

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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Ex parte TAKAYUKI KIJIMA

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Appeal No. 2006-2003  
Application No. 08/645,487

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HEARD: August 9, 2006

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Before KRASS, JERRY SMITH, and BLANKENSHIP, Administrative Patent Judges.

KRASS, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal from the final rejection of claims 1-17 and 19-39.

The invention is directed to digital image recording apparatus that uses an electronic calculation unit to perform an operation on pixels of an imaging device to vary the pixel configuration such that no shifting mechanism is needed to move the imaging device relative to a given optical path.

Representative independent claim 1 is reproduced as follows:

1. A digital image recording apparatus comprising:

a solid state imaging device;

a selecting element for selecting one of a predetermined image data in a format corresponding to a first pixel configuration of said solid state imaging device and another image data in a format corresponding to a pixel configuration different from said first pixel configuration;

an electronic calculation element responsive to said selecting element to perform an electronic pixel shift on pixels of said imaging device to obtain the different pixel configuration, thereby eliminating need for a shifting mechanism to move the imaging device relative to a given optical path; and

a recording element for recording image data selected via said selecting element.

The examiner relies on the following references:

Gray et al. (Gray)	4,872,054	Oct. 03, 1989
Tagami et al. (Tagami)	5,402,171	Mar. 28, 1995

In addition, the examiner relies on admitted prior art (APA) described at pages 3-4 of the instant specification.

Claims 1-17 and 19-39 stand rejected under 35 U.S.C. §103. As evidence of obviousness, the examiner offers Tagami and Gray with regard to claims 1-14, 16, 17, and 19-37, adding APA with regard to claims 15, 38, and 39.

Reference is made to the brief<sup>1</sup> and answer for the respective positions of appellant and the examiner.

### OPINION

Taking independent claim 1 as exemplary, the examiner contends that Tagami discloses the claimed subject matter but for the disclosure of an electronic calculation element responsive to the selecting element.

The examiner turns to Gray, specifically Figure 1 and column 5, lines 3-26, for a showing of a calculation made in order to perform an electronic pixel shift on pixels to obtain the different pixel configuration, wherein the calculation results in output data equal to a sum of values of different pixels.

The examiner then concludes that it would have been obvious to incorporate this “well known reformatting technique of Gray” into the processing circuits of Tagami “in order to provide the digital image recording apparatus of Tagami...with selectable input/output formats, permitting a multitude of input video signal formats to be captured and reformatted in accordance with a selected video output format, thereby eliminating the need for a shifting mechanism to move the imaging device relative to the optical path” (answer-pages 5-6).

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<sup>1</sup> Supplemental brief of December 11, 2003.

Appellant's position is that Tagami does not teach pixel summing, either electronically or non-electronically. Rather, contends appellant, Tagami discloses an electronic still camera utilizing a charge-coupled device, CCD1, which is physically moved relative to a given optical path by activation of a piezoelectric element 11 (brief-page 12), but there is no pixel addition in Tagami.

Moreover, appellant argues that Tagami uses a memory 6 to have a capacity capable of storing four times the pixel capacity of CCD1 to obtain a high definition (HD) image, as compared to the objective of the instant invention, which is to convert an image from one format to another format to accommodate the format of the selected display device, such as a TV monitor or computer monitor (brief-page 12).

As explained further by appellant, at page 14 of the brief,

...the present invention utilizes a CCD1 of a given pixel arrangement, and generates, at high electronic speed and from a **single** image created by CCD31 (see Fig. 10), an image comprised of pixels having a different number of pixels per row or pixels per column (or both) relative to the number of rows of pixels and the number of columns of pixels of the CCD31. This is accomplished through the utilization of high speed electronic circuitry which enables the converted image arrangement to be obtained through electronically performed **inter-pixel calculation**, which totally eliminates either physical movement of the CCD1 or mechanical shifting thereof relative to an optical path as well as eliminating the need for operating the CCD31 to create multiple images, and thus eliminates the need for performing four separate image taking and storing operations.

Of course, it is Gray upon which the examiner relies for this claim limitation, but appellant also contends that Gray has no disclosure of performing inter-pixel calculations electronically, other than a brief reference to accumulator and multiplier circuits 20 and 19.

At page 21 of the brief, appellant points out that the instant invention teaches electronic pixel shifting and/or inter-pixel calculations performed electronically, independently of CCD31, and, in the example in Figure 10, after undergoing processing by circuits 32, 33, and 34, eliminating the need for either a custom-made or an oversized CCD.

Appellant argues that Gray lacks any teaching of such calculations, teaching, instead, at column 8, lines 58-62, the employment of “standard algorithms to remove pixels on a line by line or column by column basis...interpolate them to the new video size and restore each of the interpolated pixels in a selected format in accordance with the script.” However, appellant argues, there is no description of the standard algorithm or the manner in which pixels are “removed and restored” (brief-page 22). Also, appellant argues, Gray does not recognize the problems caused by different pixel size and shapes in the monitor and CCD image device, and so cannot teach how to solve such problems.

Appellant concludes that the combination of Tagami and Gray is improper since the principal objective of Tagami is to use a small capacity CCD imaging device and to provide four images separated by pixel distances according to a parallelogram configuration (see Figure 5B) and there is no suggestion of how such a capability of generating four such images having the relative pixel shifts shown in Figure 5B of Tagami may be obtained through the use of the highly customized CCD imager of Gray.

Moreover, appellant contends that the references teach away from each other since Tagami requires use of a four-times normal CCD while Gray does not.

We have reviewed the evidence before us and we will sustain the rejection of claim 1 under 35 U.S.C. §103.

At page 23 of the brief, appellant admits that Tagami discloses the claimed subject matter but for calculation element for performing inter-pixel calculation on the predetermined image data. In fact, Tagami appears to manipulate the pixels but does so mechanically by using a charge-coupled device and a piezoelectric element.

Gray describes a kernel processor, comprising multipliers and accumulators (19) and (20) in Figure 1. This kernel processor is used to calculate partial fractions and is used to compute the correct coefficient for a particular line of data. A pixel value is automatically multiplied by the coefficient for the lines of data. Moreover, a technique is described whereby there is an automatic generation of the sum of partial fractions to

formulate an interpolation value for pixels and this process is performed horizontally and vertically (see column 5, lines 3-26). Accordingly, it appears that Gray does perform electronic calculations on pixels in order to reformat, by multiplying each pixel in a row, for example, by a coefficient.

What Gray does not appear to show, and the examiner has not convinced us that Gray does show, is the performance of any “inter-pixel” calculations. Such calculations, as we read appellant’s disclosure (e.g., page 26 of the instant specification), must include at least two pixels. For example, in Figure 2 of the instant application, a pixel data H-1 of the 768-horizontal-pixel data can be calculated from the pixel data A and B of the 800-horizontal-pixel data, taking into account the relative sampling periods of pixels A and B. Thus, at least two pixels must be used to make the calculation in “inter-pixel” calculations and that is the reading we give to this claimed limitation.

Tagami has no electronic calculation for manipulating pixels and Gray’s electronic calculations all seem to be directed to the manipulation of one pixel at a time, as in multiplying a row of pixels by a coefficient such that each pixel in that row has its value multiplied by that coefficient (see column 5, lines 2-26, of Gray). While the interpolation described by Gray *may* involve more than one pixel (see step 110, interpolation of pixels in Figure 4, and column 8, lines 57-62), this amounts to speculation as Gray is vague on the exact operation, describing an algorithm employed by

the interpolation step as removing pixels on a line by line or column by column basis (column 8, lines 58-60). We find nothing in Gray that teaches the use of more than one pixel for making a calculation to obtain a different pixel configuration. Accordingly, the cited references lack any “inter-pixel calculation.”

Unfortunately for appellant, instant independent claim 1 recites no such “inter-pixel calculation,” reciting, instead, merely a performance of an “electronic pixel shift” by an electronic calculation element.

The examiner appears to us to have provided a prima facie case of obviousness by contending that the skilled artisan, having these references before him/her would have been led to use the electronic calculations of Gray in the system of Tagami as an improved way to convert data from one format to another.

Appellant’s argument that Tagami does not disclose electronic inter-pixel calculation is not persuasive because the examiner recognized this and turned to Gray for such a teaching. While, for the reasons supra, Gray does not appear to provide for any “inter-pixel” calculation, we would note that instant claim 1 does not require “inter-pixel” calculation, but rather “electronic pixel shift,” and while page 26 of the brief is inconsistent in contending that Tagami does not perform an electronic pixel shift and then contending that Tagami does perform an electronic pixel shift, appellant’s counsel at the oral hearing of August 9, 2006, stated that the correct statement is that Tagami does perform a pixel shift. Accordingly, we take it as admitted that Tagami does perform a

pixel shift. Therefore, it appears that the only thing missing from Tagami vis a vis instant claim 1 is a performance of that pixel shift with an “electronic calculation.” However, it is clear to us that Gray does disclose an electronic calculation on pixels for reformatting a video signal (column 5, lines 3-26). We conclude, therefore, that the artisan would have found it obvious to employ an electronic calculation to obtain the pixel shift in Tagami as the artisan would have understood that such a pixel shift may be obtained either mechanically, as in Tagami, or via electronic calculation, as in Gray. The multiplication by a coefficient of each pixel in a row, taught by Gray, is one way to “shift” pixels in that row, but, in any event, appellant admits (brief-page 26) that Gray does perform a pixel shift, but contends that this pixel shift is performed within the electronic imaging device. The place where the pixel shift is performed in Gray is not convincing of nonobviousness because it is only Gray’s teaching of an electronic calculation for a pixel shift that is important. The artisan would have understood that this teaching would have been applicable to use for the pixel shift in Tagami.

Appellant’s argument that Gray does not recognize the problems caused by different pixel size and shapes in the monitor and CCD image device, and so cannot teach how to solve such problems, is not persuasive. Both Tagami and Gray are concerned with converting formats of image data and they both suggest to the artisan that the image should be reformatted in order to conform to another format specification. It is the same type of problem with which appellant is concerned.

We also do not agree with appellant's argument anent the combination being improper. It appears that appellant is concerned with a bodily incorporation of the teachings of Gray into Tagami by focusing on Tagami's four images separated by pixel distances according to a parallelogram configuration (see Figure 5B) and contending that there is no suggestion of how such a capability of generating four such images having the relative pixel shifts shown in Figure 5B of Tagami may be obtained through the use of the highly customized CCD imager of Gray.

The test of obviousness is not whether elements of one reference may be bodily incorporated into elements of a secondary reference, but rather what the teachings of these references would have suggested to the skilled artisan. We find that the artisan viewing the totality of these teachings would have been led to employ an electronic calculation, as described by Gray, in the Tagami system, rather than use the slower mechanical movement via piezoelectric elements described in Tagami, in order to shift pixels.

Based on appellant's statement regarding claims 2-5, 11, 14, and 16, at page 27 of the brief, these claims will fall with independent claim 1. Thus, we will also sustain the rejection of these claims under 35 U.S.C. §103.

While appellant does argue (brief-page 27) that claims 4 and 5 further distinguish over the applied references in that Gray fails to teach an arrangement in which both horizontal and vertical formats may be changed, Gray being limited to teaching pixel shifting in only one direction, we disagree. Column 5, lines 25-26, in Gray clearly disclose reformatting in both a horizontal and vertical direction.

We will not sustain the rejection of independent claim 6, 17, and 24, or of claims 7-10, 12, 19-21, 23, 28, and 37, dependent thereon, under 35 U.S.C. §103, because these independent claims all recite “performing inter-pixel calculation.” As explained supra, neither of the applied references describes such inter-pixel calculations.

As per claim 13, appellant merely states (brief-page 29) that an output to the monitor being a pseudo-moving image is neither taught nor remotely suggested by either Tagami or Gray. This is not persuasive in view of the examiner’s rationale (answer-page 4), pointing out, in Tagami, “a monitor element 104 for checking the framing condition of image data 8 to be recorded on the recording element 9, wherein an image output to the monitor element 104 is pseudo moving image data (e.g. Fig. 81). The examiner’s view does not seem unreasonable to us and appellant has offered no argument indicative of any error in the examiner’s rationale. Accordingly, we will sustain the rejection of claim 13 under 35 U.S.C. §103.

Similarly, the examiner has pointed out, at page 5 of the answer, how the elements of claims 14 and 16 are deemed to be taught by the applied references, and the only response by appellant, rather than point out any errors in the examiner's rationale, is to recite the claim elements and state that these elements are "neither taught nor remotely suggested by either Tagami or Gray" (brief-page 29). These are not convincing arguments to us as to why the examiner's apparently reasonable rationale is in error. Accordingly, we will sustain the rejection of claims 14 and 16 under 35 U.S.C. §103.

With regard to independent claim 25, the examiner employed similar reasoning as applied to claim 1, in order to reject the claim. Appellant argues that Gray fails to teach means for performing both electronic vertical pixel conversion and electronic pixel conversion for converting pixels in each row (in each column) to a different number of pixels. We disagree. Column 5, lines 2-26, of Gray describes an operation performed on pixels in order to effect a format conversion and, at lines 25-26, indicates that these operations are performed in both horizontal and vertical directions.

Accordingly, we will sustain the rejection of claim 25 under 35 U.S.C. §103.

We will not sustain the rejection of claims 26, 27, and 30-32 under 35 U.S.C. §103 because these claim add the limitation that there is an "inter-pixel calculation." For the reasons supra, we do not find such an inter-pixel calculation performed in either Tagami or Gray.

Claim 29 is not separately argued by appellant and so this claim will fall with independent claim 25. Thus, we will sustain the rejection of claim 29 under 35 U.S.C. §103.

We will sustain the rejection of claims 33-36 under 35 U.S.C. §103 because these claims are not separately argued from independent claim 1 and will fall therewith. We note that appellant's recitation of the elements of claim 33, at page 33 of the brief, along with a blanket statement that the references do not suggest these elements, does not constitute a separate argument.

Claims 15, 38, and 39 have been rejected under 35 U.S.C. §103 over Tagami, Gray and APA, with the examiner relying on APA for a teaching of a 768 x 480 format and image data composed of pixels having a square shape whose aspect ratio is 1:1.

Appellant argues that claims 15, 38, and 39 are patentable for the reasons argued with regard to claim 1. Since we disagree with those arguments relative to claim 1, claims 15, 38, and 39 will fall with claim 1. Hence, we will sustain the rejection of claims 15, 38, and 39 under 35 U.S.C. §103.

CONCLUSION

We have sustained the rejection of claims 1-5, 11, 13-16, 25, 29, 33-36, 38, and 39 under 35 U.S.C. 35 U.S.C. §103 but we have not sustained the rejection of claims 6-10, 12, 17, 19-24, 26-28, 30-32, and 37 under 35 U.S.C. §103.

Accordingly, the examiner's decision is 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) (1) (iv).

AFFIRMED-IN-PART

ERROL A. KRASS	)	
Administrative Patent Judge	)	
	)	
	)	
JERRY SMITH	)	BOARD OF PATENT
Administrative Patent Judge	)	APPEALS AND
	)	INTERFERENCES
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