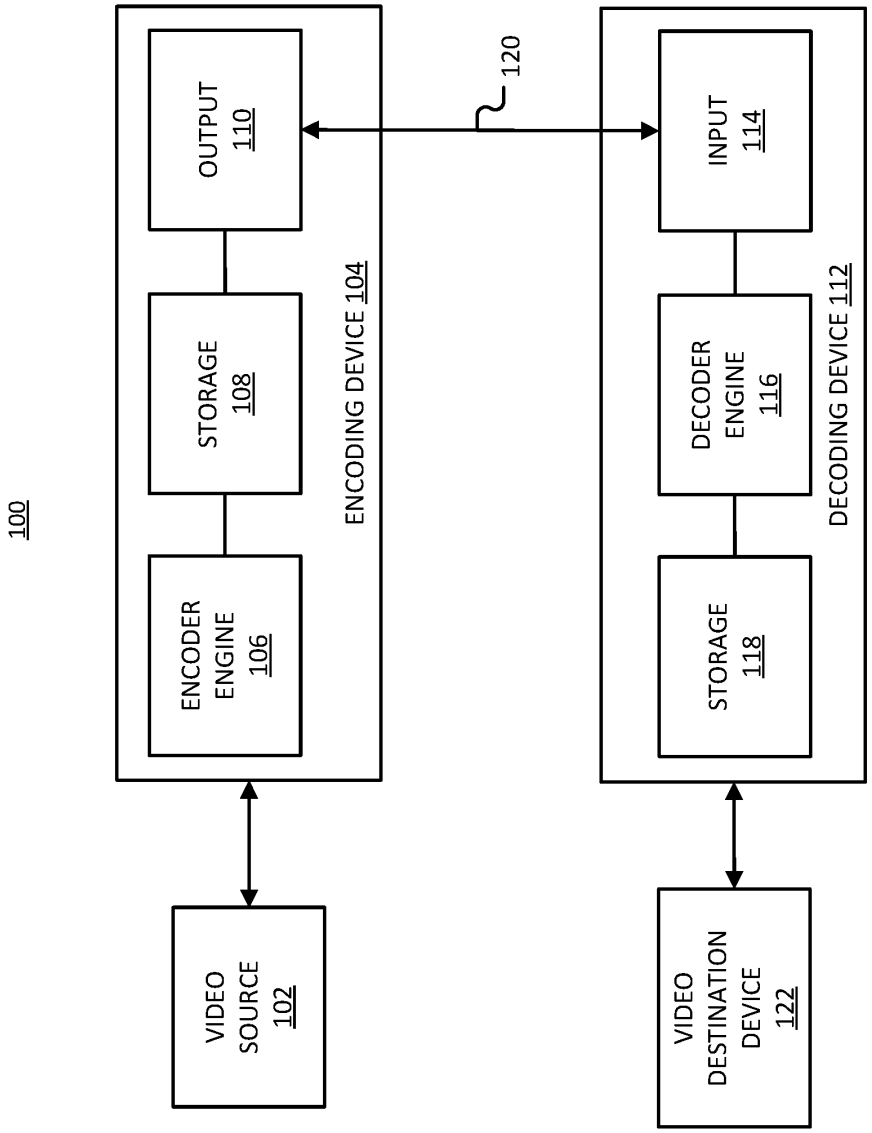

100
VIDEO SOURCE 102
ENCODER ENGINE 106
STORAGE 108
OUTPUT 110
ENCODING DEVICE 104
120
INPUT 114
DECODER ENGINE 116
STORAGE 118
DECODING DEVICE 112
VIDEO DESTINATION DEVICE 122

FIG. 1

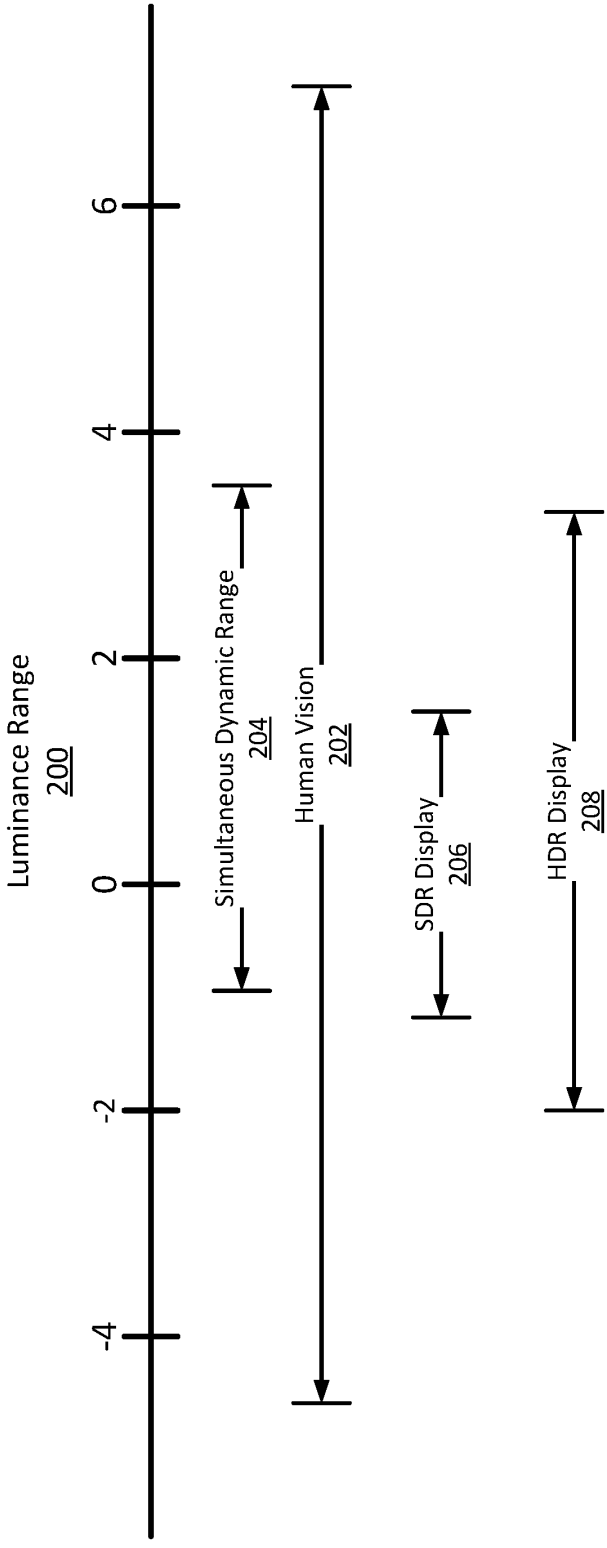

Luminance Range
200
6
4
2
0
-2
-4
Simultaneous Dynamic Range
204
Human Vision
202
SDR Display
206
HDR Display
208

FIG. 2

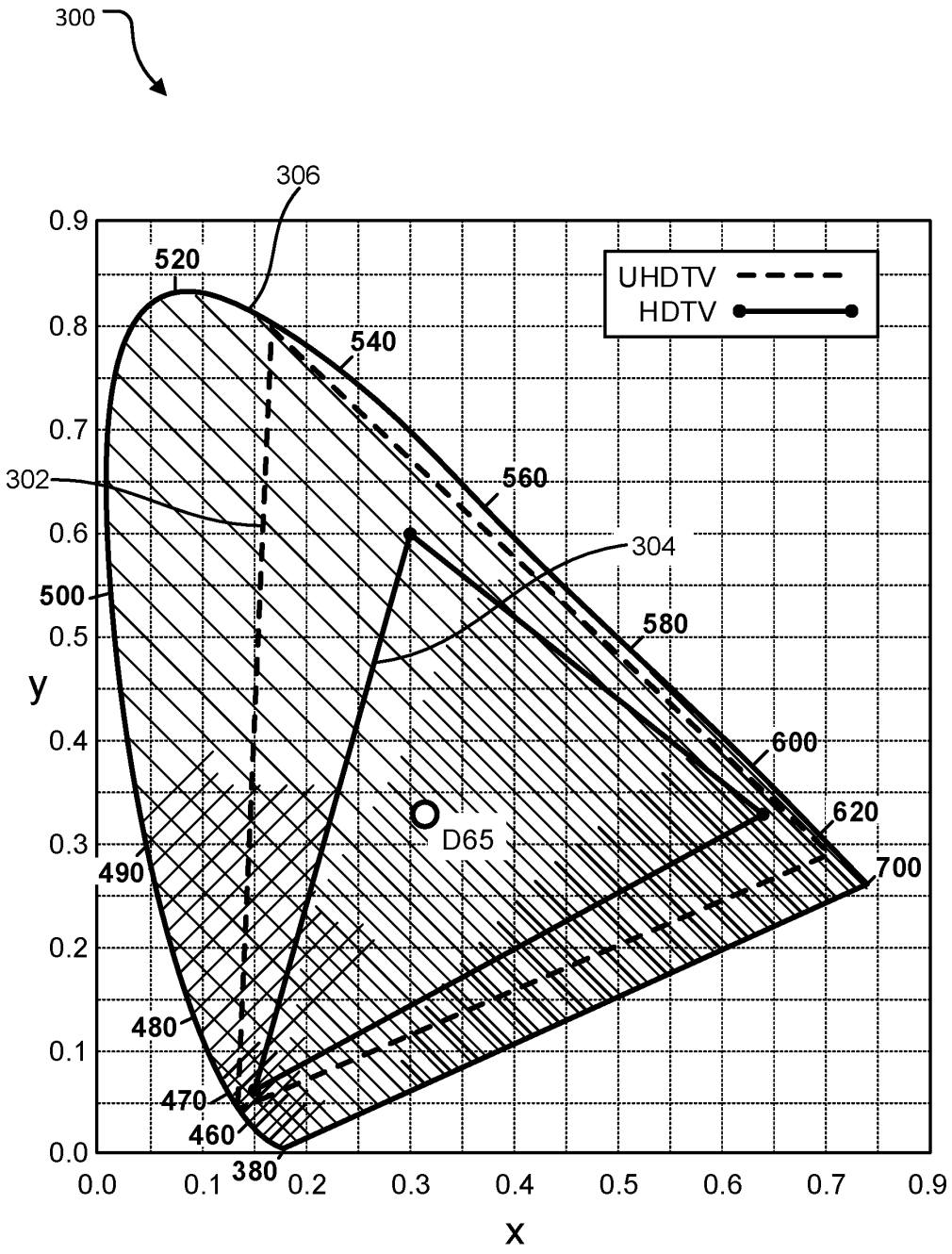

300
306
520
540
560
580
600
620
700
302
304
500
490
480
470
460
380
UHDTV
HDTV
D65
y
x
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9

FIG. 3

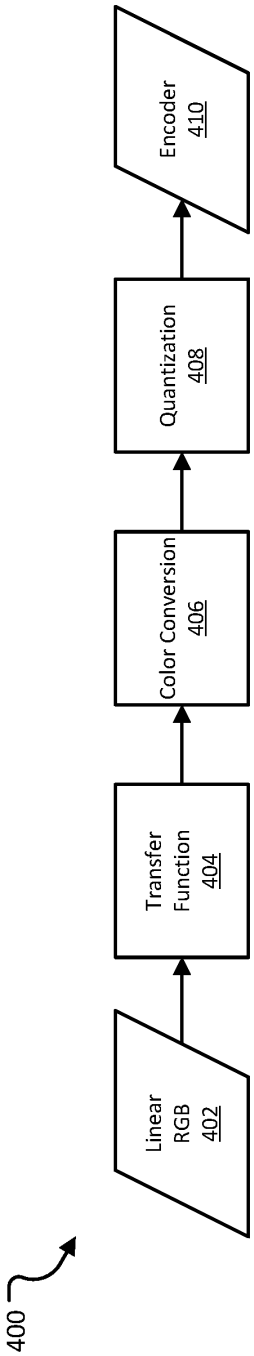

400
Linear RGB 402
Transfer Function 404
Color Conversion 406
Quantization 408
Encoder 410

FIG. 4

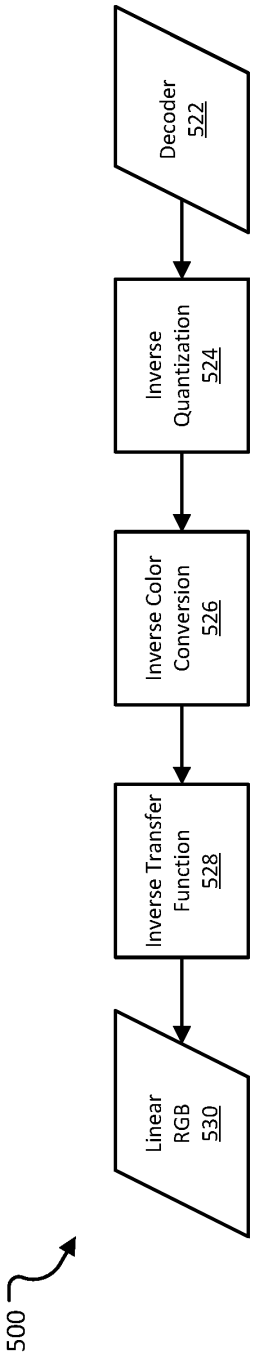

Decoder
522
Inverse
Quantization
524
Inverse Color
Conversion
526
Inverse Transfer
Function
528
Linear
RGB
530
500

FIG. 5

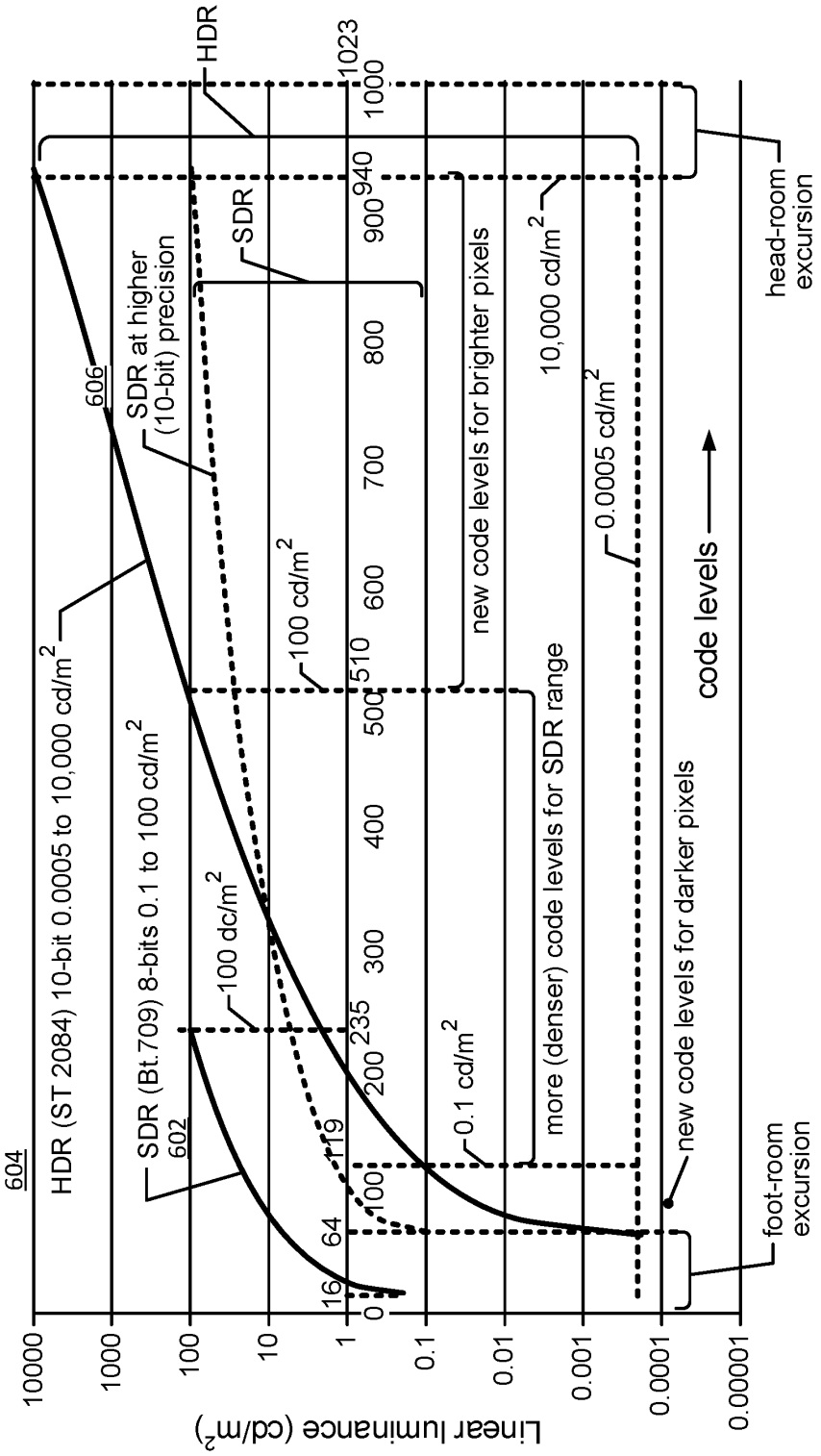

604
HDR (ST 2084) 10-bit 0.0005 to 10,000 cd/m2
606
SDR (Bt.709) 8-bits 0.1 to 100 cd/m2
602
SDR at higher (10-bit) precision
HDR
SDR
100 dc/m2
100 cd/m2
0.1 cd/m2
10,000 cd/m2
0.0005 cd/m2
new code levels for brighter pixels
more (denser) code levels for SDR range
new code levels for darker pixels
code levels
head-room excursion
foot-room excursion
Linear luminance (cd/m2)
10000
1000
100
10
1
0.1
0.01
0.001
0.0001
0.00001
0
16
64
100
119
200
235
300
400
500
510
600
700
800
900
940
1000
1023

FIG. 6

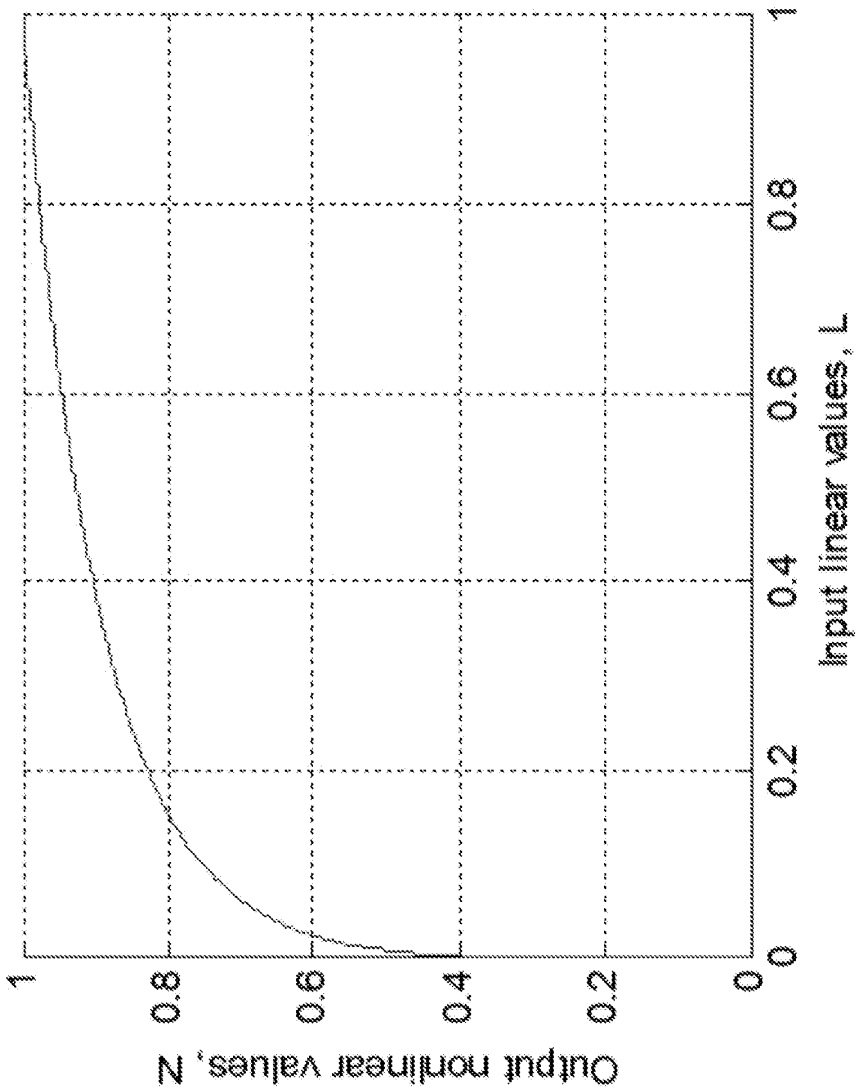

Output nonlinear values, N
1
0.8
0.6
0.4
0.2
0
0
0.2
0.4
0.6
0.8
1
Input linear values, L

FIG. 7

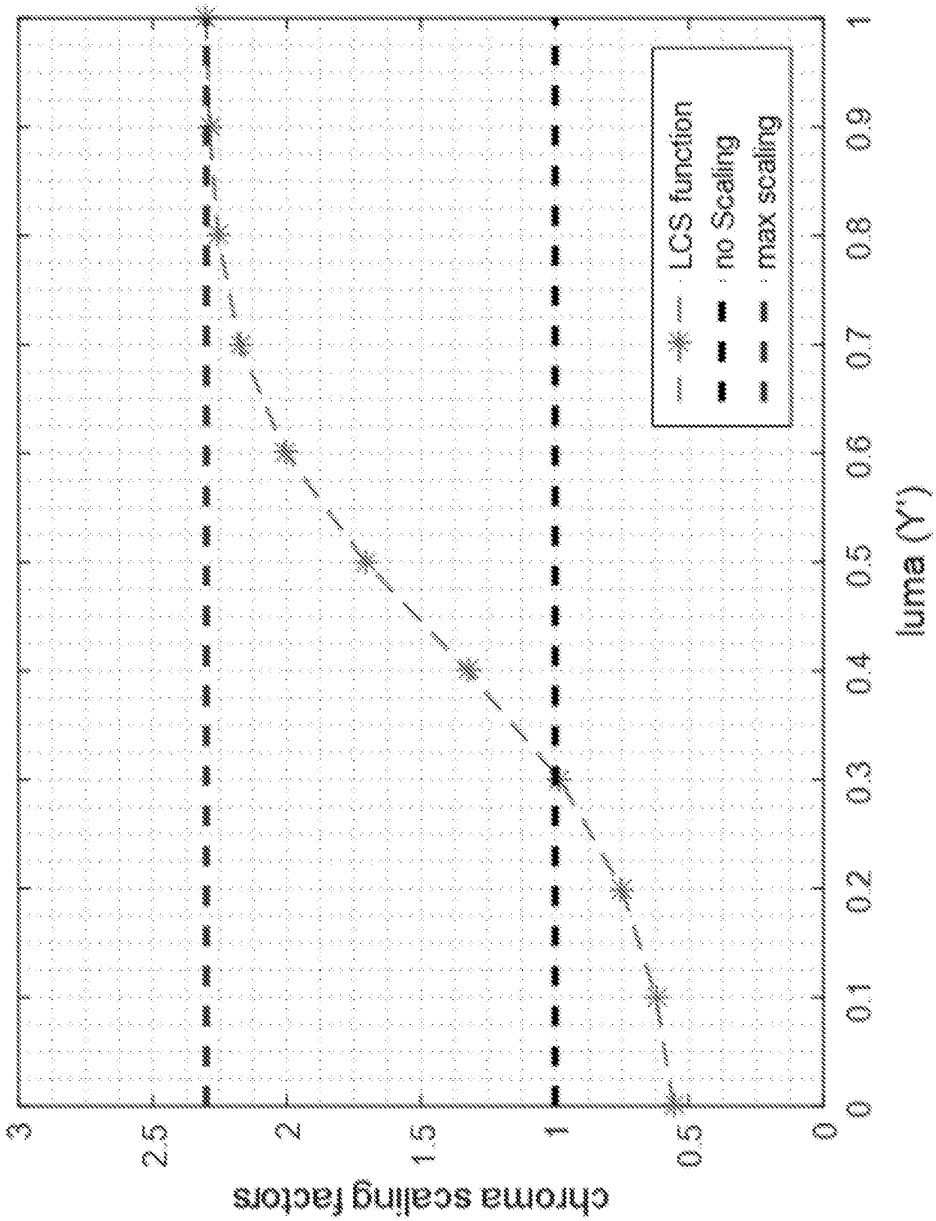

chroma scaling factors
luma (Y')
LCS function
no Scaling
max scaling
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
0.5
1
1.5
2
2.5
3

FIG. 8

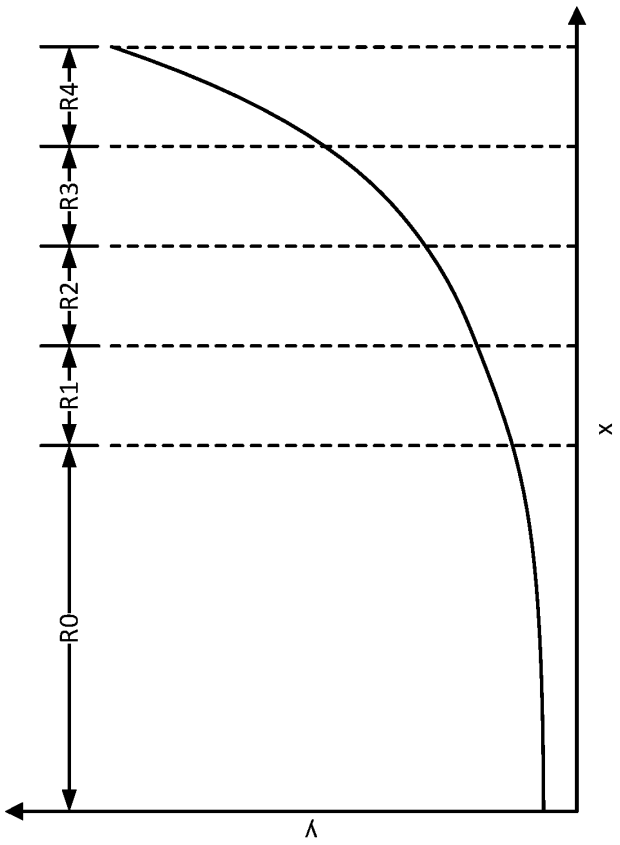


FIG. 9

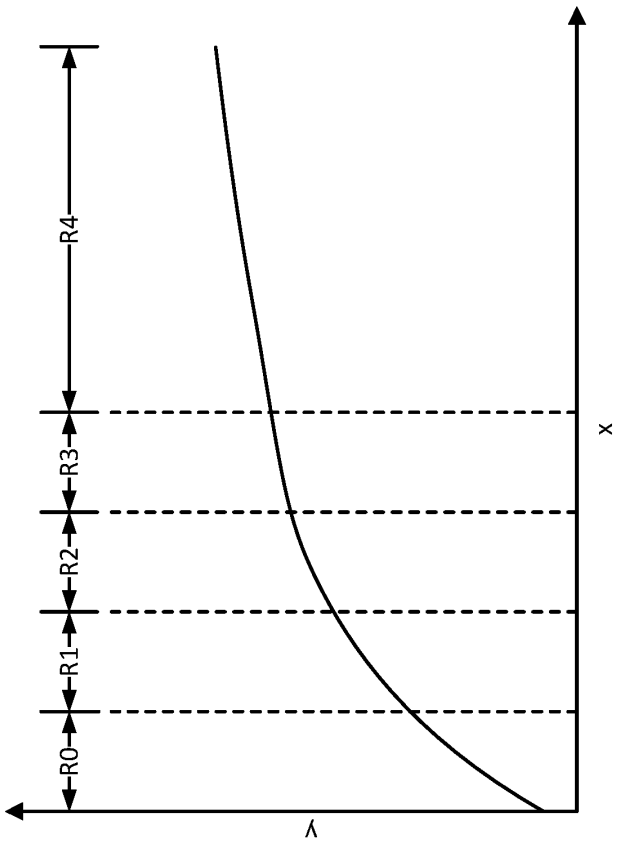


FIG. 10

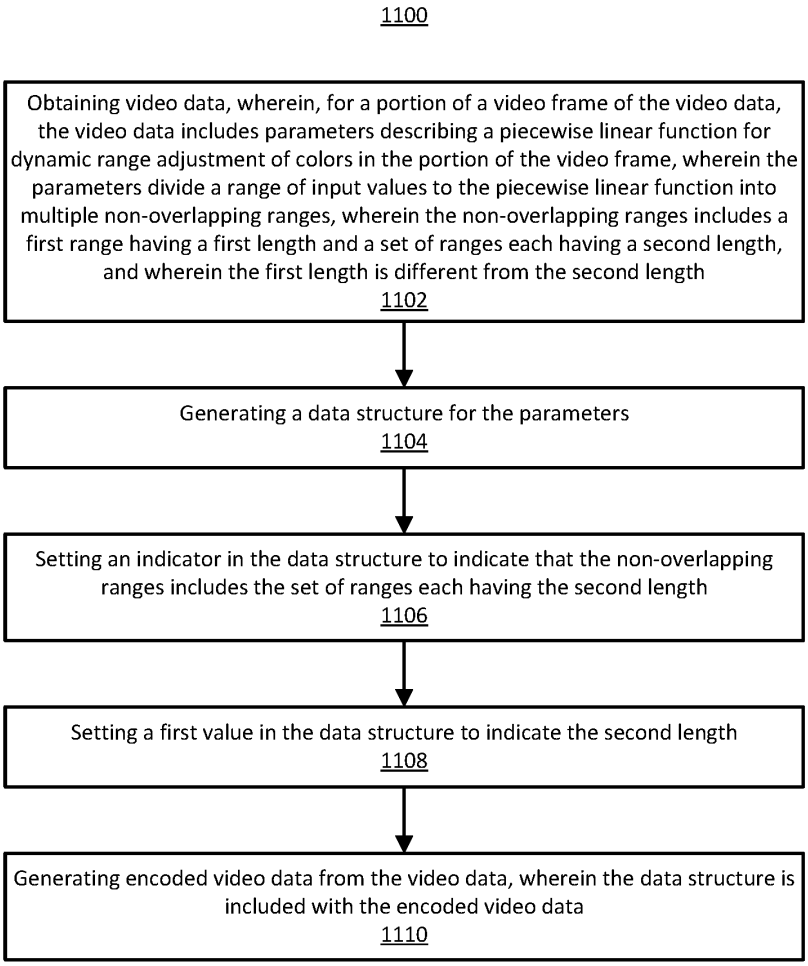

1100
Obtaining video data, wherein, for a portion of a video frame of the video data, the video data includes parameters describing a piecewise linear function for dynamic range adjustment of colors in the portion of the video frame, wherein the parameters divide a range of input values to the piecewise linear function into multiple non-overlapping ranges, wherein the non-overlapping ranges includes a first range having a first length and a set of ranges each having a second length, and wherein the first length is different from the second length
1102
Generating a data structure for the parameters
1104
Setting an indicator in the data structure to indicate that the non-overlapping ranges includes the set of ranges each having the second length
1106
Setting a first value in the data structure to indicate the second length
1108
Generating encoded video data from the video data, wherein the data structure is included with the encoded video data
1110

FIG. 11

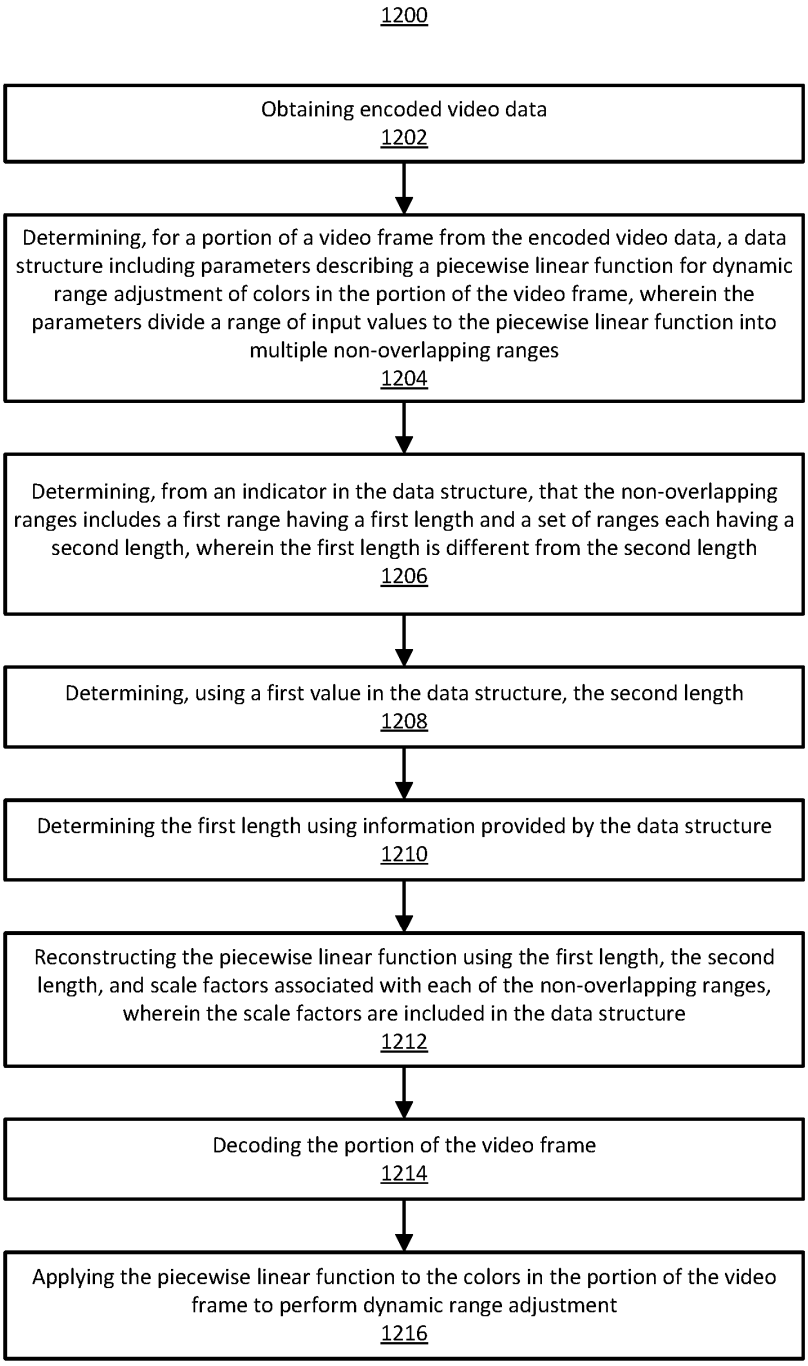

1200
Obtaining encoded video data
1202
Determining, for a portion of a video frame from the encoded video data, a data structure including parameters describing a piecewise linear function for dynamic range adjustment of colors in the portion of the video frame, wherein the parameters divide a range of input values to the piecewise linear function into multiple non-overlapping ranges
1204
Determining, from an indicator in the data structure, that the non-overlapping ranges includes a first range having a first length and a set of ranges each having a second length, wherein the first length is different from the second length
1206
Determining, using a first value in the data structure, the second length
1208
Determining the first length using information provided by the data structure
1210
Reconstructing the piecewise linear function using the first length, the second length, and scale factors associated with each of the non-overlapping ranges, wherein the scale factors are included in the data structure
1212
Decoding the portion of the video frame
1214
Applying the piecewise linear function to the colors in the portion of the video frame to perform dynamic range adjustment
1216

FIG. 12

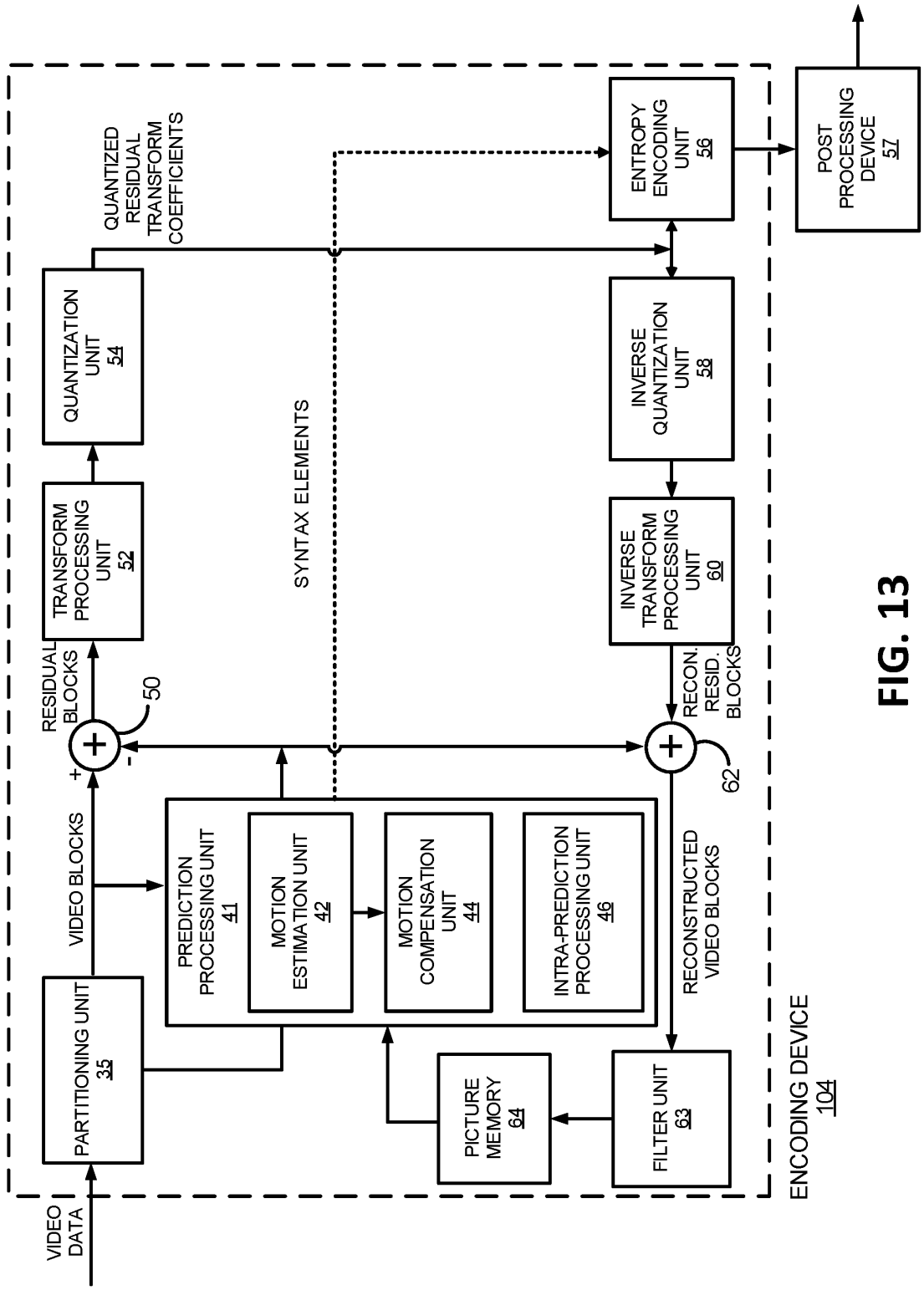

VIDEO DATA
ENCODING DEVICE 104
PARTITIONING UNIT 35
PREDICTION PROCESSING UNIT 41
MOTION ESTIMATION UNIT 42
MOTION COMPENSATION UNIT 44
INTRA-PREDICTION PROCESSING UNIT 46
PICTURE MEMORY 64
FILTER UNIT 63
VIDEO BLOCKS
RESIDUAL BLOCKS
TRANSFORM PROCESSING UNIT 52
QUANTIZATION UNIT 54
QUANTIZED RESIDUAL TRANSFORM COEFFICIENTS
SYNTAX ELEMENTS
ENTROPY ENCODING UNIT 56
POST PROCESSING DEVICE 57
INVERSE QUANTIZATION UNIT 58
INVERSE TRANSFORM PROCESSING UNIT 60
RECON. RESID. BLOCKS
RECONSTRUCTED VIDEO BLOCKS
50
62

FIG. 13

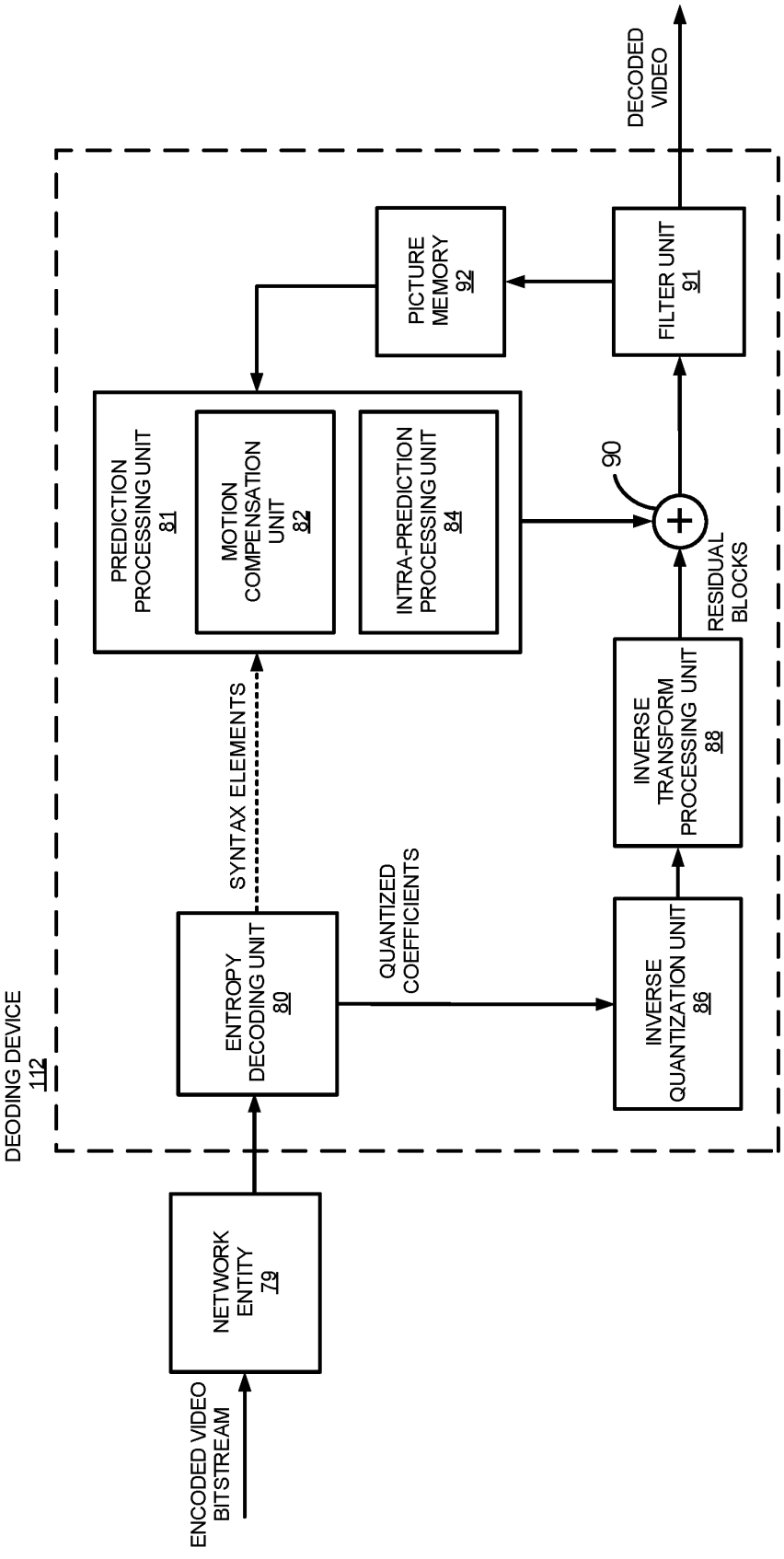

ENCODED VIDEO BITSTREAM
NETWORK ENTITY 79
DEODING DEVICE 112
ENTROPY DECODING UNIT 80
SYNTAX ELEMENTS
QUANTIZED COEFFICIENTS
INVERSE QUANTIZATION UNIT 86
INVERSE TRANSFORM PROCESSING UNIT 88
RESIDUAL BLOCKS
90
PREDICTION PROCESSING UNIT 81
MOTION COMPENSATION UNIT 82
INTRA-PREDICTION PROCESSING UNIT 84
PICTURE MEMORY 92
FILTER UNIT 91
DECODED VIDEO

FIG. 14