(19) Europäisches Patentamt European Patent Office Office européen des brevets

(12)



## (11) EP 2 159 479 A3

EUROPEAN PATENT APPLICATION

(88) Date of publication A3: 30.03.2011 Bulletin 2011/13

(43) Date of publication A2: 03.03.2010 Bulletin 2010/09

(21) Application number: 09010831.7

(22) Date of filing: 24.08.2009

(51) Int Cl.: **F21S 8/12** (2006.01) F21W 101/10 (2006.01)

**F21V 7/00** (2006.01) F21Y 101/02 (2006.01)

(84) Designated Contracting States:

AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO SE SI SK SM TR

Designated Extension States:

**AL BA RS** 

(30) Priority: 27.08.2008 JP 2008218478

(71) Applicant: Koito Manufacturing Co., Ltd. Tokyo 108-8711 (JP)

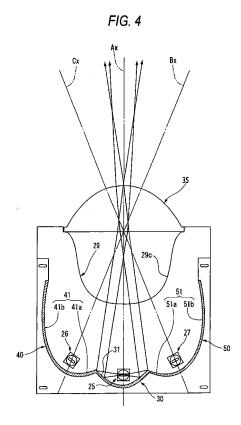
(72) Inventor: Tatsukawa, Masashi Shizuoka-shi Shizuoka (JP)

(74) Representative: HOFFMANN EITLE Patent- und Rechtsanwälte Arabellastraße 4 81925 München (DE)

## (54) Vehicle lamp unit

A vehicle lamp unit is provided. The vehicle lamp unit includes a projection lens which is disposed on an optical axis extending in a vehicle longitudinal direction; a first semiconductor light emitting element which is disposed on the optical axis behind a rear focal point of the projection lens; a center reflector which comprises a reflection surface which reflects light emitted from the first semiconductor light emitting element in a forward direction toward the optical axis; a plurality of second semiconductor light emitting elements which are disposed, respectively, on a pair of reference axes and behind the rear focal point of the projection lens, the pair of reference axes each extending in a direction tiled with respect to the optical axis; and a plurality of side reflector reflectors, which correspond to respective ones of the plurality of second semiconductor light emitting elements. Each of the side reflectors comprises a reflection surface which reflects light emitted from the corresponding second semiconductor light emitting elements element in the forward direction toward the corresponding reference axis. The reflection surface of each of the side reflectors comprises an inner reflection surface and an outer reflection surface. The inner reflection surface on a side of the corresponding reference axis closest to the optical axis of the reflection surface of the side reflector on the side of the optical axis is formed as a connection reflection region having light collecting power smaller than that of the reflection surface of the center reflector. The outer reflection surface on a side of the corresponding reference axis opposite from the optical axis of the reflection surface of

the side reflector on the opposite side of the optical axis is formed as a diffusion reflection region having light collecting power smaller than that of the connection reflection region.





## **EUROPEAN SEARCH REPORT**

Application Number EP 09 01 0831

	Citation of document with indi	cation where appropriate	Relevant	CLASSIFICATION OF THE
Category	of relevant passag		to claim	APPLICATION (IPC)
A,D	JP 2005 317226 A (KO 10 November 2005 (20 * abstract; figures	05-11-10)	1-4	INV. F21S8/12 F21V7/00
Α	DE 196 54 265 A1 (KO 3 July 1997 (1997-07 * figure 3 *		1-4	ADD. F21W101/10 F21Y101/02
A	EP 1 538 021 A2 (ICH [JP]) 8 June 2005 (2 * figure 1 *	IKOH INDUSTRIES LTD 005-06-08)	1-4	
A	DE 101 05 303 A1 (B0 8 August 2002 (2002- * figures *	 SCH GMBH ROBERT [DE]) 08-08) 	1-4	
				TECHNICAL FIELDS SEARCHED (IPC) F21S F21V
	The present search report has be	•		
	Place of search  Munich	Date of completion of the search  16 February 2011	Dar	Examiner natsas, Adam
X : part Y : part docu A : tech	ATEGORY OF CITED DOCUMENTS icularly relevant if taken alone icularly relevant if combined with another iment of the same category nological background -written disclosure	T : theory or principl E : earlier patent do after the filing da D : document cited i L : document cited f	le underlying the i cument, but publi te in the application or other reasons	invention shed on, or

## ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO.

EP 09 01 0831

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

16-02-2011

DE 19654265	A1 03	3-07-1997 3-06-2005	JP JP US DE 6 JP US	4459702 3193603 9180504 5941633 	B2 A A T2 A	28-04-2 30-07-2 11-07-1 24-08-1 12-02-2 14-07-2 16-06-2
EP 1538021	A2 08	3-06-2005	JP US DE 6 JP US	9180504 5941633 	A A  T2 A	11-07-1 24-08-1 12-02-2 14-07-2
			JP US	2005190990 2005128765	Α	14-07-2
DE 10105303	A1 08	3-08-2002	NONE			
e details about this annex : s						