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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte YOUNG JOON LEE

Appeal 2017-009081
Application 14/495,552[1]
Technology Center 2600

Before BRUCE R. WINSOR, BETH Z. SHAW, and
PHILLIP A. BENNETT, *Administrative Patent Judges*.

BENNETT, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Appellant appeals under 35 U.S.C. § 134(a) from the Examiner's non-final rejection of claims 1, 3–7, 10–15, and 17–19, which constitute all of the claims pending in this application. We have jurisdiction under 35 U.S.C. § 6(b).

We reverse.

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[1] Appellant's Brief ("App. Br.") identifies LG Display Co., Ltd., as the real party in interest. App. Br. 2.

CLAIMED SUBJECT MATTER

The claims are directed to a display driver circuit and driving method in a display device having an integrated touch screen which provide improved touch performance by applying overdriving and under-driving to a driving pulse. Spec. ¶¶ 8–11. Claim 1, reproduced below, is illustrative of the claimed subject matter:

> 1. A display device with an integrated touch screen, the display device comprising:
>
> a panel configured to operate in a display driving mode and a touch driving mode, the panel including a plurality of driving electrodes and a plurality of sensing electrodes; and
>
> a display driver integrated circuit (IC) configured to apply a common voltage to the plurality of driving electrodes and the plurality of sensing electrodes during the display driving mode of the panel, and the display driver IC is configured to apply a driving pulse to the plurality of driving electrodes during the touch driving mode of the panel and receive one or more sensing signals from the plurality of sensing electrodes responsive to a touch of the integrated touch screen during the touch driving mode of the panel,
>
> wherein the display driver IC is configured to adjust a magnitude of the driving pulse from a first level to a second level and subsequently from the second level to a third level and subsequently from the third level to a fourth level and subsequently from the fourth level to the first level during the touch driving mode of the panel, wherein the third level is less than the second level and greater than the first level,
>
> wherein the fourth level is less than the first level,
>
> wherein a difference in magnitude between the second level and the third level of the driving pulse is different than a difference in magnitude between the fourth level and the first level of the driving pulse.

App. Br. 11 (Claims Appendix).

REJECTIONS

Claims 1, 3–7, 10–15, and 17–19 stand rejected under 35 U.S.C. 103 as being unpatentable over Yousefpor et al. (US 2010/0253638 A1, published Oct. 7, 2010, hereinafter "Yousefpor") and Shepelev et al. (US 2014/0049509 A1, filed Dec. 27, 2012, published Feb. 20, 2014, hereinafter "Shepelev").

ISSUE

Has the Examiner erred in finding Shepelev teaches or suggests a display driver integrated circuit configured to adjust the magnitude of its driving pulse between four levels such that "a difference in magnitude between the second level and the third level of the driving pulse is different than a difference in magnitude between the fourth level and the first level of the driving pulse," as recited in the independent claims?

ANALYSIS

Appellant's claims are directed to a specific driving method in which a magnitude of the driving pulse sequentially through four levels (expressed in the claims as "first level," "second level," "third level," and "fourth level") during the touch driving mode. App. Br. 11 (Claims Appendix). According to the claim, the magnitudes of the driving pulse of the various levels have a specific sizes relative to each other. In particular, the claims require that the "third level is less than the second level and greater than the fourth level, and the "fourth level is less than the first level." *Id.* Additionally, the claims impose the limitation that the variance between the

second level and the third level must be different than the variance between the fourth and first level. *Id.*

In rejecting the independent claims, the Examiner relies exclusively on the teachings of Shepelev as teaching the claimed levels and differences in magnitude among them. Final Act. 6–8; Ans. 2–7. More specifically, the Examiner cites Figure 6 of Shepelev, and produces an annotated copy to illustrate how the teachings of Shepelev correspond to the limitations recited in the independent claims (Ans. 4), which we reproduce below:

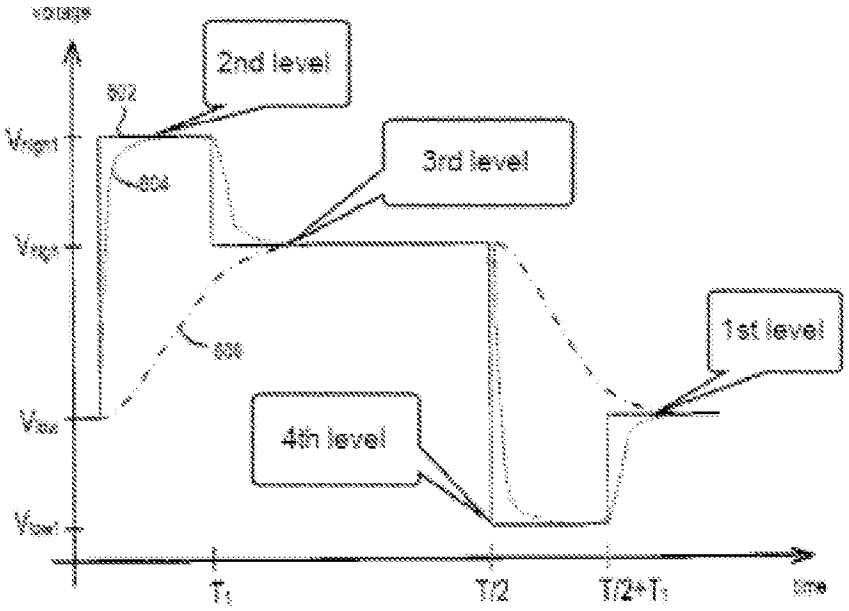

FIG. 6

Annotated Figure 6 of Shepelev depicts the Examiner's mapping of driving pulses to the four levels recited in Appellant's claims. Ans. 4.

As shown, the Examiner finds Vlow to correspond to the "first level." Vhigh1 is found to correspond to the claimed "second level." Ans. 3. Vhigh is found to correspond to the recited "third level [that] is less than the second

level and greater than the first level." Vlow1 is found to correspond to the recited "fourth level [that] is less than the first level." *Id.*

With respect to the limitation that "wherein a difference in magnitude between the second level and the third level of the driving pulse is different than a difference in magnitude between the fourth level and the first level of the driving pulse," the Examiner finds sensing period T1, as shown in Figure 6 and described in paragraph 63 of Shepelev, "discloses applying the driving multi-level boost waveform from . . . Vlow to Vhigh1" produces a difference in magnitude of 6 based on the voltage levels shown in paragraph 81. Ans. 4–5. The Examiner further finds sensing period T/2, Shepelev "discloses applying the driving multi-level boost waveform from a voltage level Vlow to a lowest voltage level Vlow1," which produces a difference in magnitude of 3. *Id.* As such, according to the Examiner, Shepelev discloses the claimed "difference in magnitude." Ans. 5.

Appellant contends the Examiner erred in finding Shepelev teaches the recited "difference in magnitude." App. Br. 4–9. In support of that contention, Appellant argues the Examiner is comparing the difference in magnitude between the first/second and the fourth/first. App. Br. 7–8; Reply Br. 7–9. This comparison is inapt, according to Appellant, because the claim requires "a difference in magnitude between the *second level and the third level* of the driving pulse is different than a difference in magnitude between the *fourth level and the first level* of the driving pulse." App. Br. 8 (emphasis added). Appellant posits that the sample voltage values described in paragraph 81 of Shepelev show a difference in magnitude between the Vhigh1 and Vhigh (i.e., $2^{nd}/3^{rd}$ level) that is the same as the difference in magnitude between Vlow1 and Vlow (i.e., $4^{th}/1^{st}$ level), as both comparisons

result in a difference of 3. *Id.* Appellant further argues that the different magnitudes cited by the Examiner are only achieved by applying the teachings of Shepelev in a manner inconsistent with the Examiner's mapping of its driving pulses to the recited "levels" in Appellant's claims. App. Br. 8–9. We agree with Appellant.

In finding the "difference in magnitude" limitation taught by Shepelev, the Examiner compares the magnitude difference between the first and second levels with the magnitude of difference between the fourth and first levels. However, the claims require not that the fourth and first levels be compared with the first and second levels as the Examiner has done here, but instead recite that "the difference in magnitude between the *second* level and the *third* level of the driving pulse is different than a difference in magnitude between the *fourth* level and the *first* level of the driving pulse." As such, the Examiner's mapping of Shepelev to the "difference in magnitude" limitation is inconsistent with his mapping of Shepelev to the four levels of driving pulse recited in the claims. Moreover, we agree with Appellant that applying the sample voltage values provided by Shepelev in paragraph 81 results in both relevant magnitude differentials having the same value—a value of 3. Accordingly, we are persuaded the Examiner has erred in finding Shepelev teaches a difference in magnitude between the Vhigh1 and Vhigh (i.e., $2^{nd}/3^{rd}$ level) that is the different from as the difference in magnitude between Vlow1 and Vlow (i.e., $4^{th}/1^{st}$ level), and we do not sustain the rejection of the independent claims under 35 U.S.C. § 103. For the same reason, we do not sustain the rejection of the remaining claims which depend therefrom.

DECISION

We reverse the Examiner's rejection of claims 1, 3–7, 10–15, and 17–19.

REVERSED