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BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte SHENG QIANG and AARON JACKSON

Appeal 2018-006134
Application 14/812,858
Technology Center 2600

Before MICHAEL J. STRAUSS, KARA L. SZPONDOWSKI, and JOHN R. KENNY, Administrative Patent Judges.

KENNY, *Administrative Patent Judge.*

DECISION ON APPEAL

STATEMENT OF THE CASE

Pursuant to 35 U.S.C. § 134(a), Appellant[1] appeals from the Examiner's decision to reject claims 1–5, 7–13, and 15–22. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

[1] We use the word Appellant to refer to "applicant" as defined in 37 C.F.R. § 1.42(a). Appellant identifies the real party in interest as Samsung Electronics Co., LTD. Appeal Br. 3.

SPECIFICATION

Appellant's Specification relates to a "low-power written input for an electronic device." Spec. ¶ 4. A disclosed method "determin[es] whether a writing utensil is within a predetermined proximity of [a] display panel while a display panel of the electronic device is powered off." *Id.* ¶ 5. If the "writing utensil is within the predetermined proximity, [the method] activat[es] a black screen display mode for the display panel." *Id.* "Additionally, the method . . . activat[es] individual pixels corresponding to locations where the writing utensil contacted the electronic device to display a contrasting color." *Id.*

ILLUSTRATIVE CLAIM

Claim 1 reproduced below (with disputed limitations italicized), is illustrative of the claimed subject matter:

> 1. A method of operating an electronic device to display a user input, the method comprising:
>
> determining whether a writing utensil is within a predetermined proximity of a display panel of the electronic device while the display panel of the electronic device is powered off;
>
> in response to determining that a writing utensil is within the predetermined proximity, activating a black screen display mode for the display panel, wherein the black screen display mode is a low power mode that when activated *the display panel is powered on while pixels in the display panel do not emit light*; and
>
> *in response to detecting the writing utensil contacting a surface of the electronic device while the black screen display mode is activated, activating individual pixels corresponding to locations where the writing utensil contacted the electronic device to emit light.*

REFERENCES

Name	Reference	Date
Tsirkel	US 2003/0051182 A1	Mar. 13, 2003
Liu	US 2013/0082937 A1	Apr. 4, 2013
Newman	US 2013/0111579 A1	May 2, 2013
Tuli	US 2016/0301796 A1	Oct. 13, 2016

REJECTIONS

Claims 1, 5–9, and 13–17 stand rejected under 35 U.S.C. § 103(a) as unpatentable over the combination of Liu and Newman. Final Act. 3.

Claims 2, 3, 10, 11, 18, 19, 21, and 22 stand rejected under 35 U.S.C. § 103(a) as unpatentable over the combination of Liu, Newman, and Tsirkel. Final Act. 4.

Claims 4, 12, and 20 stand rejected under 35 U.S.C. § 103(a) as unpatentable over the combination of Liu, Newman, and Tuli. Final Act. 5.

OPINION

A. Claims 1, 5, 7–9, 13 and 15–17

Appellant argues that claims 1, 5, 7–9 and 15–17 can be considered together, specifically addressing the rejection of claim 1. Appeal Br. 11. We select claim 1 as representative of this group of claims.[2]

1. Not-Emitting-Light Limitation

Appellant argues that the cited prior art does not teach or suggest that "the display panel is powered on while pixels in the display do not emit light," as recited in claim 1. Appeal Br. 12–19. The Examiner finds that the combination of Liu and Newman discloses this limitation. Ans. 2–3. In

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[2] Appellant also argues each claim on appeal should be considered separately, or at least each claim that is argued separately should be considered separately. Appeal Br. 27. We do the latter. *See* 37 C.F.R. § 41.37(iv).

particular, the Examiner finds that Liu discloses a low power state in which its display 111 is triggered by the proximity of a stylus. *Id*. Although the Examiner finds that Liu does not expressly teach the use of a dark background (Final Act. 3), the Examiner finds that Newman teaches displaying active pixels (text) as white with a black background. Final Act. 3; Ans. 3. Further, the Examiner finds that black pixels in an OLED display, like Newman's background pixels, do not emit light. Ans. 3. In addition, the Examiner determines that an ordinarily skilled artisan would combine the teachings of Liu and Newman because Liu teaches that power reduction is desirable and Newman teaches that power consumption is reduced by using a black background. *Id.* at 4.

Appellant disagrees, arguing that Newman's white-on-black display emits light and, thus, the cited prior art does not satisfy the not-emitting-light limitation of claim 1. Appeal Br. 15. Appellant notes that Newman does not state that it has a black screen display mode or that the pixels in its display panel do not emit light while the display panel is on. *Id.* Appellant asserts that Newman simply stands for the principle that alternating text and background colors can save display power, not that pixels in a display would not emit light. *Id.*

We are not persuaded by Appellant's arguments. Appellant does not dispute the Examiner's finding that black pixels in an OLED display do not emit light. Ans. 3; Reply Br, generally. Instead, Appellant merely argues that Newman does not state that fact. Reply Br. 5. A reference, however, need not state what is already known to an ordinarily skilled artisan. *See* Ex. A, 3 ("An OLED instead turns the pixel off entirely to produce the color black."). Therefore, the white text on a black background in Newman's display means that the pixels in that display with white text emit light, and the pixels that are part of the black background do not. The latter are the recited "pixels in the display [that] do not emit light."

Claim 1 does not require that no pixels emit light, rather it merely requires that some pixels do not emit light. And Newman's pixels in its black background satisfy that requirement. Thus, we agree with the Examiner that the combination of Liu and Newman teaches the not-emitting-light limitation of claim 1. Ans. 2–3.

2. Activating Limitation

Appellant argues that the cited prior art does not teach or suggest "in response to detecting the writing utensil contacting a surface of the electronic device while the black screen display mode is activated, activating individual pixels corresponding to locations where the writing utensil contacted the electronic device to emit light," as recited by claim 1. Appeal Br. 19.

The Examiner finds that the combination of Liu and Newman teach the activating limitation of claim 1. Ans. 4–5. As discussed above, the Examiner finds that Liu discloses a low power state that is triggered by the presence of a stylus. Also as discussed above, the Examiner finds that an ordinarily skilled artisan would combine Liu's lower power state with Newman's teaching of using white text on a black background. Further, the Examiner finds that Liu activates pixels to show handwritten text, and that with Newman's white-on-black writing, the white pixels would be activated when the writing occurs. *Id.* at 5.

Appellant disagrees, arguing that Liu is silent as to any individual pixel activation during a black screen display mode. Appeal Br. 20; Reply

Br. 7–10. Appellant further argues that Newman does not disclose anything about pixel behavior during handwritten input. Appeal Br. 21; Reply Br. 9.

We are not persuaded by these arguments. As discussed above, the Examiner's finding that black pixels in an OLED do not emit light is undisputed. Therefore, as the Examiner finds, for the OLED pixels to change from black to white and emit light, they must be activated. Ans. 4–5. Accordingly, the writing of the white text on the black background taught by Newman activates the pixels that turn white, and we agree with the Examiner that the combination of Liu and Newman teaches the activating limitation. *Id.*

3. Asserted Teaching Away

Appellant argues that Liu teaches away from the not-emitting-light limitation of claim 1 because Liu teaches (i) reducing power by not fully powering the processor (ii) while powering the display. Appeal Br. 16. Appellant argues that these teachings in Liu would discourage an ordinarily skilled artisan from practicing the claimed invention. *Id.* We are not persuaded.

We agree with the Examiner that the mere fact that Liu teaches one technique for reducing power (i.e., not fully powering the processor) would not discourage an ordinarily skilled artisan from additionally using another technique for reducing power (i.e., a black background). Ans. 3–4. Appellant has not presented any persuasive argument or evidence indicating that the two techniques are incompatible, and we are not persuaded that the powering of the display in Liu would discourage the use of a black background. As indicated above, black pixels in an OLED do not emit light even when the OLED's display is powered. Thus, we agree with the

Examiner that Liu does not teach away from the claimed invention, and we sustain the rejection of claim 1 and of claims 5, 7–9, 13 and 15–17, not separately argued. Appeal Br. 11.

B. Claims 2, 10, 18, 21, and 22

Appellant presents the same arguments for claims 2, 10, 18, 21, and 22 as for claim 1. Appeal Br. 23. Thus, we sustain the rejection of claims 2, 10, 18, 21, and 22.

C. Claims 3, 11, and 19

Appellant acknowledges that claim 3 is representative of the group of claims 3, 11, and 19. Appeal Br. 23. Thus, we treat claim 3 accordingly.

Appellant argues that the cited prior art does not teach or suggest "storing the input result without powering on the display panel beyond the black screen display mode and the activated individual pixels," as recited by claim 3. Appeal Br. 24. The Examiner finds that the combination of Liu, Newman, and Tsirkel teach this limitation. Ans. 5–6. In particular, the Examiner finds that Liu teaches storing information input into the display. Newman teaches using a black screen with activated pixels, and Tsirkel teaches storing data after a time out without user intervention. *Id.* at 6. The Examiner determines that these combined findings teach the disputed limitation. *Id.*

Appellant argues that neither Newman nor Liu individually teach saving inputs without powering on the display panel beyond the black screen mode and the activated individual pixels. Reply Br. 12. That argument, however, is not responsive to the Examiner's rejection because the Examiner relies on the combination of Newman and Liu (with Tsirkel) for that limitation. Ans. 5–6. "Non-obviousness cannot be established by attacking references individually where the rejection is based upon the teachings of a combination of references." *In re Merck & Co., Inc.*, 800 F.2d 1091, 1097 (Fed. Cir. 1986) (citing *In re Keller*, 642 F.2d 413, 425 (CCPA 1981)). Accordingly, we sustain the rejection of claim 3 and of claims 11 and 19, not separately argued. Appeal Br. 23.

CONCLUSION

The Examiner's rejections of claims 1–5, 7–13, 15–22 are affirmed.

DECISION SUMMARY

In summary:

Claims Rejected	35 U.S.C. §	Basis	Affirmed	Reversed
1, 5–9, and 13–17	103	Liu and Newman	1, 5–9, and 13–17	
2, 3, 10, 11, 18, 19, 21, 22	103	Liu, Newman, Tsirkel	2, 3, 10, 11, 18, 19, 21, 22	
4, 12, 20	103	Liu, Newman, Tuli	4, 12, 20	
Overall			1–5, 7–13, 15–22	

TIME PERIOD FOR RESPONSE

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a). *See* 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED

Add A Page | Delete Last Page

Notice of References Cited	Application/Control No. 14/812,858	Applicant(s)/Patent Under Reexamination
	Examiner	Art Unit Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification	
1	A	US-			1	1
	B	US-				
	C	US-				
	D	US-				
	E	US-				
	F	US-				
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	H	US-				
	I	US-				
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FOREIGN PATENT DOCUMENTS

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NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	Exhibit A
	V	
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*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.

TELEVISION

Why Is OLED Different and What Makes It So Great?

Andrew Tarantola
11/06/14 11:05AM • Filed to: GIZ EXPLAINS

I have seen the future of high definition displays and lo, it is glorious. Not to mention rollable, foldable, and clearly superior to LCD/LED—really every other panel technology available today.

What is OLED and how does it work?

OLED, or Organic Light Emitting Diodes, are an offshoot of existing conventional LED technology. LEDs are semiconducting light sources that function through electroluminescence—that is, they produce photons (aka light) by plopping electrons into little electron holes within the device's emissive layer. Basically, electricity goes in and light comes out thanks to a semiconductuctive material, rather than a white-hot metal filament like an old-school lightbulb.

OLED technology, first successfully implemented in 1987 by Kodak researchers Ching W. Tang and Steven Van Slyke, takes this same idea as LED, but flattens it. Rather than an array of individual LED *bulbs*, OLED uses a series of thin, light emitting *films*. This allows the OLED array to produce brighter light while using less energy than existing LCD/LED technologies. And since these light-emitting films are composed of hydrocarbon chains, rather than semiconductors laden with heavy metals like gallium arsenide phosphide, they get that "O" for "organic" in their name.

An OLED panel is typically composed of four primary layers: The substrate, which acts as the structural framework; the anode, which draws electrons; the cathode, which provides electrons; and the organic layer between. That organic layer is further divided into a conducting layer—which provides the "electron holes" that the electrons flowing through layer can snap into, shedding energy in the process—and an emissive layer where the light is actually produced. And if you want to start messing with producing actual color, it's just a matter of adding red-, green-, and blue-tinted plastic layers to the substrate.

There are additional flavors of OLEDs that are better for different kinds of devices. When a device only needs to display a static pattern with relatively slow refreshes—like the LCD readout of a calculator or e-ink displays of the Kindle Paperwhite—you can use something called a passive matrix OLED (or a PMOLED). These work by turning on voltage to specific areas of the film and leaving them on until the device refreshes its instructions.

Then there's active matrix OLEDs, like the AMOLEDs you might find in a smart phone. These are for high-definition applications that demand fast refresh rates, such as smartphone screens or HD televisions. AMOLED displays require a thin film transistor back-plane to actually drive each of the individual pixels, but this layer is just as flexible as the others, allowing for the development of rollable, foldable, transparent display panel prototypes.

Why's it so great?

The LEDs in today's LED televisions are actually used only to provide a white back light, which then shines through a rapidly-refreshing LCD shutter array which tints the emanating light. OLEDs, on the other hand, operate as both light source and color array simultaneously. This may not sound like a big difference, but does offer a wide range of benefits including:

- **Lower power consumption** - An OLED display doesn't need any of the electronics and circuitry used to drive the LED back light *and* LCD shutter from a LED display, which makes OLEDs more efficient. LED screens produce black simply by fully closing the pixel shutter—the back light is still shining (it never actually turns off) but the light itself is being blocked. An OLED instead turns the pixel off entirely to produce the color black, saving energy in the process.
- **Better picture quality** - Since OLEDs incorporate their own color filters, they can produce deeper blacks and a wider gamut array. The lack of a permanently-on backlight promotes higher contrast ratios (the difference between the brightest and darkest pixels on the screen). And thanks to the lack of a shutter array, OLED displays can have refresh rates that are an order magnitude faster than those of LCD/LED sets. We're talking a boost from 480 Hz to 100,000 Hz—theoretically, at least. On top of that, OLEDs offer an impressively wide viewing angle—nearing 90 degrees off center for many panels—without the color and clarity losses seen in traditional LEDs.
- **Better durability and lighter weight** - Ditching the back light and shutter arrays also means manufacturers can replace the heavier, shatter-prone glass substrates often used in LED displays with lighter, stronger plastic substrates. And with the advent of injet-based

printable OLEDs, these light producing compounds can be applied to more exotic and malleable surfaces. Additionally, the OLED films themselves are quite durable and can withstand a wider operating temperature range than regular LEDs without failing.

- **The price is only going down from here** - The ability to simply print out OLEDs as you would a term paper or silk-screened t-shirt holds incredible technological potential. It's also ludicrously expensive at present—look to spend about triple for an OLED set than a conventional LCD/LED these days—but once roll-to-roll production capabilities are scaled up sufficiently, the cost of spitting out an OLED panel should drop below what we're paying to make current generation LEDs.

It's not perfect but it's close

OLED technology isn't without its drawbacks and shortcomings. The biggest issue facing OLED right now is the fact that the material used to produce blue light degrades at a much faster rate than the other hues, which eventually throws off the color balance and reduces the overall brightness of the display.

This forces manufacturers to compensate by, say, drastically increasing the size of the blue sub-pixel to as much as double the green and red, or requiring the consumer to continually fiddle with the calibration. Luckily, a great deal of research has been made into improving the efficiency and lifespan of blue OLED, culminating in a recent breakthrough that has brought the hue up to par with its other subpixels.

To be clear, the composition of the display panel—whether it's a CRT, plasma, LED, or OLED—has very little to do with the resolution of the screen. The terms, HD, 4K, and UltraHD all refer to the number of pixels the manufacturer can pack into a panel, not what those pixels are made of or how they work. This is why you can find sets like Sony's flagship 4K XBR-65X950B using LCD/LED panels and 1080p sets like the LG EC 9300 sporting OLED displays.

If you're currently in the market for a TV that is both future-proof *and* offers a superior image, you're going to be paying through the nose for something like LG's obscenely expensive 4K OLEDs. Conversely, you could split the difference, depending on how soon you think you'll be buying your next set, and either opt for a 4K LCD/LED or a 1080p OLED. Just don't waste your cash on a 1080p LED; that tech is already in the past, replaced by a bright and glorious future. [OLED Info - Wiki 1, 2 - How Stuff Works - Explain that Stuff - PC Mag - Cornell University]

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