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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/569,173	02/22/2006	Mark T. Johnson	GB030145	7872

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P.O. BOX 3001
BRIARCLIFF MANOR, NY 10510

EXAMINER	
CRAWLEY, KEITH L	

ART UNIT	PAPER NUMBER
2629	

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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.	Applicant(s)	
	10/569,173	JOHNSON ET AL.	
	Examiner	Art Unit	
	KEITH CRAWLEY	2629	

-- 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 *04 May 2009*.

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

3)☐ 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

4)☒ Claim(s) *1-13* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-13* is/are rejected.

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

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

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ 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).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

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).

a)☐ All b)☐ Some * c)☐ None of:

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) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Specification

1. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-4, 7, and 12-13 are rejected under 35 U.S.C. 102(b) as being anticipated by Reddy (US 6,175,355).

Regarding claim 1, Reddy discloses an active matrix display device (col. 1, line 62, reference is directed to "digital display panel") comprising: a display with a plurality of display pixels (fig. 1, also col. 1, line 63-64);

a data input for receiving a data signal (fig. 5b, “display data” is input to delay flip-flop 140, see also col. 6, line 48-50);

a controller for distributing said data signal over said display pixels (fig. 5b, see also col. 7, line 3-8, output values “fre” are coupled to display panel) to generate an image on said display with an overall brightness value for each display pixel during at

least one frame period (col. 1, line 64-67, overall brightness value is called a “grayscale level”),

wherein said device is adapted to divide said frame period (col. 1, line 67-col. 2, line 1, frame is divided into sub-frames) for at least one subset of said display pixels (col. 2, line 11-15, display is divided into subsets of pixels called “blocks”)

such that said display pixels of said at least one subset have at least a light output at a first non-zero brightness level during a first sub-period of said frame period and at a second non-zero brightness level during a second sub-period of said frame period (col. 3, line 30-41, pulse width modulation scheme using 16 sub-frames is described, see also table 1 and col. 4, line 7-10; specifically with reference to table 1, for grey level 3, the first sub-period from PS0 to PS7 has a first non-zero brightness level and the second sub-period from PS8 to PS15 has a second non-zero brightness level)

the time averaged sum of said brightness levels being substantially equal to said overall brightness level (col. 1, line 18-28, see also col. 4, line 7-10).

Regarding claim 2, Reddy discloses an active matrix display device according to claim 1, wherein said display is a colour display and said subset is defined by colour (R, G, B) (col. 3, line 10-13 and line 19-22, reference can be applied to display panel for each of three sub-pixels, see also col. 1, line 29-32).

Regarding claim 3, Reddy discloses an active matrix display device according to claim 1, wherein said device is adapted to determine one or more particular areas of

said display and said subset is defined by said areas (fig. 1, see also col. 2, line 15-17, blocks can be arranged as four-by-four arrays).

Regarding claim 4, Reddy discloses an active matrix display device according to claim 1, wherein said device is adapted to determine the total time during which said display pixels have had a light output (col. 3, line 61-65, also figs. 3 and 4, total time is called a “display frame”)

and said subset is defined by said total time (col. 4, line 14-20, sequences of pixel sub-frames are temporally dispersed via pixel and block dispersion).

Regarding claim 7, Reddy discloses an active matrix display device according to claim 1, wherein said device is adapted to supply a select signal for selecting said display pixels of said subset (fig. 5a, see col. 5, line 46-48, pixel counter 108 and line counter 110 identify each pixel in a four-by-four array),

said select signal comprising at least a first select signal triggering said first sub-period and a second select signal triggering said second sub-period (fig. 5b, see col. 6, line 61-67, the value “frame_modulation” is coupled to a select input of multiplexer 142 to select a greyscale value for each sub-frame identified by “sub-frame_cnt”).

Regarding claim 12, Reddy discloses an electronic device comprising an active matrix display device according to claim 1 (col. 1, line 33-34, a digital display system is discussed, see also rationale for claim 1).

Regarding claim 13, Reddy discloses wherein the first and second sub-periods are adjacent in time (table 1, for grey level 3, the first sub-period from PS0 to PS7 is adjacent in time to the second sub-period from PS8 to PS15, see col. 3, line 24-42).

Claim Rejections - 35 USC § 103

3. 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.

4. Claims 5, 6, 8, and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Reddy in view of Koyama (US 6,828,950).

Regarding claim 5, Reddy fails to disclose wherein said first brightness level exceeds said second brightness level.

Koyama teaches wherein said first brightness level exceeds said second brightness level (fig. 2, frame period is divided into sub-frames with V1>V2, fig. 4 shows that as applied voltage increases, so does current; see also col. 6, line 27-28, brightness is proportional to current, so brightness of first sub-frame exceeds brightness of second sub-frame).

Both Reddy and Koyama are directed to grayscale schemes utilizing sub-frame periods, therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the pixel modulating techniques of Reddy with the driving method and display of Koyama since such a modification provides a display device with high image quality (Koyama, col. 31, line 13-14) and does not induce motion artifacts into the image (Reddy, col. 1, line 56-58).

Regarding claim 6, Reddy fails to disclose wherein said first sub-period has a shorter duration than said second sub-period.

Koyama teaches wherein said first sub-period has a shorter duration than said second sub-period (col. 13, line 7-12, length of display period of the sub-frame periods can be varied).

Regarding claim 8, Reddy fails to disclose wherein said display pixels comprise current emissive elements driven by drive elements and said device is adapted to vary a voltage for said drive elements such that said at least one subset of current emissive elements is driven to at least said first brightness level during said first sub-period and said second brightness level during said second sub-period.

Koyama teaches wherein said display pixels comprise current emissive elements (fig. 5, EL element 304, see also col. 3, line 10-12) driven by drive elements (fig. 6, source and gate line driving circuits)

and said device is adapted to vary a voltage for said drive elements (fig. 2, EL driving voltage) such that said at least one subset (base reference, see claim 1) of current emissive elements is driven to at least said first brightness level during said first sub-period and said second brightness level during said second sub-period (same rationale as claims 5 and 11).

Regarding claim 11, Reddy fails to disclose wherein said device is adapted to generate said light output such that said second brightness level has a brightness that is 30% or less than said first brightness level.

Koyama teaches wherein said device is adapted to generate said light output such that said second brightness level has a brightness that is 30% or less than said first brightness level (col. 13, line 7-12 and line 24-31, by varying length of display periods of sub-frames and varying the current [brightness is proportional to current, see col. 12, line 43-57], second brightness level can be 30% or less than first brightness level, see also fig. 19).

5. Claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Reddy in view of Yamazaki et al. (US 7,145,536).

Regarding claim 9, Reddy discloses that said light output of said display pixels of said at least one subset yields said first brightness level during said first sub-period and said second brightness level during said second sub-period (same rationale as claim 1).

Reddy fails to disclose wherein said display is an active matrix liquid crystal display, said device comprising a backlight and being adapted to control said backlight.

Yamazaki teaches wherein said display is an active matrix liquid crystal display (abstract), said device comprising a backlight and being adapted to control said backlight (inherent in liquid crystal displays).

Both Reddy and Yamazaki are directed to grayscale schemes utilizing sub-frame periods, therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the pixel modulating techniques of Reddy with the active matrix liquid crystal display and driving scheme of Yamazaki since such a modification provides a liquid crystal display device with high precision, high resolution, and multi grey scale (Yamazaki, col. 2, line 4-6) and does not induce motion artifacts into the image (Reddy, col. 1, line 56-58).

Regarding claim 10, Reddy fails to disclose wherein said display is a colour display and said backlight is a LED-backlight or a colour sequential backlight.

Yamazaki teaches wherein said display is a colour display (col. 29, line 27-33) and said backlight is a LED-backlight or a colour sequential backlight (col. 29, line 24-25).

Response to Arguments

2. Applicant's arguments filed 5/4/09 have been fully considered but they are not persuasive.

Regarding claims 1-4, 7, and 12, Applicant argues the PWM modulation of the pixels in Reddy, that have a time average sum substantially equal to the overall brightness, do not have a non-zero brightness. Examiner respectfully disagrees. Reddy discloses in table 1, for grey level 3, a first sub-period from PS0 to PS7 that has a first non-zero brightness level and a second sub-period from PS8 to PS15 that has a second non-zero brightness level. Thus, Reddy does disclose "display pixels of said at least one subset have at least a light output at a first non-zero brightness level during a first sub-period of said frame period and at a second non-zero brightness level during a second sub-period of said frame period, the time averaged sum of said brightness levels being substantially equal to said overall brightness level", as addressed in the above rejection of claim 1.

Regarding claims 5, 6, and 11, Applicant argues that the control of the brightness of the pixels in Koyama do not provide a time average sum substantially equal to the overall brightness do not have a non-zero brightness. Reddy discloses these limitations as stated in the above rejection and thus the combination of Reddy and Koyama does disclose "display pixels of said at least one subset have at least a light output at a first non-zero brightness level during a first sub-period of said frame period and at a second non-zero brightness level during a second sub-period of said frame period, the time averaged sum of said brightness levels being substantially equal to said overall brightness level", as addressed in the above rejection of claim 1.

Regarding claims 9 and 10, Applicant argues the control of the brightness of the pixels in Koyama do not provide a time average sum substantially equal to the overall brightness do not have a non-zero brightness. The Koyama reference is not used in the rejection of claims 9 and 10, thus this argument is not germane.

Conclusion

3. **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 KEITH CRAWLEY whose telephone number is (571)270-7616. The examiner can normally be reached on M-F, 7:30-5:00 EST, alternate Fri. off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bipin Shalwala can be reached on (571)272-7681. 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.

/Bipin Shalwala/
Supervisory Patent Examiner, Art Unit 2629

/KEITH CRAWLEY/
Examiner, Art Unit 2629