), a camera module of the cellular phone comprising the liquid lens allows the focusing operation to be performed by automatically changing the thickness according to a distance from the liquid lens to a subject without mechanically driving the liquid lens.

[11] Meanwhile, in order to allow the liquid lens to be automatically focused, it is necessary to apply electric field. Thus, it is necessary to provide a metallic electrode having an excellent conductivity to the liquid lens in order to allow application of external electric power thereto.

[12] Generally, such a conventional liquid lens is manufactured using an expensive apparatus via a complicated process such as chemical etching process and the like. Moreover, the liquid lens also requires subsidiary facilities, and a complicated depositing process, which results in an increase of manufacturing costs.

Disclosure of Invention

Technical Problem

[13] The present invention has been made to solve the above problems, and it is an object of the present invention to provide an apparatus for depositing an electrode of a liquid lens, which is configured to operate in such a way of masking a lens part of a liquid lens instrument with a metallic lens mask, attaching the lens mask to a magnet, and coating a predetermined portion outside the lens part with a metallic material,

thereby easily forming the metallic electrode which can drive the liquid lens with electric power applied thereto.

Technical Solution

[14] In accordance with one aspect of the present invention, the above and other objects can be accomplished by the provision of an apparatus for depositing an electrode of a liquid lens, comprising: a jig of a predetermined shape having an upper surface on which a liquid lens instrument is mounted, and a lower surface to which a magnet is secured; a metallic lens mask attached to the magnet while masking a lens part formed at a center of the liquid lens instrument and a sheet mask to cover a surface of the liquid lens instrument outside the lens part thereof such that the electrode of the liquid lens is prevented from being deposited on a peripheral edge of the liquid lens instrument excluding an electrode deposition part of the liquid lens instrument to be deposited with the electrode of the liquid lens.

[15] Preferably, the upper surface of the jig has a liquid lens receiving groove to mount the liquid lens instrument, and the lower surface of the jig has a magnet receiving groove to secure the magnet.

[16] Preferably, the jig is formed of a plastic material or a metallic material not reacting with the magnet. Accordingly, with the structure of the jig which does not react with the magnet, the metallic lens mask can be attached to the magnet while masking the instrumenton the upper surface of the jig.

[17] Preferably, the lens mask has a frustoconical shape or a flare shape such that a bottom surface of the lens mask having a greater diameter is brought into contact with the lens part. In addition, the bottom surface of the lens mask has a concave shape to allow only a ring-shaped peripheral edge of the bottom surface to be brought into contact with the lens part.

[18] Preferably, the ring-shaped peripheral edge of the lens mask contacting the lens part has a curved surface of a predetermined curvature or a flat surface to minimize damage of the lens part.

[19] Preferably, the lens mask is subjected to surface treatment with a coat of polymeric compounds or plastic materials in order to minimize the damage of the lens part. Preferably, the coat is one of parylene, polyethylene, polypropylene, poly vinyl chloride (PVC), acrylonitrile butadiene styrene (ABS), acryl, poly carbonate (PC), polyurethane (PU), protactinium (PA), and Teflon.

[20] Preferably, the sheet mask is formed of a plastic material or a metallic material that does not react with the magnet. Accordingly, only the lens mask reacts with the magnet, and can be securely attached to the magnet.

[21] Preferably, the electrode of the liquid lens is deposited by sputtering, thermal

vacuum deposition, or electronic beam deposition.

Advantageous Effects

[22] As apparent from the above description, one of advantageous effects of the present invention is that the apparatus employs simple instrumentation such as the surface treated metallic lens mask, and the magnet secured to a lower surface of the jig to secure the lens mask when depositing the electrode of the liquid lens, thereby considerably simplifying a process of depositing the electrode of the liquid lens.

[23] In addition, the apparatus of the present invention has other advantageous effects in that the apparatus enables a simple process in comparison to a chemical etching process, and does not require subsidiary facilities or chemical organic solvents, thereby reducing manufacturing costs for depositing the electrode of the liquid lens.

Brief Description of the Drawings

[24] The foregoing and other objects and features of the present invention will be more clearly understood from the following detailed description taken in conjunction with the accompanying drawings, in which:

[25] Fig. 1 is a view illustrating the overall configuration of an apparatus for depositing an electrode of a liquid lens in accordance with one embodiment of the present invention;

[26] Fig. 2 is a partially enlarged cross-sectional view of the apparatus shown in Fig. 1; and

[27] Fig. 3 is an enlarged perspective view illustrating a lens mask applied to the present invention.

Best Mode for Carrying Out the Invention

[28] Preferred embodiments of the present invention will be described in detail with reference to the accompanying drawings.

[29] Fig. 1 is a view illustratingthe overall configuration of an apparatus for depositing an electrode of a liquid lens in accordance with one embodiment of the present invention, and Fig. 2 is a partially enlarged cross-sectional view of the apparatus shown in Fig. 1.

[30] As shown in Fig. 1, the apparatus of the present invention comprises a jig 10 having a predetermined shape, liquid lens instruments 30 mounted on an upper surface of the jig 10, a magnet 20 secured to a lower surface of the jig 10, a lens mask 40 to mask a lens part formed at the center of each liquid lens instrument 30, and a sheet mask 50 to cover a peripheral edge of each liquid lens instrument 30.

[31] As shown in Fig. 1, the jig 10 has at least two liquid lens instruments 30 mounted on the upper surface thereof, and the magnets 20 secured to the lower surface thereof, which correspond to the liquid lens instruments 30, respectively. That is, the apparatus

according to the invention deposits electrodes of liquid lenses on the at least two liquid lens instruments 30.

[32] Fig. 2 is a partially enlarged cross-sectional view illustrating a part (denoted by mark "A" in Fig. 1) of the apparatus shown in Fig. 1.

[33] Each liquid lens instrument 30 is mounted on the upper surface of the jig 10 having the predetermined shape, and each magnet 20 is secured to the lower surface of the jig 10 on a line coaxial with the liquid lens instrument 30.

[34] Preferably, the upper surface of the jig 10 is formed with a liquid lens receiving groove 11 to allow the liquid lens instrument 30 to be mounted therein, and the lower surface of the jig 10 is formed with a magnet receiving groove 13 to allow the magnet to be secured thereto.

[35] The jig 10, where the lens instruments 30 and the magnets 20 will be mounted or secured, is formed of a plastic material or a metallic material which does not react with the magnet. Thus, only the lens mask 40 described below reacts with the magnet 20, and can be securely attached to the instrument 30.

[36] The liquid lens is formed at the center of each liquid lens instrument 30, and the metallic electrode is formed at the peripheral edge thereof, to which electric current is applied. With this structure of the invention, the electrode of the liquid lens is deposited in a ring shape on an electrode deposition part 33 of the liquid lens instrument 30 outside the lens part 31 thereof.

[37] Since the liquid lens is formed on the lens part 31 positioned at the center of the liquid lens instrument 30, it is necessary to mask the lens part 31 in order to prevent the lens part 31 from being deposited with the electrode during a process of depositing the electrode of the liquid lens on the electrode deposition part 33 of the liquid lens instrument 30.

[38] The lens part 31 of the liquid lens instrument 30 is masked by the metallic lens mask 40 having a predetermined shape. It is necessary for the lens mask 40 not to move during the process of depositing the electrode on the electrode deposition part 33 of the liquid lens instrument 30. In order to prevent the lens mask 40 from moving on the lens part 31 of the liquid lens instrument 30, the magnet 20 is secured to the lower surface of the jig 10 which has the liquid lens instrument 30 mounted on the upper surface.

[39] Thus, the lens mask 40 must be made of a metallic material which reacts with the magnet 20, and is configured to prevent the lens part 31 of the liquid lens instrument 30 from being damaged thereby.

[40] The lens mask 40 has a frustoconical shape, which is formed as shown in (a) of Fig. 3 by removing an upper portion of a cone, or a flare shape as shown in (b) of Fig. 3. With such a shape, the lens mask 40 has a bottom surface, which has a greater diameter

and is brought into contact with the lens part 31 of the liquid lens instrument 30.

[41] For the lens mask 40 configured to allow the bottom surface thereof to contact the lens part 31, the bottom surface of the lens mask 40 preferably has a concave shape 41 in order to prevent damage of the lens part 31 by minimizing a contact area between the bottom surface of the lens mask 40 and the lens part 31. With this structure, among the bottom surface of the lens mask 40, only a ring-shaped peripheral edge is brought into contact with the lens part 31.

[42] The ring-shaped peripheral edge of the bottom surface in contact with the lens part 31 preferably has a curved surface 43 having a predetermined curvature or a flat surface to prevent scratches from being formed on the lens part thereby.

[43] In order to prevent particles from being created on the lens part 31 due to damage of the lens part 31 by the lens mask 40, the lens mask 40 is subjected to surface treatment with a coat of polymeric compounds or plastic material.

[44] Preferably, the coat used for the surface treatment of the lens mask 40 includes parylene, polyethylene, polypropylene, poly vinyl chloride (PVC), acrylonitrile butadiene styrene (ABS), acryl, poly carbonate (PC), polyurethane (PU), protactinium (PA), Teflon, and the like.

[45] After one of the coats described above is applied to an overall surface of the metallic lens mask 40, the surface of the lens mask 40 is heated at a predetermined temperature, or is subjected to chemical treatment so that the lens mask 40 has a smooth surface.

[46] With the lens mask 40 masking the lens part 31 of the liquid lens instrument 30, the sheet mask 50 is covered on a portion of the liquid lens instrument 30 to deposit an electrode 60 of the liquid lens on the electrode deposition part 33.

[47] That is, the sheet mask 50 covers the peripheral edge of the liquid lens instrument 30 excluding the electrode deposition part 33, on which the electrode of the liquid lens will be deposited, among the upper surface of the liquid lens instrument 30 outside the lens part 31. Accordingly, when an electrode material is deposited on the liquid lens instrument 30 via various deposition processes, the material can be deposited only on the electrode deposition part 33, thereby forming the electrode 60 of the liquid lens.

[48] In order to allow the sheet mask 50 to cover the liquid lens instrument 30 such that the sheet mask 50 masks only a portion of the liquid lens instrument 30 excluding the lens part 31 and the electrode deposition part 33 of the liquid lens instrument 30, it is necessary for the sheet mask 50 to have a hole formed therein, which allows the lens mask 40 to be positioned therein. In addition, the sheet mask 50 is preferably formed of a plastic material or a metallic material which does not react with the magnet 20 secured to the lower surface of the jig 10.

[49] With the sheet mask 50 covering the liquid lens instrument 30, the electrode

material is deposited on the liquid lens instrument 30. Deposition of the electrode 60 may be performed by sputtering, thermal vacuum deposition, or electronic beam deposition.

[50] The apparatus for depositing the electrode of the liquid lens having the structure, operation and embodiments as described above can be applied to various deposition processes without being limited to the embodiment in which the electrode of the liquid lens is deposited. That is, when forming a predetermined pattern by a masking process, the pattern can be formed by the apparatus employing the magnet and the metallic mask having the predetermined shape.

[51] It should be understood that the embodiments and the accompanying drawings have been described for illustrative purposes and the present invention is limited only by the following claims. Further, those skilled in the art will appreciate that various modifications, additions and substitutions are allowed without departing from the scope and spirit of the invention as set forth in the accompanying claims.

[52]

Claims

[1] An apparatus for depositing an electrode of a liquid lens, comprising:
a jig of a predetermined shape having an upper surface on which a liquid lens instrument is mounted, and a lower surface to which a magnet is secured;
a metallic lens mask attached to the magnet while masking a lens part formed at a center of the liquid lens instrument; and
a sheet mask to cover a surface of the liquid lens instrument outside the lens part thereof such that the electrode of the liquid lens is prevented from being deposited on a peripheral edge of the liquid lens instrument excluding an electrode deposition part of the liquid lens instrument to be deposited with the electrode of the liquid lens.

[2] The apparatus as set forth in claim 1, wherein the upper surface of the jig has a liquid lens receiving groove to mount the liquid lens instrument.

[3] The apparatus as set forth in claim 2, wherein the lower surface of the jig has a magnet receiving groove to secure the magnet.

[4] The apparatus as set forth in claim 3, wherein the jig is formed of a plastic material or a metallic material not reacting with the magnet.

[5] The apparatus as set forth in claim 1, wherein the lens mask has a frustoconical shape or a flare shape such that a bottom surface of the lens mask having a greater diameter is brought into contact with the lens part.

[6] The apparatus as set forth in claim 5, wherein the bottom surface of the lens mask has a concave shape to allow only a ring-shaped peripheral edge of the bottom surface to be brought into contact with the lens part.

[7] The apparatus as set forth in claim 6, wherein the ring-shaped peripheral edge of the lens mask contacting the lens part has a curved surface of a predetermined curvature or a flat surface.

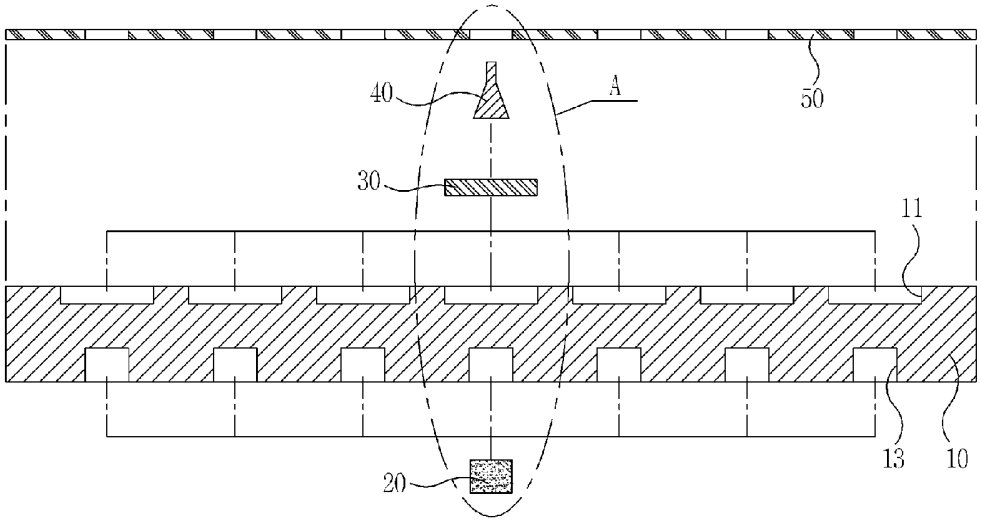
[8] The apparatus as set forth in claim 6, wherein the lens mask is subjected to surface treatment with a coat of polymeric compounds or plastic materials.

[9] The apparatus as set forth in claim 8, wherein the coat is one of parylene, polyethylene, polypropylene, poly vinyl chloride (PVC), acrylonitrile butadiene styrene (ABS), acryl, poly carbonate (PC), polyurethane (PU), protactinium (PA), and Teflon.

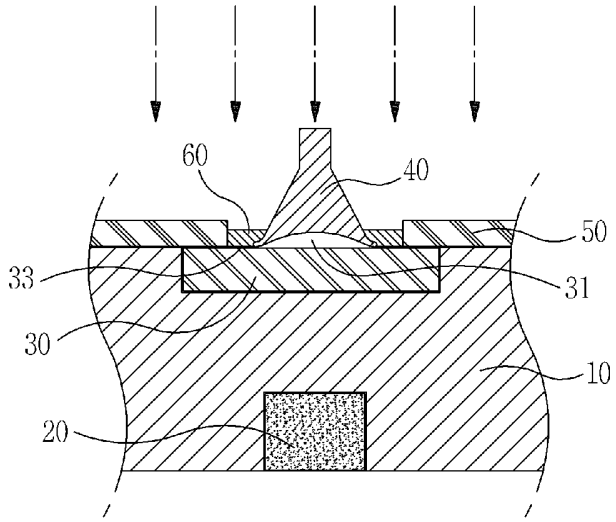
[10] The apparatus as set forth in claim 1, wherein the sheet mask is formed of a plastic material or a metallic material not reacting with the magnet.

[11] The apparatus as set forth in claim 1,wherein the electrode of the liquid lens is deposited by sputtering, thermal vacuum deposition, or electronic beam deposition.

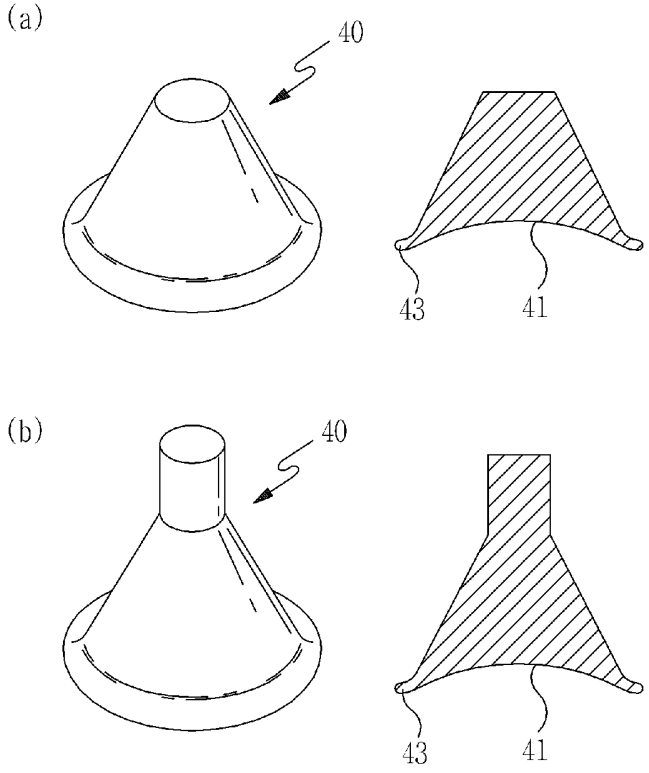
[Fig. 1]



[Fig. 2]



[Fig. 3]



INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2006/000932

A. CLASSIFICATION OF SUBJECT MATTER

C23C 14/50(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)

IPC8 C23C 14/50, C23C 14/04, G02B 1/06, H01L 21/203

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

Korean Patents and applications for inventions since 1975.
Korean Utility models and applications for Utility models since 1975.
Japanese Utility models and applications for Utility models 1975.

Electronic data base consulted during the intertnational search (name of data base and, where practicable, search terms used)

Patent and Utility Search Systemat KIPO.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	JP 03-091237 A (SHARP COPERATION) 16 April 1991 See column 5, line 2-column 6, line 8 and figure 2.	1-4, 10, 11
Y	JP 05-117839 A (DAI NIPPON PRINTING CO., LTD.) 14 May 1993 See claims 1-5, column 3, line 5-column 4, line 3 and figure 2.	1-4, 10, 11
A	JP 2003-059671 A (SONY CO., LTD.) 28 Feburary 2003 See claims 1-7 and figures 4-8.	1-11
A	KR 10-0462520 B1 (POINT CHIPS CO., LTD.) 9 December 2004 See pages 2-4 and figure 1a.	1-11
A	WO 03/069380 A1 (KONINKLIJKE PHILPS ELECTRONICS N.V.) 21 August 2003 See the abstract and figures 1-5.	1-11

☐ 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 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
14 JULY 2006 (14.07.2006)	**18 JULY 2006 (18.07.2006)**
Name and mailing address of the ISA/KR Korean Intellectual Property Office 920 Dunsan-dong, Seo-gu, Daejeon 302-701, Republic of Korea Facsimile No. 82-42-472-7140	Authorized officer LEE, Han Uk Telephone No. 82-42-481-8309

Form PCT/ISA/210 (second sheet) (April 2005)

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/KR2006/000932

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
JP03091237	16.04.1991	NONE	
JP05117839	14.05.1993	JP3465797B2	10.11.2003
		JP5117839A2	14.05.1993
JP15059671	28.02.2003	NONE	
KR100462520B1	09.06.2005	NONE	
W003069380A1	21.08.2003	AU2003201481AA	04.09.2003
		EP1478951A1	24.11.2004
		JP2005518052T2	16.06.2005
		KR1020040084902	06.10.2004
		US2005113912AA	26.05.2005
		W02003069380A1	21.08.2003