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(54) **METHOD, APPARATUS AND RECORDING MEDIUM FOR DATA COMPRESSION**

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(51) **Int. Cl.**
　　*G06K 9/36*　　(2006.01)
(52) **U.S. Cl.** ...................................... **382/251**; 382/232
(58) **Field of Classification Search** ......... 382/232–253
　　See application file for complete search history.

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Nikkan Kogyo Shimbun Co., May 25, 1981, "Digital Image Signal Processing", Fukinuke, T.
Shokodo Co., Feb. 25, 1992, "Digital Communication Systems", Kasahara et al.

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(57)　　　　**ABSTRACT**

Fast and efficient data compression can be carried out. Original image data are subjected to wavelet transform. The obtained wavelet-transformed data are classified and bit allocation is determined. Based on the determined bit allocation, the wavelet-transformed data are quantized and quantized data are obtained. The quantized data are classified into 0 data and non-zero data. Binary classification information data indicating this classification are also obtained. The classification information data are coded according to a coding method having a comparatively simple operation, such as Huffman coding and run length coding. The multi-valued, non-zero data are coded according to a coding method having a high compression efficiency although having a comparatively complex operation, such as universal coding and Golomb-Rice coding.
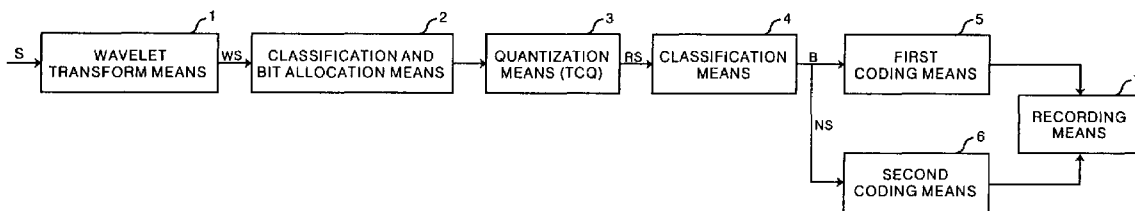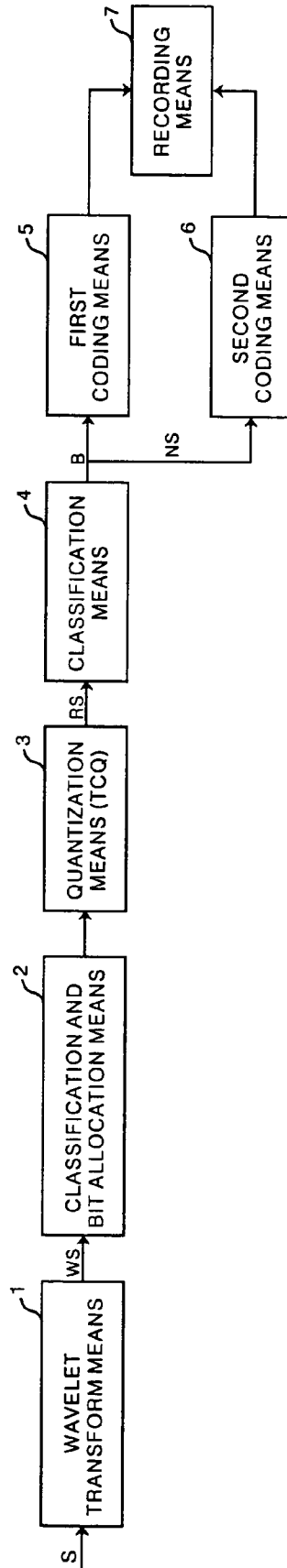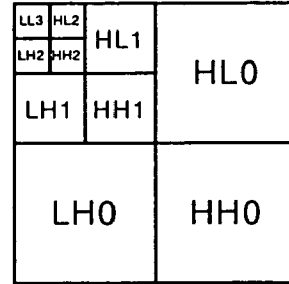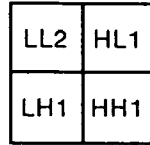
**30 Claims, 10 Drawing Sheets**

# FIG. 1

| | |
|---|---|
| LL1 | HL0 |
| LH0 | HH0 |

| | |
|---|---|
| LL2 | HL1 |
| LH1 | HH1 |

| | | |
|---|---|---|
| LL3 HL2 / LH2 HH2 | HL1 | HL0 |
| LH1 | HH1 | |
| LH0 | | HH0 |

# FIG.2a  FIG.2b  FIG.2c

$D_0$

-12Δ    -8Δ    -4Δ    0    3Δ    7Δ    11Δ

$D_1$

-11Δ    -7Δ    -3Δ    0    4Δ    8Δ    12Δ

$D_2$

-10Δ    -6Δ    -2Δ    Δ    5Δ    9Δ

$D_3$

-9Δ    -5Δ    -Δ    2Δ    6Δ    10Δ

# FIG.3

FIG.4



FIG.5

START

S1

WAVELET TRANSFORM

S2

CLASSIFICATION AND
BIT ALLOCATION

S3

QUANTIZATION

S4

CLASSIFICATION

S5

CLASSIFICATION INFORMATION
DATA CODING
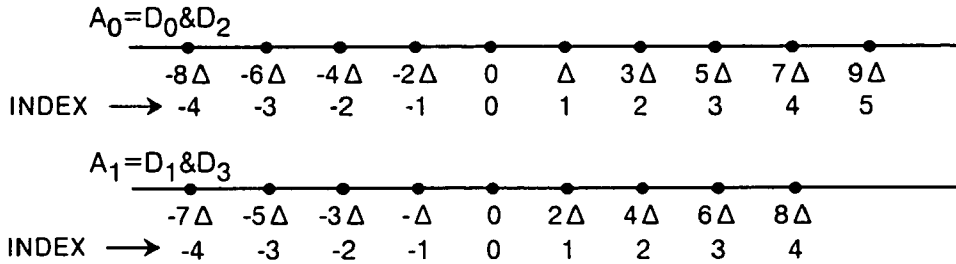
S6
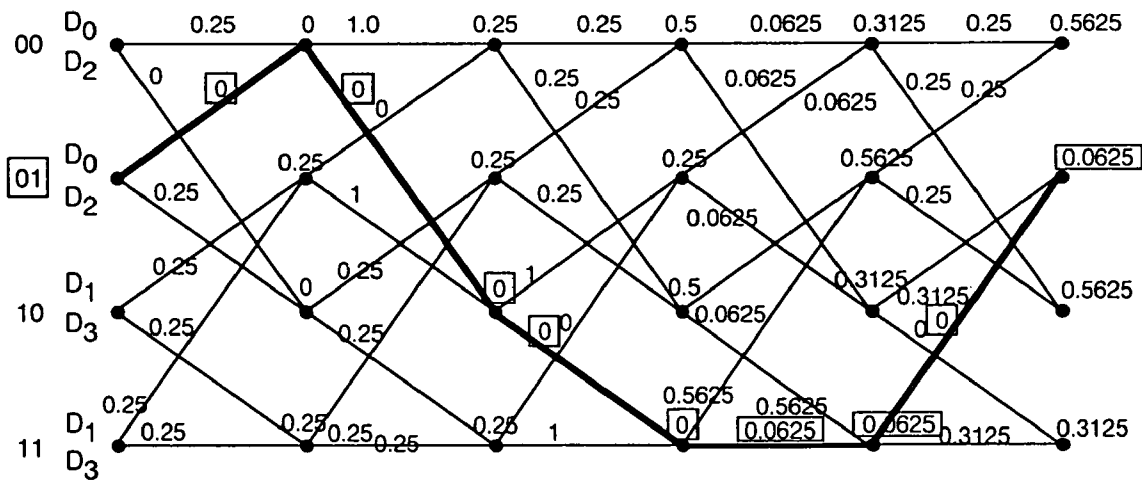
NON-ZERO DATA CODING

S7

RECORDING

END
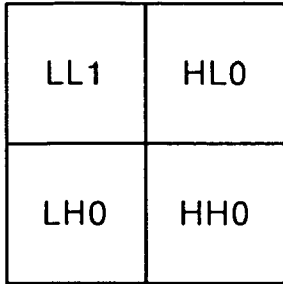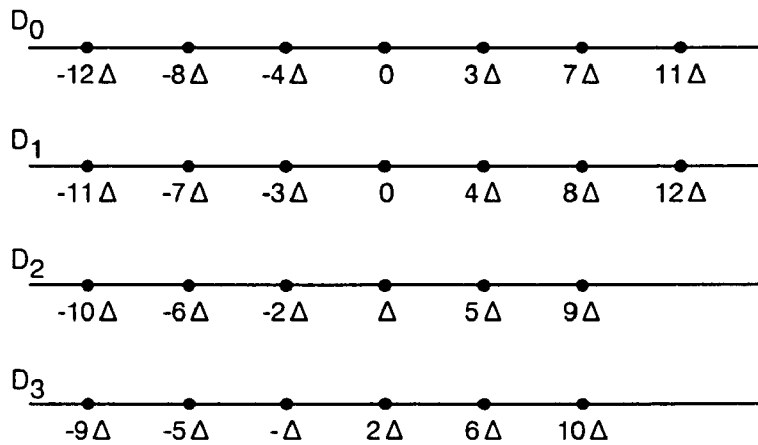
# FIG.6

# DOCKET ALARM
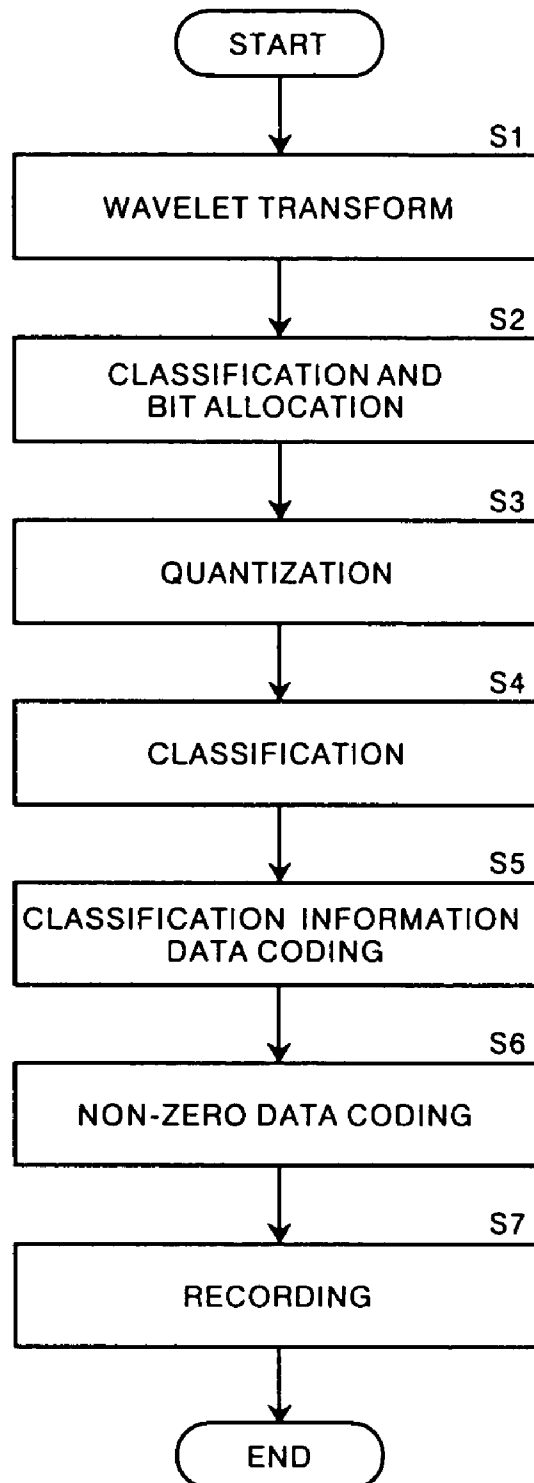
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