Paper No. 61

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

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Ex parte HIDEKAZU KOBAYASHI and TOMIO SONEHARA

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Appeal No. 1998-1441
Application No. 08/294,779

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HEARD: APRIL 10, 2001

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Before THOMAS, LALL, and BLANKENSHIP, Administrative Patent Judges.

BLANKENSHIP, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal under 35 U.S.C. § 134 from the examiner's final rejection of claims 3-5, 11-17, 21-24, 26-28, 30-42, 47, 48, 51, 52, 55, 58-62, 79, and 80.

We affirm-in-part.

BACKGROUND

The invention is directed to an image forming device that includes an electro-optic medium which is responsive to applied voltage and input beam intensity. Claim 55 is reproduced below.

55. An image forming device, comprising:

means for providing a light valve including at least one layer of a photoconductive material rendered conductive by light of at least a predetermined intensity level and at least one layer of an electrooptic medium having at least a predetermined electric field threshold, said light valve means having an image forming region which is defined by at least portions of said layers of photoconductive material and electrooptic medium which are in registration, said image forming region of said light valve means being free of an electrically conductive layer between said layers of photoconductive material and electrooptic medium;

means for applying a modulated electric field across said layers of photoconductive material and electrooptical medium of said image forming region of said light valve means and modulating said electric field relative to said predetermined electric field threshold of said electrooptic medium

means for producing at least one scanned light beam;

means for inputting an image to said photoconductive material by modulating and scanning said at least one scanned light beam along the photoconductive layer side of said image forming region of said light value [sic; valve] means synchronous with the modulation of said electric field, said image inputting means including a first deflector means for deflecting scanning of said at least one scanned light beam in a first direction and second deflector means for deflecting scanning of said at least one scanned light beam deflected by said first deflector device [sic; means] in a direction essentially orthogonal to said first direction;

a location of said photoconductive material becoming conductive to permit application of said electric field to a corresponding location of said electrooptic

medium at least when said at least one scanned light beam is modulated to have an intensity above said predetermined level is applied to said location, a corresponding location of said electrooptic medium in registration with said photoconductive material which has become conductive undergoing a light transmissive state transition upon application of said electric field modulated to be at least at said predetermined threshold, whereby said image input by said image inputting means is stored in said electrooptic medium; and

means for reading said stored image from said light valve means;

wherein said image is written into said electrooptic medium at successive locations in said light valve means where said predetermined threshold of the electric field and said predetermined intensity level of the at least one scanned light beam are simultaneously satisfied, for reading by said image reading means.

The examiner relies on the following references:

Tsukada	4,445,126	Apr. 24, 1984
Masaki	4,538,884	Sep. 3, 1985
Shibata et al. (Shibata)	4,717,925	Jan. 5, 1988
Winsor	4,933,687	Jun. 12, 1990
Moddel et al. (Moddel)	4,941,735	Jul. 17, 1990
Kaneko (published Japanese Patent Application)[1]	59-216126	Dec. 6, 1984

Samuelson et al., Fast photoconductor coupled liquid-crystal light valve, Appl. Phys. Lett. 34 (7), pp. 450-52 (Apr. 1, 1979) (Samuelson)

Kubota et al., A Compact High-Resolution Image Projector and Printer Using a Laser-Addressed Liquid-Crystal Light Valve, SID 85 Digest, pp. 260-61 (1985) (Kubota)

[1] An English translation provided by the USPTO Translation Branch, dated Apr. 1998, is attached to this decision.

Claims 3, 4, 13-17, 21-24, 26-28, 38, 47, 48, 52, 55, 58, 59, 61, and 62 stand rejected under 35 U.S.C. § 103 as being unpatentable over Samuelson, Masaki, Kubota, Tsukada, and Winsor.

Claims 5, 11, 12, 34-37, 39-42, 51, 60, and 79 stand rejected under 35 U.S.C. § 103 as being unpatentable over Samuelson, Masaki, Kubota, Tsukada, Winsor, and Moddel.

Claims 30-33 stand rejected under 35 U.S.C. § 103 as being unpatentable over Samuelson, Masaki, Kubota, Tsukada, Winsor, and Shibata.

Claim 80 stands rejected under 35 U.S.C. § 103 as being unpatentable over Samuelson, Masaki, Kubota, Tsukada, Winsor, and Kaneko.

Claims 3-5, 11-17, 21-24, 26-28, 30-42, 47, 48, 51, 52, 55, 58-62, 79, and 80 thus stand rejected.

Claims 53, 54, 63, 64, 66-76, and 78 have been allowed.

Claims 29 and 43-45 have been objected to as containing allowable subject matter but depending from rejected claims.

Claims 18-20, 49, and 77 have been withdrawn from consideration.

Claims 1, 2, 6-10, 25, 46, 50, 56, 57, and 65 have been canceled.

We refer to the Final Rejection (Paper No. 33) and the Examiner's Answer (Paper No. 49) for a statement of the examiner's position and to the Brief (Paper No. 48) for appellants' position with respect to the claims which stand rejected.

OPINION

Initially, we note that the appendix of claims that accompanied the Brief is not correct. Claim 52 depends from claim 55, rather than from (canceled) claim 2, in accordance with the amendment filed June 22, 1992 (Paper No. 10). Claims 59 and 61 in the appendix do not reflect the corrections made to the claims by the amendment filed May 5, 1993 (Paper No. 15).

We also note that the Answer, on pages 12 through 14, repeats rejections of claims 63, 66-68, 70, 71, 74-76, and 78 which include Goldberg (U.S. Patent 4,383,261) as a reference. The Answer (page 5) also lists Goldberg as prior art relied upon in the rejection of claims on appeal. However, although the above-noted rejections stood at the time of the Final Rejection (set forth at pages 12 through 14), it is clear from the Advisory Action mailed April 30, 1997 (Paper No. 46) that the rejections have been withdrawn, and the claims allowed, in view of appellants' amendment filed April 3, 1997 (Paper No. 45). We also note, at the bottom of page 2 of the Answer, that the examiner states that claims which included those rejected over the prior art including Goldberg are now allowed. Thus, we have not considered the above-noted rejections, nor have we considered the Goldberg reference in making our determinations.

Turning to the standing rejections, we first consider the rejection of claim 55, which is the only independent claim on appeal, as being unpatentable over the prior art as evidenced by the disclosures of Samuelson, Masaki, Kubota, Tsukada, and Winsor.

The examiner bears the initial burden of presenting a prima facie case of unpatentability. If that burden is met, the burden of coming forward with evidence or argument shifts to the applicant. After evidence or argument is submitted by the applicant in response, patentability is determined on the totality of the record, by a preponderance of evidence with due consideration to persuasiveness of argument. In re Oetiker, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992). In our view, upon consideration of the rejection and the arguments by appellants in response, the combined teachings of the references establish prima facie unpatentability of claim 55.

Appellants submit numerous arguments in defense of patentability of the claim in the Brief, but we find them unpersuasive for substantially the same reasons expressed by the examiner in the Answer. We add the following observations and reasoning to the position advanced by the examiner.

Samuelson discloses structure of a liquid crystal light valve (Fig. 1) which falls within the ambit of recitations setting forth the light valve in claim 55. As appellants appear to recognize, Samuelson provides little detail with regard to how the light valve may be used in practical applications. However, additional references which have been applied show how the artisan would have used the knowledge available to one having the relevant skill to fashion a completely realized apparatus. Appellants argue, at least by implication, that drawing attention to the number of (i.e., how many) references upon which the examiner relies in the rejections somehow serves to show nonobviousness of the claimed subject

matter. However, similar arguments have been submitted to, and dismissed by, our reviewing court. See In re Gorman, 933 F.2d 982, 986, 18 USPQ2d 1885, 1888 (Fed. Cir. 1991) ("The criterion...is not the number of references, but what they would have meant to a person of ordinary skill in the field of the invention.")

One salient teaching is found in the Masaki reference, in Masaki's description of the prior art. In column 1, lines 47-61, Masaki refers specifically to the Samuelson article, and observes that "erasing a projection image is carried out by applying a voltage opposite in polarity to that for forming a projection image, between counter electrodes." Further, Samuelson provides, in the last full paragraph of the second column of page 451, examples of both DC and AC voltage excitation of the structure.

The examiner points to Kubota (Answer, page 7) as suggesting light beam modulation, in particular at page 260, column 2, lines 28-30 of the reference. Appellants contend that "[t]he mere listing of a laser writing power, writing time and contrast is hardly a teaching of light beam modulation as claimed...." (Brief, page 20.) The examiner responds that "by definition, change of laser writing power and writing time constitute modulation in the recording arts and...Appellants claim no more modulation than that taught by Kubota et al.; in fact claim 55 merely recites modulation without further definition." (Answer, pages 18-19.)

We note that, consistent with the examiner's interpretation of the term, "modulation" is a broad and relatively non-specific word in the electrical arts. "Modulation" is defined as

"[t]he process for varying some characteristic of one wave in accordance with another wave." McGraw-Hill Electronics Dictionary, Fifth Edition (1994). We also note that a standard electronics dictionary contains the following definition for "modulator": "A transmitter circuit or device that varies the amplitude, frequency, phase, or other characteristic of a carrier signal in accordance with the waveform of a modulating signal which contains useful information. The carrier can also be direct current, pulse train, light beam, laser beam, or other transmission medium." Id.[2]

Thus, the "light beam modulation as claimed" merely refers to varying a characteristic of the light beam in accordance with the input image information. Consistent with the accepted definitions of the terms, change of "laser writing power and writing time" refer to characteristics of a laser beam which may be representative of image information.

Further evidence of the obviousness of light beam modulation as claimed is found in Tsukada, also applied against claim 55. "[T]here are already proposed various image forming apparatus for the formation of images, such as characters or graphics, by scanning a recording medium, such as an electrophotographic photosensitive member, with a light beam, such as a laser beam, modulated in response to information signals." Tsukada, column 1, lines 12-18.

Claim 55 also recites "means for applying a modulated electric field." The recited form of "modulation" does not appear to follow the accepted definition of the term, but the

[2] A copy of the relevant definitions is to be mailed with this decision.

claim goes on to recite that the "modulation" of the electric field is "relative to [the] predetermined electric field threshold of [the] electrooptic medium." The "modulation" of the electric field thus merely refers to the recognition that the field is to be applied in view of the known electric field threshold of the electrooptic medium. Our interpretation of the requirement is consonant with that of the examiner's, in view of the paragraph bridging pages 6 and 7 of the Answer. Appellants, on page 19 of the Brief, note the examiner's interpretation of the "modulation," but do not offer any interpretation to the contrary.

Claim 55 recites that the modulated light beam is incident on the light valve means "synchronous" with the "modulation" of the electric field. (Note instant Figure 6.) However, the requirement would have been obvious because there would have been little reason for concern whether a beam is incident when the light valve is polarized for erasing. The beam would need to be applied, however, when the light valve is polarized for writing -- "synchronous" with the "modulation" of the electric field.

The examiner turns to Tsukada, as set forth in the paragraph bridging pages 7 and 8 of the Answer, for the "first and second deflector means" included in the "image inputting means" of claim 55. Tsukada discloses a means for inputting an image comprising (Fig. 1) a rotating polygonal mirror 3 which sweeps a light beam in an "x" direction on mirror 5. The beam is swept in the "x" direction on recording medium 6 by reflection of mirror 5. The recording medium is displaced in the "y" direction to effect two-dimensional scanning. See Tsukada, column 3, lines 1-34.

The examiner also applies Winsor to show suggestion of "mov[ing] the Tsukada stationary mirror as opposed to moving the Samuelson et al. LCLV." (See Answer, page 8.) However, since we do not consider Winsor to be necessary in the rejection of independent claim 55, it is cumulative to art already applied. The first and second deflector means of claim 55 are suggested by Tsukada as shown in Figure 1 of the reference. The claim is not specific as to which of the deflectors may or may not be stationary.

Further, viewing the relevant recitations under the precepts of 35 U.S.C. § 112, sixth paragraph, the functions recited with respect to the "first" and the "second" deflector means do not require that the corresponding structure in the specification include any structures for moving the second deflector means. Our interpretation of claim 55 is buttressed by a reading of the dependent claims. Claim 28, for example, is more specific in requiring that the "second deflector means" includes a movable mirror.

In any event, study of the Winsor disclosure results in our conclusion that the reference does not support the fact for which it stands in the rejection. Winsor is relied upon as showing equivalence in the art of (1) moving a recording medium while holding a scanning mirror stationary, and (2) moving a mirror while holding the recording medium stationary. (See Answer, page 20.) The Winsor reference, however, is not consistent with the proposition.

Winsor shows an embodiment (Fig. 1) whereby a mirror and aperture assembly 26 is driven horizontally by lead screw 54 and stepping motor 56, with the mirror reflecting the light beam to color negative film 2 on drum 4. See Winsor, column 2, line 41 through column 3, line 19. Winsor discloses a second embodiment (Fig. 7) whereby the mirror and aperture assembly 26c is fixed while rotating drum 4c is moved longitudinally by means of stepping motor 142 and lead screw 138. See id. at column 5, line 61 through column 6, line 20.

However, Winsor teaches that the second embodiment is preferred for producing images of best quality, because the beam travels a fixed length. See id. We recognize the possibility that the teaching of preference may be limited to the disclosed arrangement of using three beams. Winsor at column 3, lines 13-15 stresses the criticality of the three beams being maintained coincident. However, it is not apparent in the four corners of the reference that the teaching of preference is so limited.

Winsor does not show equivalence; if anything, Winsor suggests that the layout of Tsukada, in which the length of the light beam remains relatively fixed, is the preferred arrangement. We are cognizant that in a section 103 inquiry "'the fact that a specific [embodiment] is taught to be preferred is not controlling, since all disclosures of the prior art, including unpreferred embodiments, must be considered.'" Merck & Co. v. Biocraft Labs., Inc., 874 F.2d 804, 807, 10 USPQ2d 1843, 1846 (Fed. Cir. 1989) (quoting In re Lamberti, 545 F.2d 747, 750, 192 USPQ 278, 280 (CCPA 1976)). However, the

examiner has not advanced any reason for the proposed modification, but has based the proposal on an unfounded assertion of equivalence.

Since the references applied are not sufficient to show prima facie unpatentability of claim 28, we do not sustain the rejection of that claim. On page 25 of the Brief, appellants point out the relevant language of claim 28, but also allege that the invention "as described" in claims 58 and 59 is not taught by the prior art. However, claims 58 and 59 are not commensurate in scope with claim 28. Claim 58 refers to a polygonal mirror 412 (Fig. 4; see also Brief, page 6, line 3 et seq.). Tsukada suggests a polygonal mirror 3 (Fig. 1) as part of a first deflector means. We sustain the rejection of claim 58. Claim 59 does not require any movement of the "second deflector means," and is fairly descriptive of deflection of the light beam by mirror 5 in Tsukada. We also sustain the rejection of claim 59.

Since appellants do not provide separate arguments for patentability of the dependent claims subject to the ground of rejection applied against the independent claim, except for those that we have noted, we sustain the rejection of claims 3, 4, 13-17, 21-24, 26, 27, 38, 47, 48, 52, 55, 58, 59, 61, and 62. See 37 CFR § 1.192(c)(7). We do not sustain the rejection of claim 28.

For the rejection of claims 30-33, the examiner adds Shibata to the basic combination of references. Appellants submit separate arguments for claims 30 and 31 on page 28 of the Brief. We agree that the references do not show obviousness of the

subject matter of claim 30.[3] The claim requires control of the second deflector means in response to a reference signal. As set out on page 12 of the Answer, Winsor, in combination with other teachings, is used for the requirement of showing of a second deflector means which operates in response to a reference signal. As we have previously determined, the teachings of Winsor do not suggest movement of a second deflector means in an arrangement as disclosed by Tsukada. We therefore do not sustain the rejection of claim 30.

The rejection (Answer, page 12) takes notice that it was known to synchronize horizontal and vertical scanning using the same signal, but that does not speak to the specific requirements of claim 31. The claim requires that an "image signal source means" provides a horizontal synchronization signal as a reference signal, with the optical scanning means synchronizing with the reference signal. We do not sustain the rejection of claim 31.

Appellants do not submit separate arguments for claims 32 and 33. Claim 33 is similar in scope to claim 31, and we do not sustain the rejection of that claim for the reasons noted above with respect to claim 31. Claim 32, however, recites a "first detecting means" detecting a horizontal scanning cycle of the first deflector means and

[3] We note two obvious informalities in claim 30. The "second deflecting means" should be amended to second --deflector-- means. The "first deflecting means" should be amended to first --deflector-- means.

producing a reference signal, with the optical scanning means and electric field means synchronizing with the reference signal.

Shibata suggests such a "detecting means" (20; Fig. 1) which generates a synchronizing signal for the beam deflected by polygon mirror 16. See Shibata, column 2, lines 40-61. In our view it would have been obvious to combine the teachings for use with a polygonal mirror as disclosed by Tsukada, and to use the feedback signal for synchronizing the optical scanning means and electric field means. We therefore sustain the rejection of claim 32.

For the rejection of claims 5, 11, 12, 34-37, 39-42, 51, 60, and 79, the examiner adds the reference of Moddel. Appellants contest the rejection on pages 26 and 27 of the Brief, but note that it is unclear to what teachings in Moddel the rejection refers. The examiner responds, principally on page 21 of the Answer, to where the particular teachings are submitted to reside. Upon questioning at the oral hearing, counsel for appellants did not fault the teachings of Moddel as applied, but relied on the arguments with respect to the rejection of base claim 55.

Because the examiner has set out a reasonable prima facie case for obviousness of the claims which has not been rebutted by appellants, we sustain the rejection of claims 5, 11, 12, 34-37, 39-42, 51, 60, and 79. We do not consider Winsor as being necessary in the rejection, but merely cumulative.

For the rejection of claim 80, the examiner adds Kaneko to the combined teaching of the references applied against base claim 55. Appellants rely, as stated on page 29 of the Brief, on the arguments presented on behalf of claim 55. Since we find the arguments in support of the base claim unpersuasive, and do not consider Winsor a necessary reference in the rejection but merely cumulative, we sustain the rejection of claim 80.

CONCLUSION

We have affirmed the rejection of claims 3, 4, 13-17, 21-24, 26, 27, 38, 47, 48, 52, 55, 58, 59, 61, and 62 under 35 U.S.C. § 103 as being unpatentable over Samuelson, Masaki, Kubota, Tsukada, and Winsor, but we have reversed the rejection of claim 28. We have affirmed the rejection of claim 5, 11, 12, 34-37, 39-42, 51, 60, and 79 under 35 U.S.C. § 103 as being unpatentable over Samuelson, Masaki, Kubota, Tsukada, Winsor, and Moddel. We have affirmed the rejection of claim 32 under 35 U.S.C. § 103 as being unpatentable over Samuelson, Masaki, Kubota, Tsukada, Winsor, and Shibata, but we have reversed the rejection of claims 30, 31, and 33. We have affirmed the rejection of claim 80 under 35 U.S.C. § 103 as being unpatentable over Samuelson, Masaki, Kubota, Tsukada, Winsor, and Kaneko.

The examiner's decision in rejecting claims 3-5, 11-17, 21-24, 26-28, 30-42, 47, 48, 51, 52, 55, 58-62, 79, and 80 is thus affirmed-in-part.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

AFFIRMED-IN-PART

JAMES D. THOMAS Administrative Patent Judge	)
PARSHOTAM S. LALL Administrative Patent Judge	) BOARD OF PATENT) APPEALS) AND) INTERFERENCES
HOWARD B. BLANKENSHIP Administrative Patent Judge	)

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