



(51) International Patent Classification:

G01J 5/08 (2006.01) G01J 5/52 (2006.01)
G01J 5/02 (2006.01) G01J 5/62 (2006.01)
G01J 5/04 (2006.01) H04M 1/02 (2006.01)
G01J 5/00 (2006.01)

(21) International Application Number:

PCT/US2014/073098

(22) International Filing Date:

31 December 2014 (31.12.2014)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

PCT/US2013/078551

31 December 2013 (31.12.2013)

61/923,742 5 January 2014 (05.01.2014)

14/246,006 4 April 2014 (04.04.2014)

14/281,883 19 May 2014 (19.05.2014)

14/299,987 9 June 2014 (09.06.2014)

PCT/US2014/059200

3 October 2014 (03.10.2014)

(63) Related by continuation (CON) or continuation-in-part (CIP) to earlier application:

US 14/281,883 (CIP)

Filed on 19 May 2014 (19.05.2014)

(71) Applicant: FLIR SYSTEMS, INC. [US/US]; 27700 SW Parkway Ave., Wilsonville, Oregon 97070 (US).

(72) Inventor: KENT, Michael; Flir Systems, Inc., 70 Castilian Drive, Goleta, California 93117-3027 (US).

(74) Agent: FOLSOM, Brent A.; Haynes And Boone, LLP, 2323 Victory Avenue Suite 700, Dallas, Texas 75219-7673 (US).

[Continued on next page]

(54) Title: TECHNIQUES FOR DEVICE ATTACHMENT WITH DUAL BAND IMAGING SENSOR

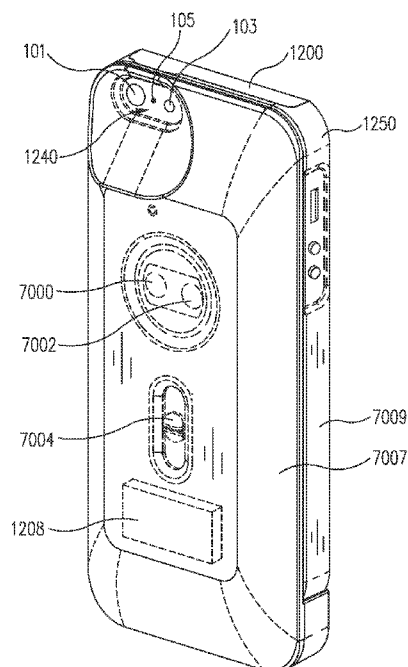


FIG. 1

(57) Abstract: Various techniques are disclosed for providing a device attachment configured to releasably attach to and provide infrared imaging functionality to mobile phones or other portable electronic devices. The device attachment may include an infrared imaging module and a non-thermal imaging module that cooperate with one or more of a non-thermal imaging module in an attached device and a light source in the attached device for capturing and processing images. In particular, a thermal imaging module is coupled to a non-thermal imaging module via a bridge in order to substantially maintain a position of the thermal imaging module relative to the non thermal imaging module. Further, a thermal imaging module may be provided with a switch assembly to control a shutter and to switch on and off the device.



(81) **Designated States** (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, 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, IR, IS, JP, KE, KG, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) **Designated States** (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ,

TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Published:

- with international search report (Art. 21(3))
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))

(88) **Date of publication of the international search report:**

3 September 2015

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2014/073098

A. CLASSIFICATION OF SUBJECT MATTER

INV. G01J5/08 G01J5/02 G01J5/04 G01J5/00 G01J5/52
G01J5/62 H04M1/02

ADD.

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)

G01J H04M H04N G03B

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)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2013/270441 A1 (BURT WARN [US] ET AL) 17 October 2013 (2013-10-17)	1-3,5-8, 10
Y	abstract; figures 1,12 -----	4,9
X	DE 10 2009 040017 A1 (BEAUJEAN RENE [DE]; LINDNER BJOERN [DE]; PHILIPPS JUERGEN [DE]) 24 March 2011 (2011-03-24)	1-3,5-8, 10
Y	paragraph [0052]; figure 3 -----	4,9
Y	US 6 081 331 A (TEICHMANN HELMUT [CH]) 27 June 2000 (2000-06-27)	4,9
	abstract; figure 7 -----	
A	US 4 754 139 A (ENNULAT REINHARD D [US] ET AL) 28 June 1988 (1988-06-28)	5,10
	abstract; figures 1-3 ----- -/-	

☒ 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

3 July 2015

Date of mailing of the international search report

14/07/2015

Name and mailing address of the ISA/

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040,
Fax: (+31-70) 340-3016

Authorized officer

Schmidt, Charlotte

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2014/073098

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X,P	WO 2014/105993 A1 (FLIR SYSTEMS [US]) 3 July 2014 (2014-07-03) page 31, line 3 - line 21; figure 8 -----	1-3,6-8
X	WO 2006/060746 A2 (INFRARED SOLUTIONS INC [US]; JOHNSON KIRK R [US]; MCMANUS THOMAS J [US] 8 June 2006 (2006-06-08) abstract; figures 1,4 -----	1-3,6-8
X	US 8 373 757 B1 (NGUYEN VU L [US]) 12 February 2013 (2013-02-12)	11,16
Y	column 4, line 33 - column 5, line 3; figure 1 -----	12-15, 17-20
Y	US 6 995 359 B1 (HILLENBRAND ERIC A [US] ET AL) 7 February 2006 (2006-02-07) column 8, line 5 - column 9, line 29; figure 5 -----	12-15, 17-20
Y	JP 2001 309003 A (MATSUSHITA ELECTRIC IND CO LTD) 2 November 2001 (2001-11-02) paragraphs [0018], [0019]; figures 8, 9 -----	12-15, 17-20
Y	US 2004/041935 A1 (NAGAMINE TOMOYUKI [JP] ET AL) 4 March 2004 (2004-03-04) figures 3, 4 -----	12-15, 17-20
X,P	WO 2014/105241 A1 (FLIR SYSTEMS [US]) 3 July 2014 (2014-07-03) page 40, line 23 - page 42, line 14; figures 28-30 -----	11-20

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2014/073098

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☒ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☒ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-10

A device and a method comprising a thermal and a non-thermal imaging module wherein a bridge is provided between the modules. This solves the problem of maintaining relative position between the modules.

2. claims: 11-20

A device and a method comprising a thermal imaging module wherein a switch is provided for on/off and control of a shutter. This solves the problem of controlling blocking of the thermal module.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2014/073098

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2013270441 A1	17-10-2013	NONE	
DE 102009040017 A1	24-03-2011	DE 102009040017 A1	24-03-2011
		US 2011118608 A1	19-05-2011
US 6081331 A	27-06-2000	CA 2262158 A1	11-09-1999
		EP 0942267 A1	15-09-1999
		JP 2000065642 A	03-03-2000
		US 6081331 A	27-06-2000
US 4754139 A	28-06-1988	NONE	
WO 2014105993 A1	03-07-2014	NONE	
WO 2006060746 A2	08-06-2006	CN 101111748 A	23-01-2008
		EP 1831657 A2	12-09-2007
		US 2006249679 A1	09-11-2006
		US 2006289772 A1	28-12-2006
		US 2009302219 A1	10-12-2009
		WO 2006060746 A2	08-06-2006
US 8373757 B1	12-02-2013	NONE	
US 6995359 B1	07-02-2006	NONE	
JP 2001309003 A	02-11-2001	NONE	
US 2004041935 A1	04-03-2004	JP 4031325 B2	09-01-2008
		JP 2004096330 A	25-03-2004
		US 2004041935 A1	04-03-2004
		US 2008220817 A1	11-09-2008
WO 2014105241 A1	03-07-2014	NONE	