Paper No. 26

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte TETSUO URABE,
HIDEO KATAOKA and NOBUYUKI SHIGENO

Appeal No. 2001-1516
Application No. 08/684,299

ON BRIEF

Before KRASS, BARRETT and DIXON, Administrative Patent Judges.

KRASS, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal from the final rejection of claims 20-24. Claims 26-35 stand withdrawn as being directed to a non-elected invention. Claims 1-19 and 25 have been canceled.

The invention is directed to a liquid crystal display (LCD) device. More particularly, the structure has, inter alia, a plurality of reflective pixel electrodes wherein

each electrode has formed thereabove in sequence a portion of an optical thin film layer followed by a portion of a passivation layer adjacent and beneath a liquid crystal layer. Moreover, the optical thin film layer has a predetermined optical anisotropic axis formed from a liquid crystal polymer having liquid-crystal molecules uniaxially oriented along the optical anisotropic path such that the optical thin film layer functions as a 1/4 wavelength phase shifter.

Independent claim 20[1] is reproduced as follows:

20. A liquid-crystal display device, comprising:

a first substrate for receiving incident light, said first substrate having an inner surface on which a transparent electrode is formed;

a guest-host liquid-crystal layer beneath the transparent electrode which contains a dichroic dye and which is uniformly oriented with respect to said transparent electrode;

a plurality of reflective pixel electrodes beneath the liquid-crystal layer, each pixel electrode having formed thereabove in sequence a portion of an optical thin film layer followed by a portion of a passivation layer adjacent and beneath the liquid crystal layer;

the optical thin film layer having a predetermined optical anisotropic axis formed from a liquid-crystal polymer having liquid crystal molecules uniaxially oriented along the optical anisotropic path such that the optical thin film layer functions as a λ/4 phase shifter;

[1] While the advisory action of April 19, 2000 (Paper No. 20) indicated that the amendment of March 20, 2000 (Paper No. 19) would not be entered, apparently, the examiner agreed in a telephone conversation with appellants' representative (see page 4 of the principal brief) to enter the amendment for purposes of appeal. Further, the examiner agrees (answer, page 3) that the appendix to the principal brief is an accurate copy of the claims on appeal.

a switching element associated with each of the pixel electrodes, said switching elements being formed beneath the respective pixel electrode;

a lower substrate following beneath the switching element; and

said optical thin-film layer including a plurality of coloring areas, and a pattern is formed for each coloring area, so as to form color filters.

The examiner relies on the following references:

Iida et al. (Iida)	5,472,635	Dec. 05, 1995
Abileah et al. (Abileah)	5,499,126	Mar. 12, 1996
Adachi et al. (Adachi)	JP 06-222,351	Aug. 12, 1994

Claims 20-24 stand rejected under 35 U.S.C. § 103 as unpatentable over Adachi in view of Iida and Abileah.

Reference is made to the briefs and answer for the respective positions of appellants and the examiner.

OPINION

To reach a proper conclusion under § 103, the decision maker must step backward in time and into the shoes worn by [a person having ordinary skill in the art] when the invention was unknown and just before it was made. In light of *all* the evidence, the decision maker must then determine whether...the claimed invention as a whole would have been obvious at *that* time to *that* person. The answer to that

question partakes more of the nature of law than of fact, for it is an ultimate conclusion based on a foundation formed of all the probative facts. In re Fine, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988).

The proper inquiry for obviousness should not be limited to the specific structure shown by the reference(s) but should be into the concepts fairly contained therein. The overriding question to be determined is whether those concepts would have suggested to the skilled artisan the modification called for by the claims. In re Bascom, 230 F.2d 612, 109 USPQ 98 (CCPA 1956).

In the instant case, the examiner cites Adachi as the primary reference. Adachi clearly discloses the claimed first substrate (Adachi-32), a guest-host liquid-crystal layer (Adachi-34) beneath a transparent electrode (Adachi-36) and having a dichroic dye (Adachi-35), and a lower substrate (Adachi-33).

While Adachi does not explicitly disclose a plurality of "reflective pixel electrodes..." and an "optical thin film layer...that...functions as a λ/4 phase shifter," the reference does disclose a combination of a reflective film 38 and a λ/4 wavelength panel 39 which might, arguably, fill the claimed structural functions. Still, even, assuming, arguendo, that all this is true of Adachi, the reference clearly does not disclose or suggest the claimed "switching element" and the claimed optical thin-film layer including "a plurality of coloring areas, and a pattern is formed for each coloring area, so as to form color filters."

The examiner recognized these deficiencies and employed Iida for providing a λ/4 wave plate from a liquid crystal polymer with a uniform nematic orientation, the examiner indicating column 2, lines 43-52, as the teaching. The examiner held that it would have been obvious to substitute a polymer liquid crystal quarter wave plate for the quarter wave plate of Adachi to reduce the cost and improve the yield.

The examiner employed Abileah for the teaching (column 10, lines 25-31) of combining the functions of a retarder and a color filter. The examiner held that

> [s]ince color filters are usually formed by introducing a coloring material into a polymer layer, with different colors for different pixels, and since the retarder of Adachi, as modified by the teachings of Iida . . ., is a polymer film, it would have been obvious to add a coloring material to the liquid crystal polymer to give the retarder a color filtering function to form a color display. Further, to avoid using still more layers for a mask for adding the color material, it would have been obvious to use a photosensitive layer as the protective film and to use the protective film (or passivation layer) as the mask [answer-pages 5-6].

Even if we take for granted the truth of the examiner's allegations about what each reference teaches, we will not sustain the examiner's rejection of claims 20-24 under 35 U.S.C. § 103 because, in our view, the examiner has not established a prima facie case of obviousness with regard to the instant claimed subject matter.

In accordance with the language of independent claim 20, the optical thin film layer functions as a quarter wave phase shifter and also includes the plurality of coloring areas to form color filters. If Adachi's quarter wave panel 39 is the claimed

optical thin film layer, it clearly does not include a plurality of coloring areas to form color filters. While Abileah may teach color filters in LCDs, the examiner has pointed to nothing in the reference which would suggest having those color filters formed by a plurality of coloring areas included in a quarter wave phase shifter. The only section of Abileah referenced by the examiner teaches combining the functions of a retarder and a color filter into a single element. However, there is no indication that a "retarder" is an optical thin film layer functioning as a quarter wave plate. As defined in Abileah, a "retarder" is a compensating element "which would introduce a phase delay opposite in sign to that caused by the liquid crystal layer..." [column 4, lines 33-34]. Thus, a retarder, although an element for introducing phase delay, need not be a quarter wave phase shifter.

But, even if we assume that since Adachi and Iida teach quarter wave plates, which are delays, or phase shifters, the artisan viewing Abileah together with these references would have been led to employ Abileah's color filter in the quarter wave plate of the other references, there is still the problem of the claimed "switching element associated with each of the pixel electrodes, said switching elements being formed beneath the respective pixel electrode."

For a showing of this claimed element, the examiner relies on switching elements "(commonly thin film transistors), as is conventional in the art for individual

control of each area of the display without crosstalk" [answer-top of page 5]. Thus, the examiner has not specifically pointed to anything in the three applied references that would suggest the claimed "switching element associated with each of the pixel electrodes, said switching elements being formed beneath the respective pixel electrode." Rather, the examiner contends that this is "conventional in the art."

While the examiner contends, at page 8 of the answer, that appellants have not challenged "that the use of TFTs is not known for advantages such as reduction of cross talk, i.e., has not challenged that the use of TFTs is not an obvious modification," it appears to us that appellants have, indeed, challenged this allegation by the examiner, at page 7 of the principal brief, wherein appellants state:

> The Examiner does not rely on any reference in support of the contention that the switching elements are obvious . . . Appellants strongly disagree with the Examiner's assumption that the elements for which he does not cite a reference are obvious.

Accordingly, the examiner was put to his proof to establish, by evidence, that which he alleges to be true, i.e., that it was known to employ TFTs as claimed. The examiner has not done so. Accordingly, an important claimed element has not been sufficiently treated in the required obviousness analysis under 35 U.S.C. § 103 and, as such, we will not sustain the rejection of claims 20-24 under 35 U.S.C. § 103. None of the teachings of the applied references would have suggested a modification to include

a “switching element associated with each of the pixel electrodes, said switching elements being formed beneath the respective pixel electrode.”

The examiner’s decision is reversed.

REVERSED

ERROL A. KRASS Administrative Patent Judge	)))))) BOARD OF PATENT
LEE E. BARRETT Administrative Patent Judge	) APPEALS) AND) INTERFERENCES
JOSEPH L. DIXON Administrative Patent Judge	))))

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