THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 26

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte OSAMU TANAKA
and YUKITO TORIUMI

Appeal No. 96-0462
Application 08/165,513[1]

HEARD: June 7, 1999

Before HAIRSTON, BARRETT, and FRAHM, Administrative Patent Judges.

BARRETT, Administrative Patent Judge.

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[1] Application for patent filed December 10, 1993, entitled "Electrode Structure Of Liquid Crystal Display Panel," which is a continuation of Application 07/993,090, filed December 18, 1992, now abandoned, which claims the priority benefit under 35 U.S.C. § 119 of Japanese Application 3-360058, filed December 27, 1991.

DECISION ON APPEAL

This is a decision on appeal under 35 U.S.C. § 134 from the final rejection of claims 1-5.

We reverse.

BACKGROUND

The invention relates to an electrode structure for a liquid crystal display panel in which thin transparent electrode layers are subject to possible damage resulting from the generation of static electricity. In the invention, possible buildup of static electricity on liquid crystal display panel electrode segments is avoided by providing an overlying layer of electrode material having a high surface resistivity, but providing sufficient surface conductivity to distribute static electricity over the underlying array of electrode segments to prevent localized accumulation of static electricity.

Claim 1 is reproduced below.

> 1. A liquid crystal display panel having an electrode structure on a substrate, said electrode structure comprising:
>
> a first electrode pattern comprising an array of electrode segments formed on the substrate and having a small surface resistivity; and

> a thin film layer of electrode material having a high surface resistivity formed on the substrate and extending over a central portion of the array of electrode segments so as to cover at least part of each of the electrode segments, the thin film layer of electrode material having sufficient surface conductivity to distribute static electricity over the area of the array to prevent localized accumulation of static electricity on the electrode segments.

The Examiner relies on the following prior art:

Kamijo et al. (Kamijo)	4,718,751	January 12, 1988
Hanyu et al. (Hanyu)	4,932,757	June 12, 1990

Claims 3 and 5 stand rejected under 35 U.S.C. § 112, first paragraph, based on a lack of enabling disclosure for making a thin film of indium tin oxide (ITO) with a high surface resistivity, such as 1 MS/**G**.

Claims 1, 2, 4, and 5 stand rejected under 35 U.S.C. § 103 as being unpatentable over Kamijo and Hanyu.

We refer to the Final Rejection (Paper No. 13) (pages referred to as "FR__") and the Examiner's Answer (Paper No. 18) (pages referred to as "EA__") for a statement of the Examiner's position and to the Brief (Paper No. 16) (pages referred to as "Br__") and the Reply Brief (Paper No. 19) (pages referred to as "RBr__") for a statement of Appellants' arguments thereagainst.

OPINION

Grouping of claims

Appellants argue (RBr) that the Examiner erred in stating that "claims 1, 2, 4 and 5 stand or fall together" (EA2). We agree. Appellants stated in the Grouping of Claims section that claims 2, 4, and 5 fall separately (Br5) and gave reasons in the Argument section (Br15). However, since we reverse the rejections, the error does not affect our decision.

35 U.S.C. § 112, first paragraph, enablement

The issue is enablement of a thin film layer of ITO having a high surface resistivity, as recited in claim 3, or a thin film layer of electrode material with a surface resistivity of about 1 MS/**G**, as recited in dependent claim 5. The Examiner limits the issue to ITO (EA2); however, neither claim 5 nor independent claim 1 recites ITO or any particular electrode material.

"The test of enablement is whether one reasonably skilled in the art could make or use the invention from the disclosures in the patent coupled with information known in the art without undue experimentation." United States v. Telectronics, Inc., 857 F.2d 778, 785, 8 USPQ2d 1217, 1223

(Fed. Cir. 1988), citing Hybritech, Inc. v. Monoclonal Antibodies, Inc., 802 F.2d 1367, 1384, 231 USPQ 81, 94 (Fed. Cir. 1986). The Patent and Trademark Office must support a rejection for lack of enablement with reasons. In re Marzocchi, 439 F.2d 220, 223-24, 169 USPQ 367, 369-70 (CCPA 1971). Once that is done, the burden shifts to the applicant to rebut this conclusion by offering evidence to prove that the disclosure in the specification is enabling. In re Eynde, 480 F.2d 1364, 1370, 178 USPQ 470, 474 (CCPA 1973).

The Examiner alleges that "continuous thin films of ITO with high surface resistivity are not known in the liquid crystal art" (EA4). Appellants argue that the Examiner "does not cite any authority for that proposition, and it is clearly based solely on the Examiner's speculation" (Br11) and that "[a]t no time has the Examiner cited any authority to support the contention that one skilled in the art would not known how to prepare an ITO film with a surface resistivity of 1 MS/**G**" (Br12). The Examiner responds that he "has provided evidence in the form of Matsumoto et al. and Kamijo et al." (EA8).

The Examiner states that "Kamijo et al. demonstrate the

normal resistance per square of ITO is around 50 S/square" (FR3). Kamijo discloses a resistivity of 50 S/**G** (Table 1, col. 3). However, since Kamijo is making transparent electrodes it is expected that the resistivity would be low; this does not prove that an ITO film with high resistivity was unknown to those of ordinary skill in the art. The Examiner states that "[Matsumoto] demonstrates the normal resistivity per square" (FR4). Matsumoto discloses a transparent electrode of metal oxide such as ITO which "has a surface resistivity of not greater than 100 ohm/**G**, preferably, from 10 to 80 ohm/**G**" (col. 2, lines 59-60). It is also disclosed that there are known ITO films with "a resistivity of from 200 to 300 ohm/**G**" (col. 3, lines 15-16). Again, since Matsumoto is making transparent electrodes it is expected that the resistivity would be low; this does not prove that an ITO film with high resistivity was unknown to those of ordinary skill in the art. The Examiner has failed to demonstrate that one of ordinary skill in the art would not have known how to make ITO thin films with high resistivity. The fact that the Examiner is personally not aware of ITO films with high resistivity is not persuasive as to what would have been known

to those of ordinary skill in the art. Claim 5 is not limited to any particular thin film electrode material and the Examiner has failed to even try to show that there is no material which could provide a thin film electrode with high surface resistivity of about 1 MS/**G**. The Examiner has failed to establish a prima facie case of nonenablement that would shift the burden of rebuttal to Appellants. The rejection of claims 3 and 5 under § 112, first paragraph, is reversed.

The Examiner states that Appellants argue that the film can be made by forming a film of incomplete coverage, but that "[i]ncomplete coverage is not disclosed by the originally filed application nor [is it] conventional within the liquid crystal art" (EA4). Since the Examiner has not established a prima facie case that one of ordinary skill in the art would not have known how to make an ITO (or other material) thin film with high resistivity, the fact that the specification does not disclose the process of making is not important. A patent need not teach, and preferably omits, what is well known in the art. Paperless Accounting, Inc. v. Bay Area Rapid Transit System, 804 F.2d 659, 664, 231 USPQ 649, 652 (Fed. Cir. 1986).

35 U.S.C. § 103

The Examiner relies on Kamijo only for its disclosure of ITO electrodes having a surface resistivity of about 50 S/**G**. Hanyu describes ITO electrodes coated with "short circuit-preventing layers" of SnO_2 or Sn-Ti oxide (Table 1, cols. 5-6), each of which has a resistance of from 1 S/cm^2 to 10^5 S/cm^2 "in the direction of the layer thickness" (col. 3, line 7). The Examiner states (FR4): "The 1 MS/square point is overlapped by the range of the resistance being 1 to 10^5 S/cm^2 for a thickness of 10-300 nm." We see that the thicknesses are taken from claim 3.

Appellants argue that the Examiner's argument makes no sense because "resistivity and resistance do not correspond to surface resistivity and are expressed in entirely different units, and values given for those properties cannot be related in any way to surface resistivity values" (Br14). The Examiner asserts that "[t]he surface resistivity and the resistivity are proportional even if the measurements are of different characteristics" (FR5). Appellants respond (Br14): "The Examiner has cited no authority for that speculative assertion and, indeed, cannot do so. As noted above, there is

no correspondence whatsoever between surface resistivity and resistivity, which are expressed in different units."

We find that surface resistance is proportional to resistivity. See Sze, Physics of Semiconductor Devices (2d ed., John Wiley & Sons 1981), pages 30-32 (equations 49 and 49a) (copy attached). The Examiner should have provided a reference on this disputed fact and not required us to find it for ourselves. However, we find no convenient formula interrelating surface resistivity (the term in the claim) and resistance in the direction of the layer thickness; the Examiner admits that he found none (EA9). It is not clear what the Examiner's reason is for finding that "[t]he 1 MS/square point is overlapped by the range of the resistance being 1 to 10^5 S/cm^2 for a thickness of 10-300 nm" (FR4), since the units of surface resistivity (S/**G**) are not the same as the units for resistance in the direction of the layer thickness (S/cm^2). It appears that the Examiner's statement is merely unsupported speculation that the surface resistivity is inherent. We agree with Appellants' argument that "[s]ince Hanyu et al. make no reference whatsoever to any surface resistivity values, there is nothing in that patent which

could suggest the provision of an electrode having a high surface resistivity extending over a central portion of an electrode array, but having sufficient surface conductivity to distribute static electricity over the area of the array, as required by Claim 1" (Br14). The Examiner has failed to establish a prima facie case of obviousness. The rejection of claims 1, 2, 4, and 5 under § 103 is reversed.

CONCLUSION

The rejections of claims 1-5 are reversed.

REVERSED

KENNETH W. HAIRSTON Administrative Patent Judge	)
LEE E. BARRETT Administrative Patent Judge	) BOARD OF PATENT APPEALS AND INTERFERENCES
ERIC FRAHM Administrative Patent Judge	)

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BRUMBAUGH, GRAVES, DONOHUE & RAYMOND
30 Rockefeller Plaza
New York, NY 10112