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opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.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. 33

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

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Ex parte JOHN A. WELDY
and JAMES LAWTON

_____

Appeal No.1997-3269
Application 07/918,517

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ON BRIEF

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Before JERRY SMITH, FLEMING, and LALL, **Administrative Patent Judges**.

FLEMING, **Administrative Patent Judge**.

DECISION ON APPEAL

This is a decision on appeal from the final rejection of claims 9, 10 and 13. Claims 1 through 8, 11 and 12 have been allowed.

The invention relates to an apparatus for quantizing a digital image. On page 7 of the specification, Appellants identify that the invention is to reduce the quantization error in decoding images without increasing the storage requirements. Appellants identify on pages 13 and 14 of the specification that the system can create images of different spatial resolution (i.e., different numbers of pixels). These images are titled 16BASE, 4BASE, BASE, BASE/4 and BASE/16. The 16BASE and 4BASE images are stored as residual dependent representation images, and the BASE, BASE/4, and two BASE/16 images are stored as non-dependent representative images. On page 2 of the specification, Appellants define a "non-dependent" representation as "a component of a hierarchy that does NOT require additional information (from other representations stored in the hierarchy) for display." Appellants further identify on page 15 of the specification that the quantization of non-dependent images can be encoded. On pages 10 and 11 of the specification, Appellants describe that the method of encoding the quantization values is such that a quantization value which can have M levels (represented by an integer 0 to M-1) is encoded into two values which can

have M/2 levels (represented as even integers from 0 to M-2). The M/2 level values are created by rounding to the M level value to the nearest multiple of 2, one of the M/2 level values being created by rounding up and the other by rounding down. Appellants depict the correlation between M level values and M/2 level values in Table 1 on page 10 of the specification. Thus, the average of the two M/2 level values is the same as the original M level value. Appellants identify on page 16 of the specification that this encoding technique can be used to reduce a 9 bit value to a 8 bit value, as shown in table 2. On pages 17 and 18 of the specification, Appellants also identify that the encoding technique can be used for 10 bit to 8 bit encoding by converting a M level value into four values of M/4 levels as shown in table 3. On page 18 of the specification, Appellants identify that the four M/4 level quantizations can be used on the four stored non-dependent representative images, BASE, BASE/4, and two BASE/16, such that each image has a different M/4 quantization. Appellants identify on page 19 of the specification that if an image of spatial size BASE, BASE/4, or BASE/16 is to be produced at higher resolution (more than 8

bit quantization level) than the stored image, a higher resolution image is reconstructed from two of the stored images. See also Appellants' figure 6. This is performed by adjusting one of the images to be of the same spatial resolution as the second image and then combining the images. Appellants identify on page 20 of the specification that if the images are of equal spatial resolution, the step of combining the images can be performed by averaging.

Independent claim 9 is illustrative of the invention.

9. Apparatus for reconstructing an image with additional quantization levels of signal resolution from two quantized non-dependent representations of the image at the spatial resolution of one of the representations, comprising:

means for converting one of the quantized non-dependent representations to the same spatial resolution as the other representation; and

means for combining the converted and non-converted representations to form a combined representation with additional quantization levels of signal resolution.

The Examiner relies upon the following references:

Jones et al. (Jones)	5,048,111	Sept. 10, 1991
Chung et al. (Chung)	5,239,597 (filed Feb. 25, 1991)	Aug. 24, 1993
Rosen et al. (Rosen)	5,309,528 (filed Dec. 13, 1991)	May 3, 1994

Claims 9, 10 and 13 stand rejected under 35 U.S.C. § 103 as being unpatentable over Jones, Rosen and Chung.[1]

Rather than reiterate the arguments of Appellants and the Examiner, reference is made to the briefs[2] and answers[3] for the respective details thereof.

Opinion

We will not sustain the rejection of claims 9, 10 and 13 under 35 U.S.C. § 103.

The Examiner has not set forth a ***prima facie*** case. It is the burden of the Examiner to establish why one having ordinary skill in the art would have been led to the claimed

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[1] This rejection is a "new ground of rejection" made in the October 9, 1996 Examiner's answer. The rejection of claims 9, 10 and 13 under 35 U.S.C. § 102 as unpatentable over Jones as set forth in the final rejection has been withdrawn as identified in the March 3, 1998 supplemental Examiner's answer.

[2] Appellants filed an appeal brief on June 26, 1996. Appellants filed a reply brief on December 9, 1996 in response to the Examiner's new grounds of rejection. Appellants filed a supplemental reply brief on May 6, 1997. On May 12, 1997 the Examiner mailed a communication stating that the supplemental reply brief has been entered and considered.

[3] The Examiner mailed an Examiner's answer on October 9, 1996. On March 3, 1997 the Examiner mailed a supplemental Examiner's answer.

invention by the express teachings or suggestions found in the prior art or by the implication contained in such teachings or suggestions. ***In re Sernaker***, 702 F.2d 989, 995, 217 USPQ 1, 6 (Fed. Cir. 1983). "Additionally, when determining obviousness, the claimed invention should be considered as a whole; there is no legally recognizable 'heart' of the invention." ***Para-Ordnance Mfg. v SGS Importers Int'l Inc.***, 73 F.3d 1085, 1087, 37 USPQ2d 1237, 1239 (Fed. Cir. 1995), ***cert. denied***, 519 U.S. 822 (1996) (***citing W. L. Gore & Assocs., Inc. v. Garlock, Inc***., 721 F.2d 1540, 1548, 220 USPQ 303, 309 (Fed. Cir. 1983), ***cert. denied***, 469 U.S. 851 (1984)).

First, we must determine the scope of the claims. As our reviewing court stated in ***Markman v. Westview Instruments***, 52 F.3d 967, 979, 34 USPQ2d 1321, 1329-30 (Fed. Cir. 1995) (***en banc***), ***aff'd***, 517 U.S. 370, 116 S.Ct. 1384,(1996):

> Claims must be read in view of the specification, of which they are a part. The specification contains a written description of the invention that must enable one of ordinary skill in the art to make and use the invention. For claim construction purposes, the description may act as a sort of dictionary, which explains the invention and may define terms used in the claims. (Citation omitted).

We find that the scope of independent claims 9 and 13 includes reconstructing an image from two quantized non-dependent representations of the image, where the reconstructed image has more quantization levels of resolution than the two non-dependent representations of the image. These limitations are found in claim 9, “two quantized non-dependent representations of the image” and “combining the converted and non-converted representations to form a combined representation with additional quantization levels of signal resolution.” These limitations are also found in claim 13, “a multiplicity of non-dependent representations of the image” and “combining the converted and non-converted representations to form a combined representation with additional quantization levels of signal resolution.” The term “non-dependent representation” is defined in Appellants’ specification on page 2:

> a “non-dependent” representation is defined as a component of a hierarchy that does NOT require additional information (from other representations stored in the hierarchy) for display.

Accordingly, we find the scope of claims 9 and 13 to include reconstruction of an image from two quantized independently

displayable representations of the image to construct an image with additional quantization levels.

Next, we consider the rejection of claims 9, 10 and 13 under 35 U.S.C. § 103. The Examiner sets forth the rejection starting on page 4 of the Examiner's answer (answer). The Examiner asserts on pages 4 and 5 of the answer that Jones teaches a method for reconstructing an image with additional signal levels of resolution from two non-dependent representations of the image. On page 5 of the answer, the Examiner supports this assertion by reference to Jones' figure 14, and by stating that "512 image is converted to 1K image in order to combine the signal with the 1K image to produce 2K image."[4] On page 5 of the answer, the Examiner identifies that Rosen is relied upon to teach increasing and decreasing the quantization of signal resolution. Additionally, the

[4] It is noted that in figure 14, there is an "Encoded 512 Image," "Decoded 512 Image" and "Encoded 512 Subbands." We assume that the Examiner's rejection is referring to the "Encoded 512 Subbands" as the "512 Image." We base this assumption on the Examiner's statement that the "512 Image is converted to 1K Image" and our finding that the "Encoded 512 Subbands" are shown on the right side of figure 14, and described in column 6, lines 60 and 61, as being combined to form 1K Subbands, which are then combined with the 1K decoded Image to form the 2K Image.

Examiner identifies that "Chung teaches details operation of representing image signal with additional quantization levels of signal resolution."

Appellants argue on page 2 of the reply brief that Jones does not teach reconstructing an image using more than one non-dependent image representation. Appellants assert that Jones' system uses only a single non-dependent image representation. On page 3 of the reply brief, Appellants point out that in Jones' embodiment of figure 14, the image representation LL is a non-dependent image representation, but that "[a]ll of the image representations that include an 'H' are dependent image representations." Appellants state that the image representations with an "H" are high frequency components of the image and therefore are dependent images. Appellants further support this assertion on page 3 of the reply brief, by making reference to an article Jones co-authored which identifies that the subband images are not displayable, and that to make them viewable they need to be scaled and biased.

We find that Jones does not teach reconstructing an image by combining two "non-dependent image representations," as

defined by Appellants' specification on page 2. We find that Jones states in column 7, line 3 through 5 that "[t]he 256, 512 and 1K images are all directly available for display," and as shown in figure 14, the 1K Image is image LL. Further, in column 6, lines 28 through 30, Jones teaches that "the lowest frequency subband image at any resolution level is the one used for the purpose of display." Thus, we find that Jones' image LL is, by the Appellants' definition, a non-dependent representation. However, we find that the "Encoded 512 subbands" (to which the Examiner appears to be referring to as the "512 Image," see footnote 4, ***supra***) are dependent images. We find that Jones teaches in column 6, line 68, through column 7 line 6, that the subbands are used for reconstructing the 2K Image. We do not find that Jones teaches that any of the subband images, other than the lowest frequency subband image, are displayable. Jones depicts in each of the embodiments that the subband images are combined to create displayable images. See figures 12, 14, and 18. Accordingly, we find that Jones' subband images, other than the lower order subband image, are "dependent" as they each require additional information for display. Thus, we find that Jones does not

teach the claim limitation of reconstructing an image from two quantized independently displayable representations of the image to construct an image with additional quantization levels.

We note that the Examiner has not asserted that either Chung or Rosen teaches combining two quantized independently displayable representations of an image. Nonetheless, we do not find that either of these references teaches combining two quantized independently displayable representations of an image. We find that Chung teaches in column 1, lines 39 through 43, that two image representations, the dither image and the difference signal, are used to construct an image. However, we do not find that Chung teaches that either the dither image or the difference signal are independently displayable. We find that Rosen teaches a system to facilitate transfer before and after data compression. See column 2, lines 37 through 40. However, we do not find that Rosen teaches combining two images.

Thus, we find that the combination of Jones, Chung and Rosen does not teach or suggest reconstructing an image from two quantized independently displayable representations of the

image to construct an image with additional quantization levels.

For the foregoing reasons, we will not sustain the rejection of claims 9, 10 and 13 under 35 U.S.C. § 103.

REVERSED

JERRY SMITH Administrative Patent Judge)	
MICHAEL R. FLEMING Administrative Patent Judge)	BOARD OF PATENT APPEALS AND INTERFERENCES
PARSHOTAM S. LALL Administrative Patent Judge)	

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