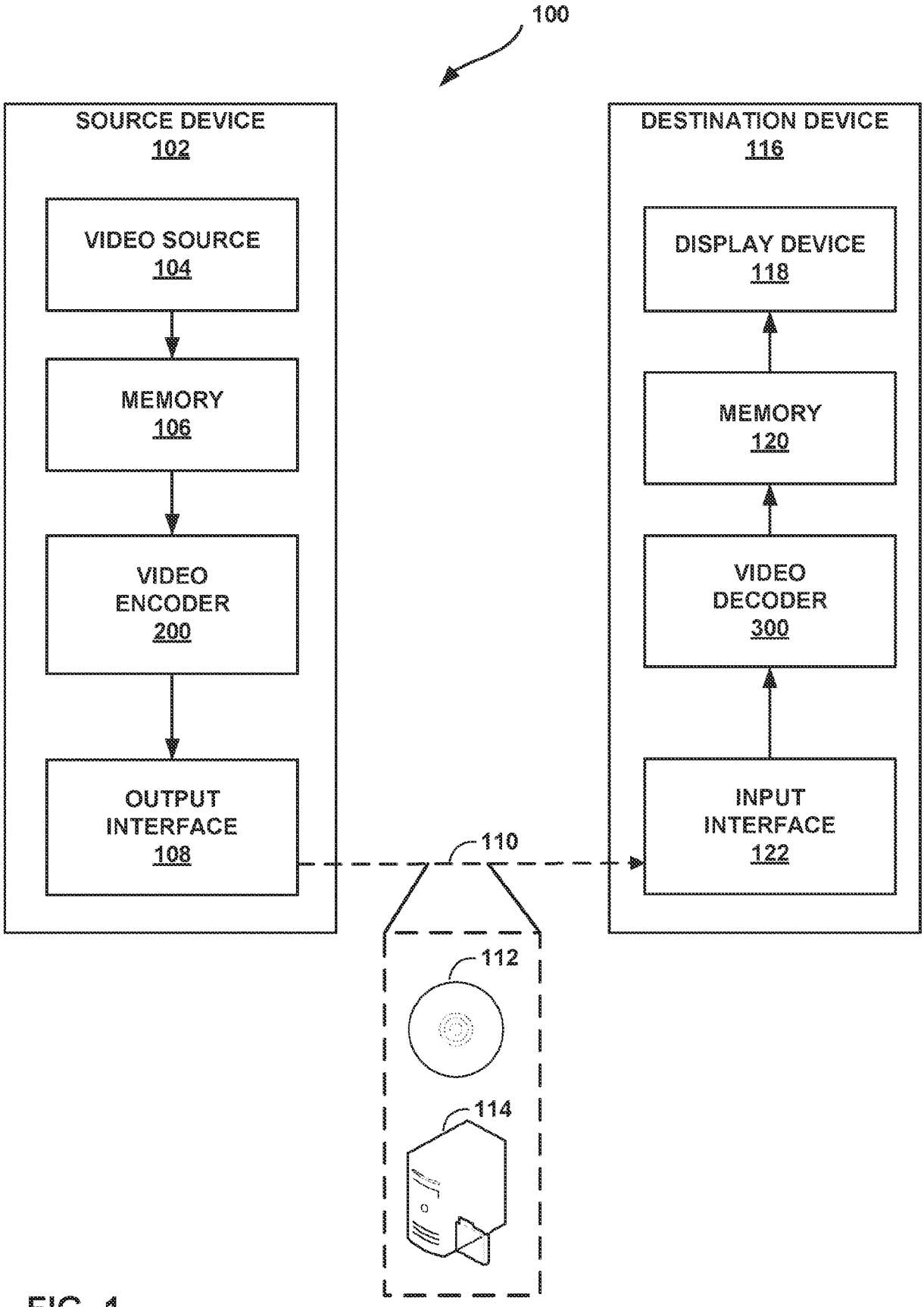

100
SOURCE DEVICE
102
VIDEO SOURCE
104
MEMORY
106
VIDEO
ENCODER
200
OUTPUT
INTERFACE
108
DESTINATION DEVICE
116
DISPLAY DEVICE
118
MEMORY
120
VIDEO
DECODER
300
INPUT
INTERFACE
122
110
112
114

FIG. 1

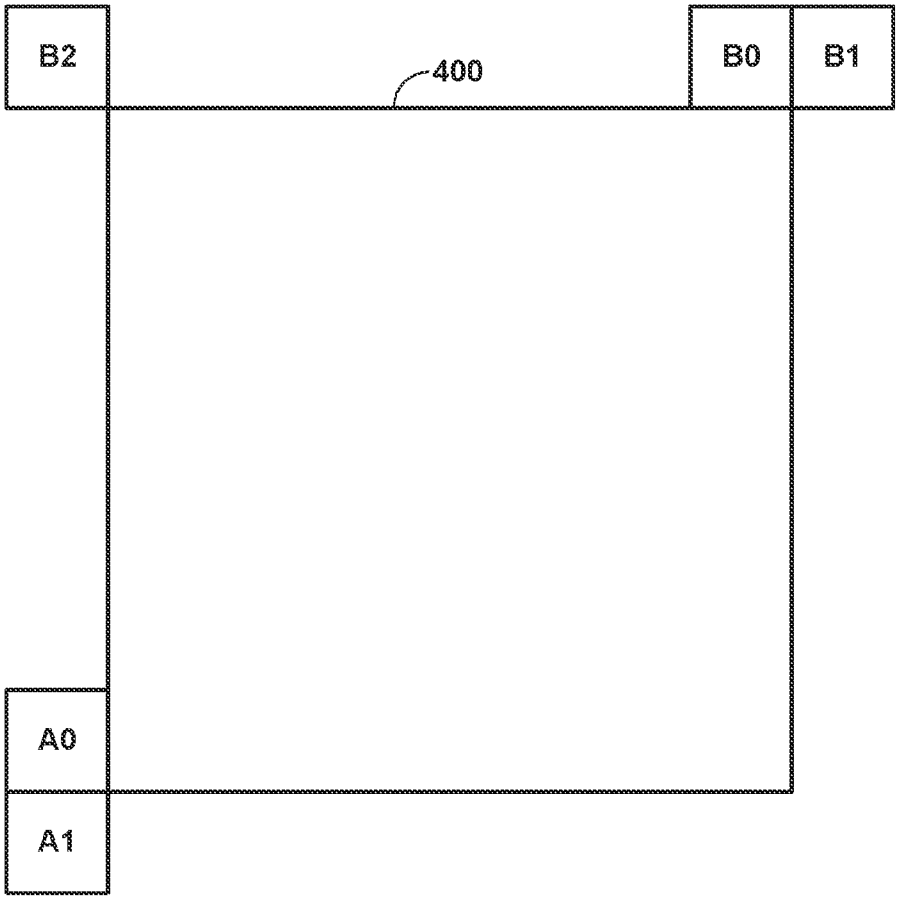


FIG. 2

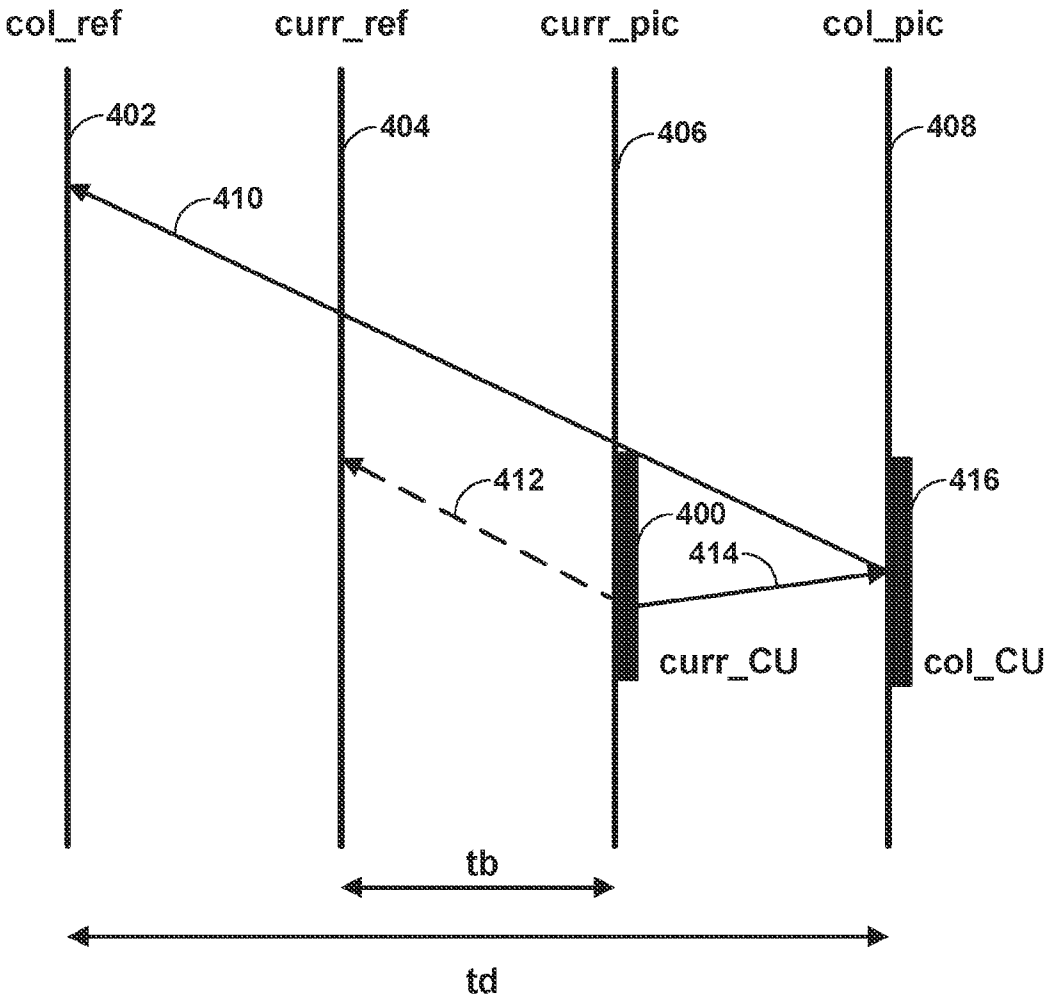

col_ref
curr_ref
curr_pic
col_pic
402
404
406
408
410
412
400
414
416
curr_CU
col_CU
tb
td

FIG. 3

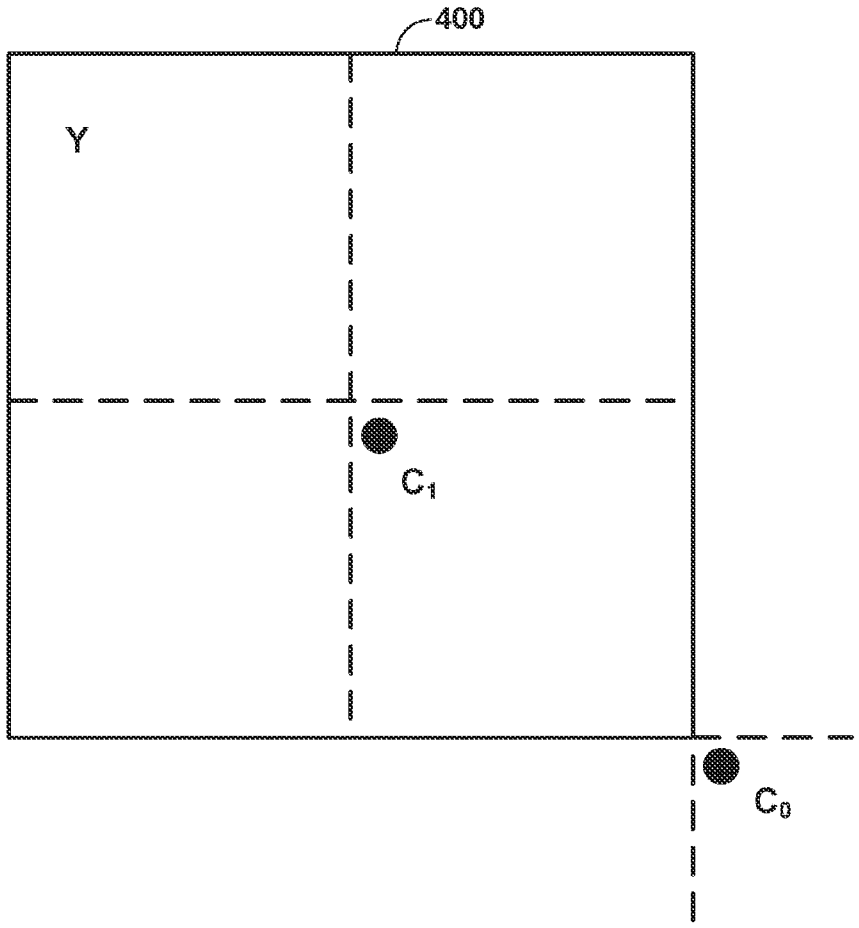


FIG. 4

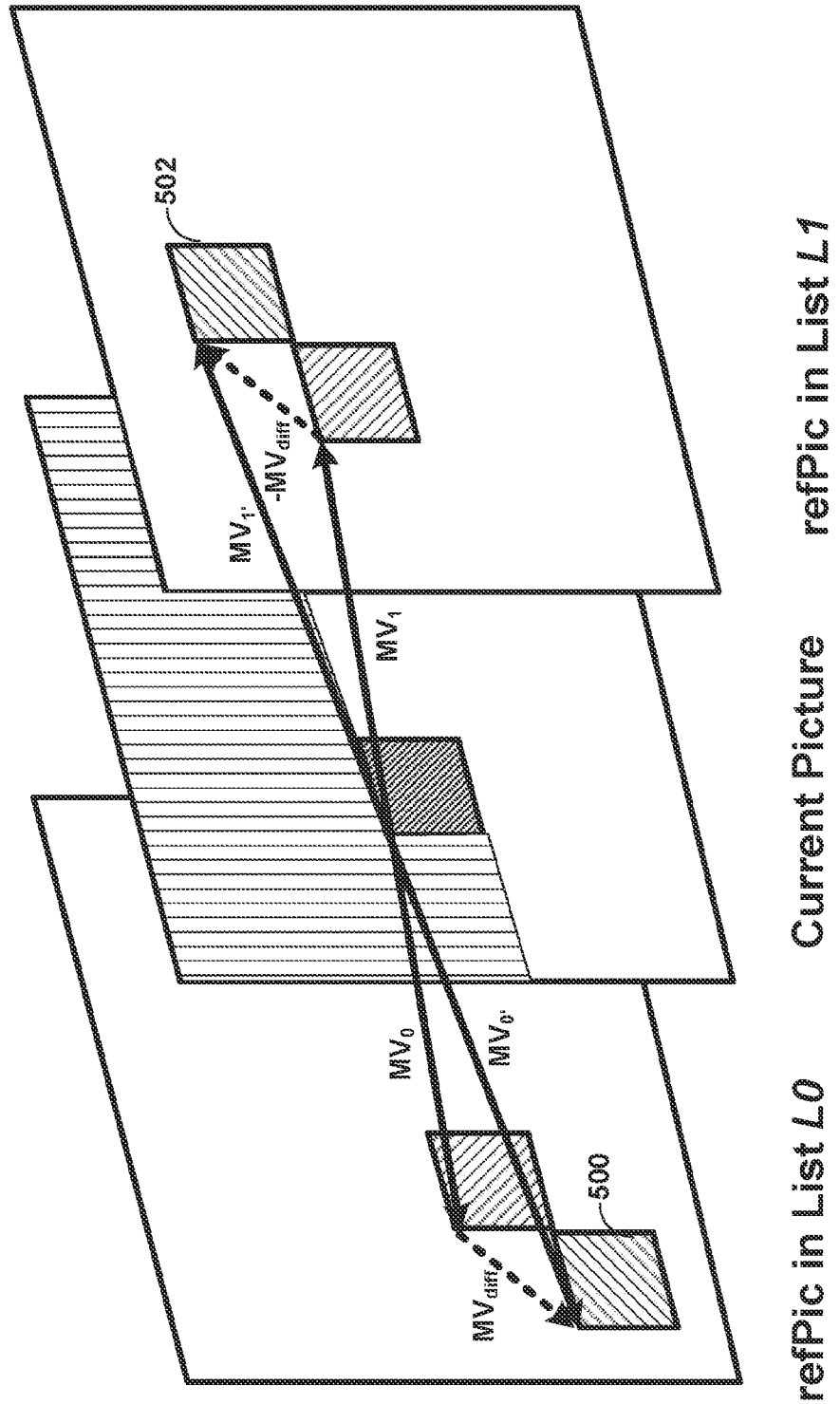

502
$MV_{1'}$
$-MV_{diff}$
MV_1
refPic in List *L1*
Current Picture
MV_0
$MV_{0'}$
500
MV_{diff}
refPic in List *L0*

FIG. 5

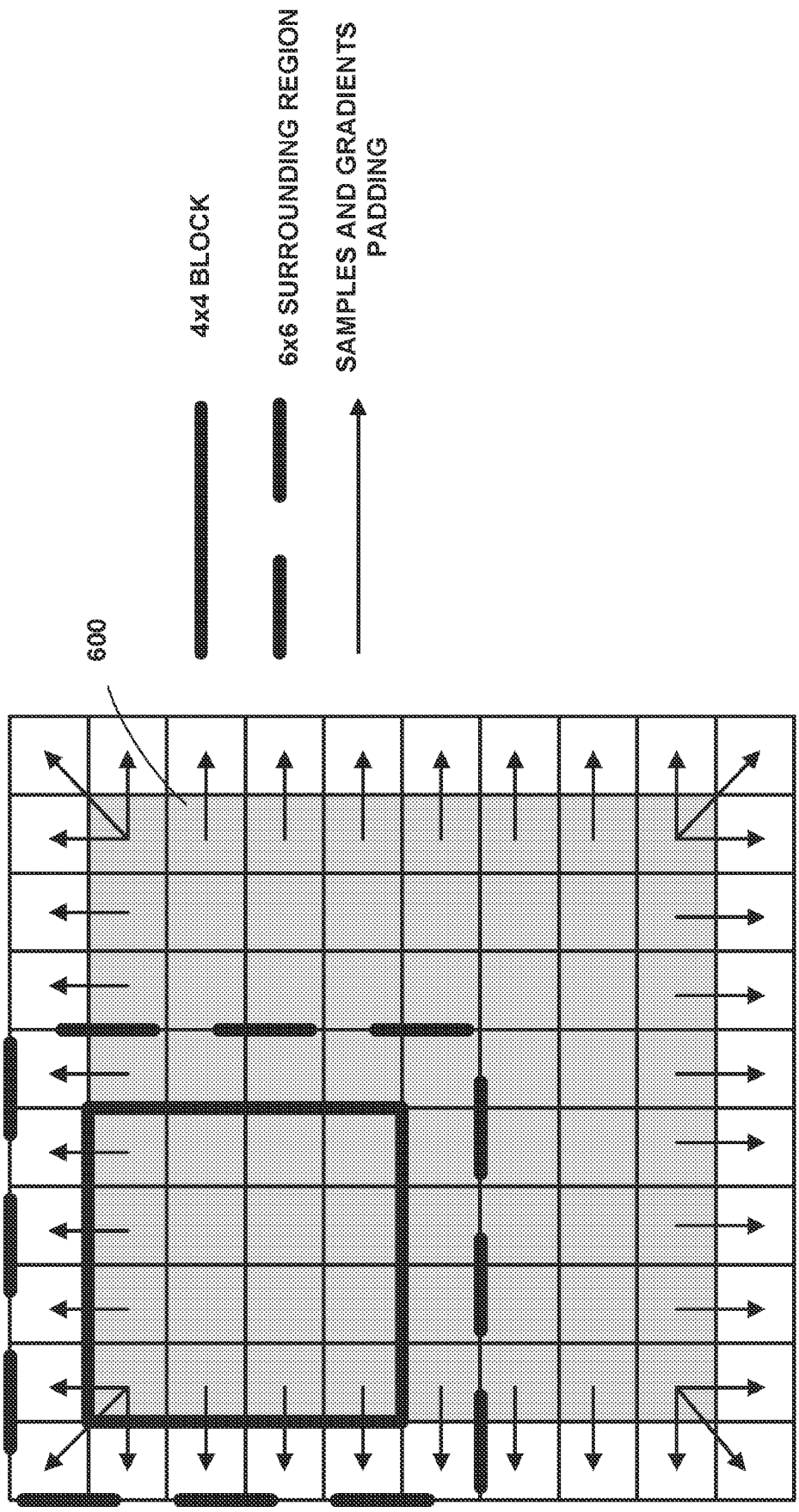

600
4x4 BLOCK
6x6 SURROUNDING REGION
SAMPLES AND GRADIENTS
PADDING
EXTENDED CU REGION IN BDOF

FIG. 6

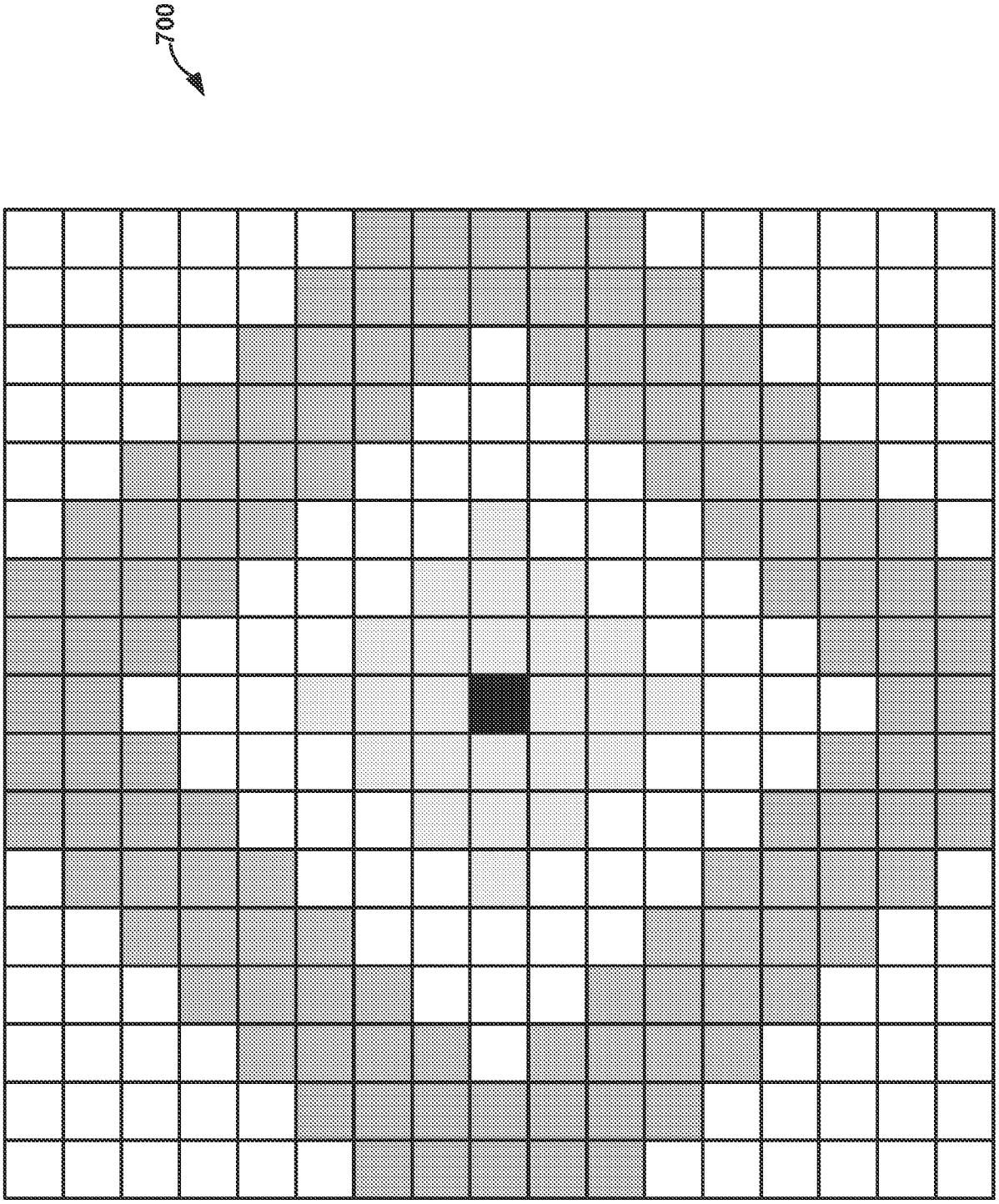


FIG. 7

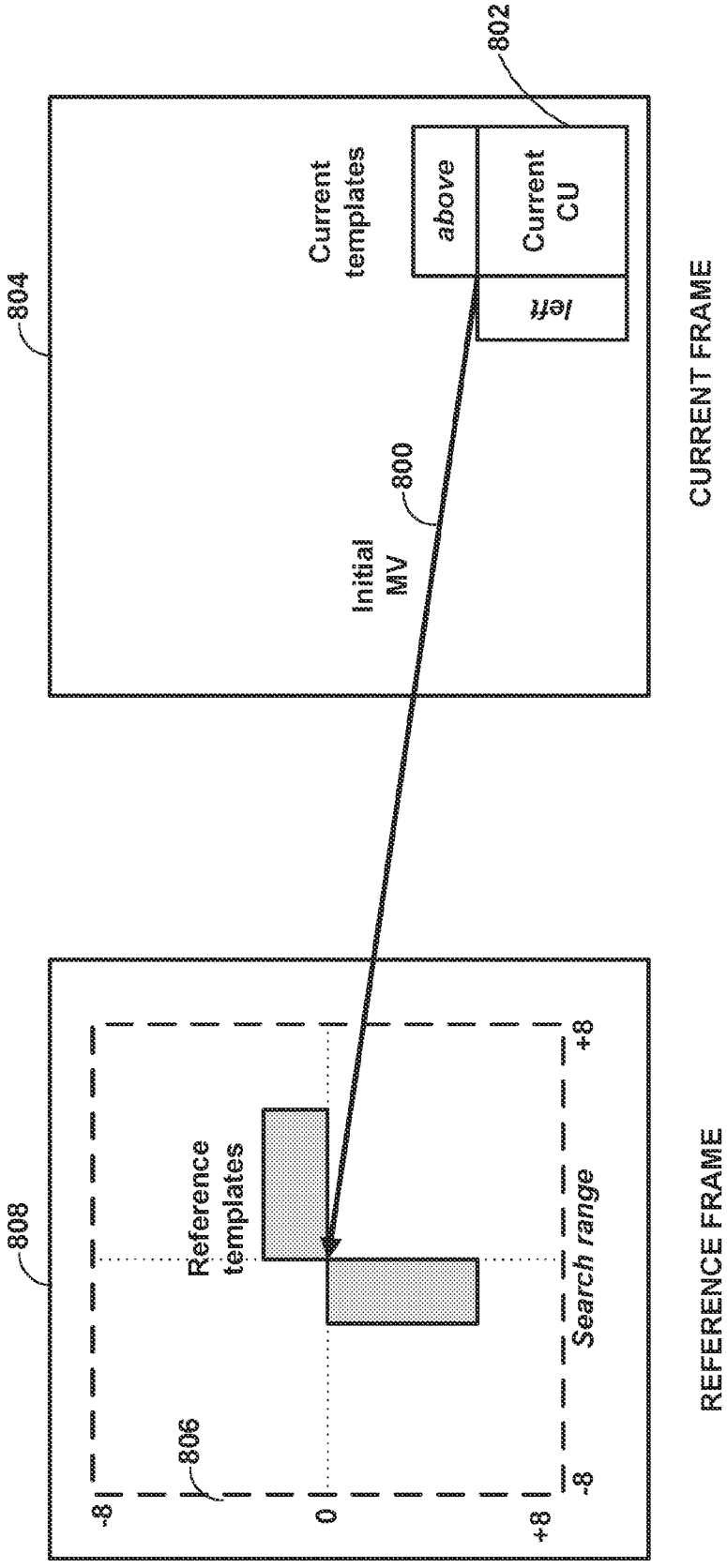

802
804
Current templates
above
Current CU
left
CURRENT FRAME
800
Initial MV
808
Reference templates
Search range
806
-8
0
+8
-8
+8
REFERENCE FRAME

FIG. 8

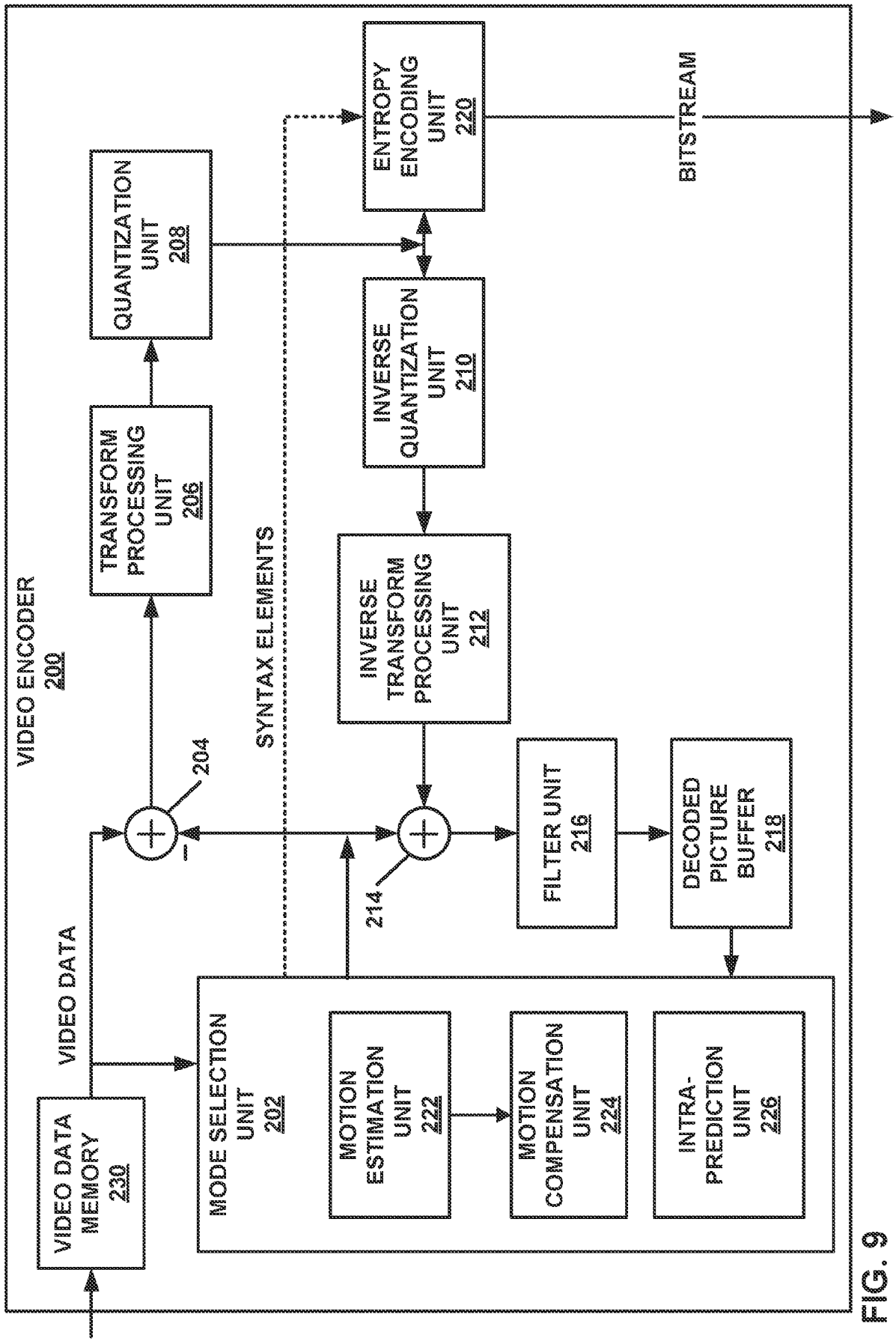

VIDEO ENCODER
200
VIDEO DATA MEMORY
230
VIDEO DATA
MODE SELECTION UNIT
202
MOTION ESTIMATION UNIT
222
MOTION COMPENSATION UNIT
224
INTRA-PREDICTION UNIT
226
204
214
TRANSFORM PROCESSING UNIT
206
QUANTIZATION UNIT
208
INVERSE QUANTIZATION UNIT
210
INVERSE TRANSFORM PROCESSING UNIT
212
FILTER UNIT
216
DECODED PICTURE BUFFER
218
SYNTAX ELEMENTS
ENTROPY ENCODING UNIT
220
BITSTREAM

FIG. 9

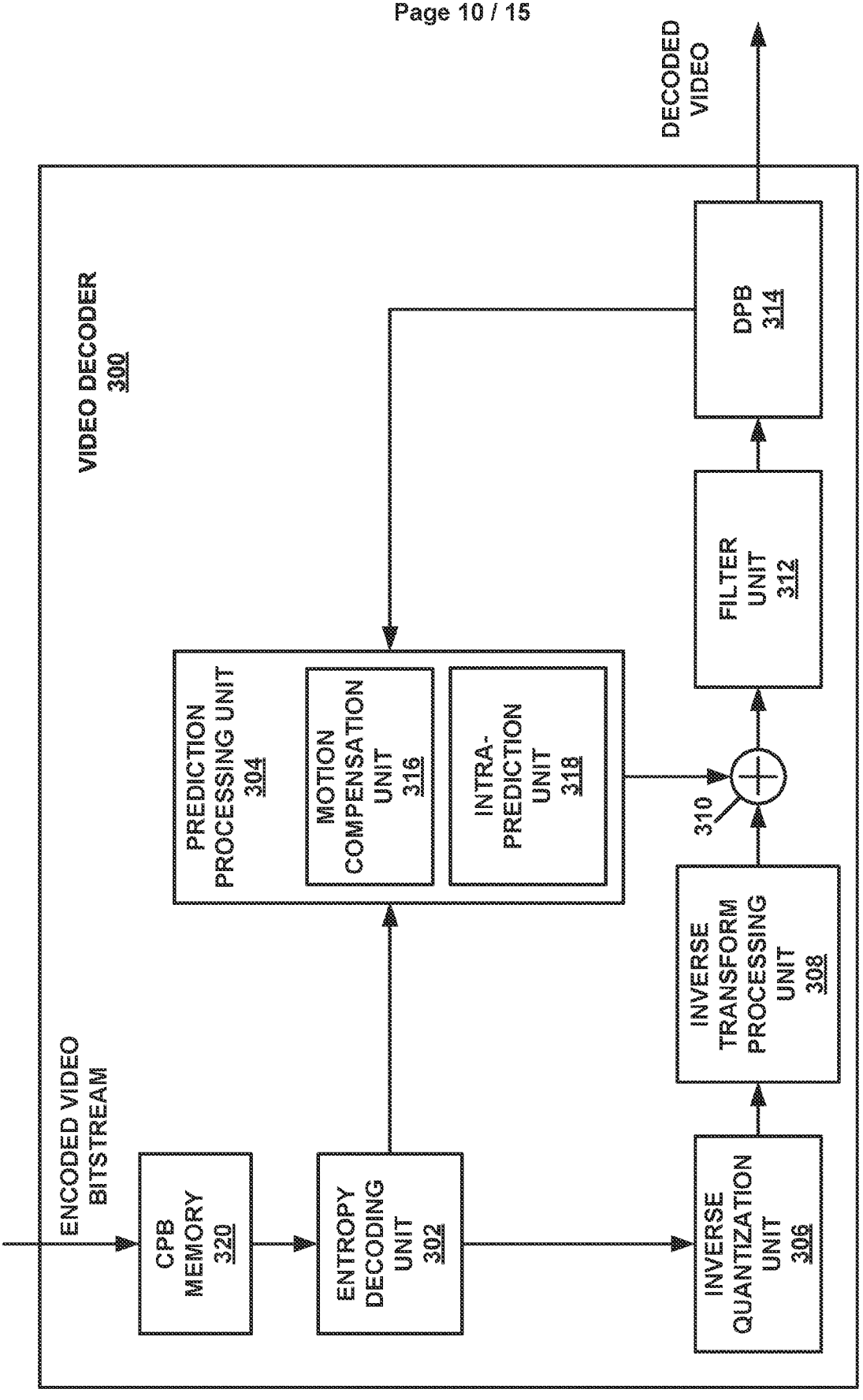

ENCODED VIDEO BITSTREAM
CPB MEMORY 320
ENTROPY DECODING UNIT 302
PREDICTION PROCESSING UNIT 304
MOTION COMPENSATION UNIT 316
INTRA-PREDICTION UNIT 318
INVERSE QUANTIZATION UNIT 306
INVERSE TRANSFORM PROCESSING UNIT 308
310
FILTER UNIT 312
DPB 314
DECODED VIDEO
VIDEO DECODER 300

FIG. 10

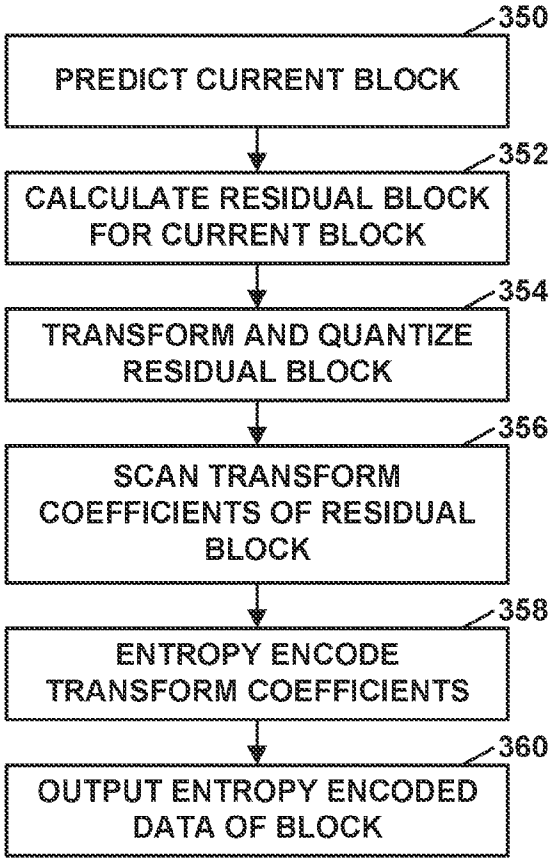

350
PREDICT CURRENT BLOCK
352
CALCULATE RESIDUAL BLOCK FOR CURRENT BLOCK
354
TRANSFORM AND QUANTIZE RESIDUAL BLOCK
356
SCAN TRANSFORM COEFFICIENTS OF RESIDUAL BLOCK
358
ENTROPY ENCODE TRANSFORM COEFFICIENTS
360
OUTPUT ENTROPY ENCODED DATA OF BLOCK

FIG. 11

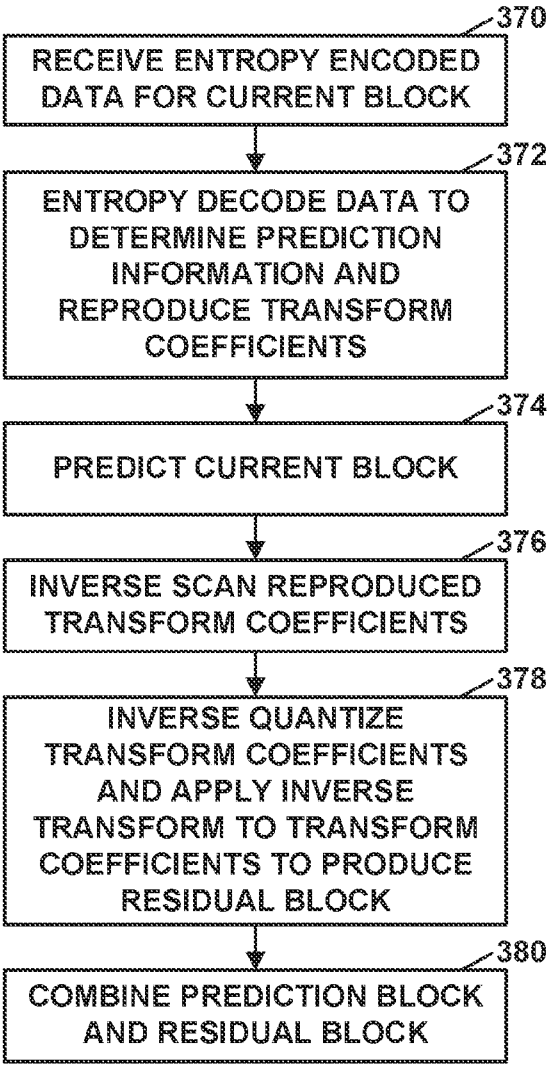

370
RECEIVE ENTROPY ENCODED DATA FOR CURRENT BLOCK
372
ENTROPY DECODE DATA TO DETERMINE PREDICTION INFORMATION AND REPRODUCE TRANSFORM COEFFICIENTS
374
PREDICT CURRENT BLOCK
376
INVERSE SCAN REPRODUCED TRANSFORM COEFFICIENTS
378
INVERSE QUANTIZE TRANSFORM COEFFICIENTS AND APPLY INVERSE TRANSFORM TO TRANSFORM COEFFICIENTS TO PRODUCE RESIDUAL BLOCK
380
COMBINE PREDICTION BLOCK AND RESIDUAL BLOCK

FIG. 12

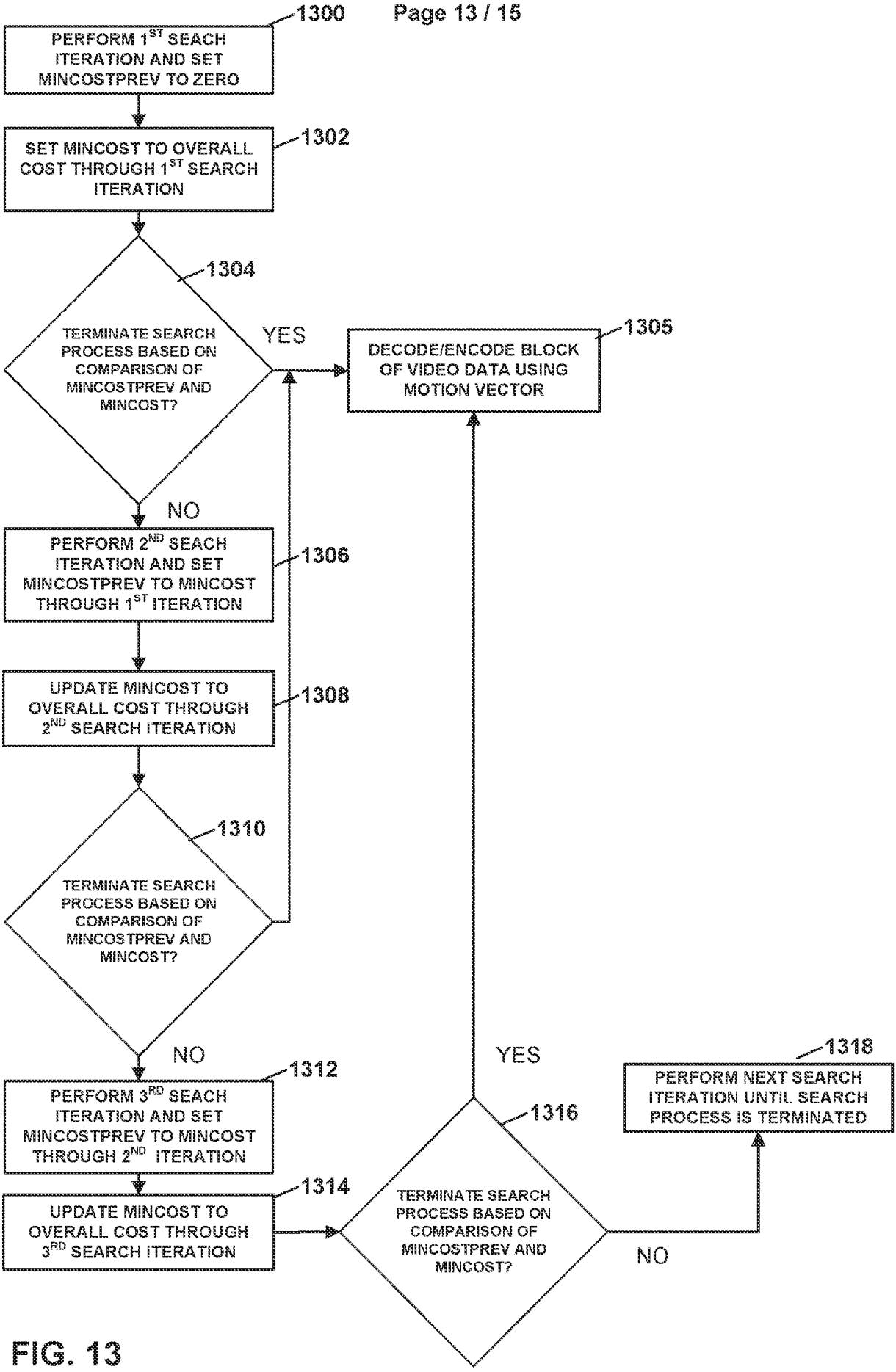

1300
PERFORM 1ST SEACH ITERATION AND SET MINCOSTPREV TO ZERO
1302
SET MINCOST TO OVERALL COST THROUGH 1ST SEARCH ITERATION
1304
TERMINATE SEARCH PROCESS BASED ON COMPARISON OF MINCOSTPREV AND MINCOST?
YES
1305
DECODE/ENCODE BLOCK OF VIDEO DATA USING MOTION VECTOR
NO
1306
PERFORM 2ND SEACH ITERATION AND SET MINCOSTPREV TO MINCOST THROUGH 1ST ITERATION
1308
UPDATE MINCOST TO OVERALL COST THROUGH 2ND SEARCH ITERATION
1310
TERMINATE SEARCH PROCESS BASED ON COMPARISON OF MINCOSTPREV AND MINCOST?
NO
1312
PERFORM 3RD SEACH ITERATION AND SET MINCOSTPREV TO MINCOST THROUGH 2ND ITERATION
1314
UPDATE MINCOST TO OVERALL COST THROUGH 3RD SEARCH ITERATION
YES
1316
TERMINATE SEARCH PROCESS BASED ON COMPARISON OF MINCOSTPREV AND MINCOST?
NO
1318
PERFORM NEXT SEARCH ITERATION UNTIL SEARCH PROCESS IS TERMINATED

FIG. 13

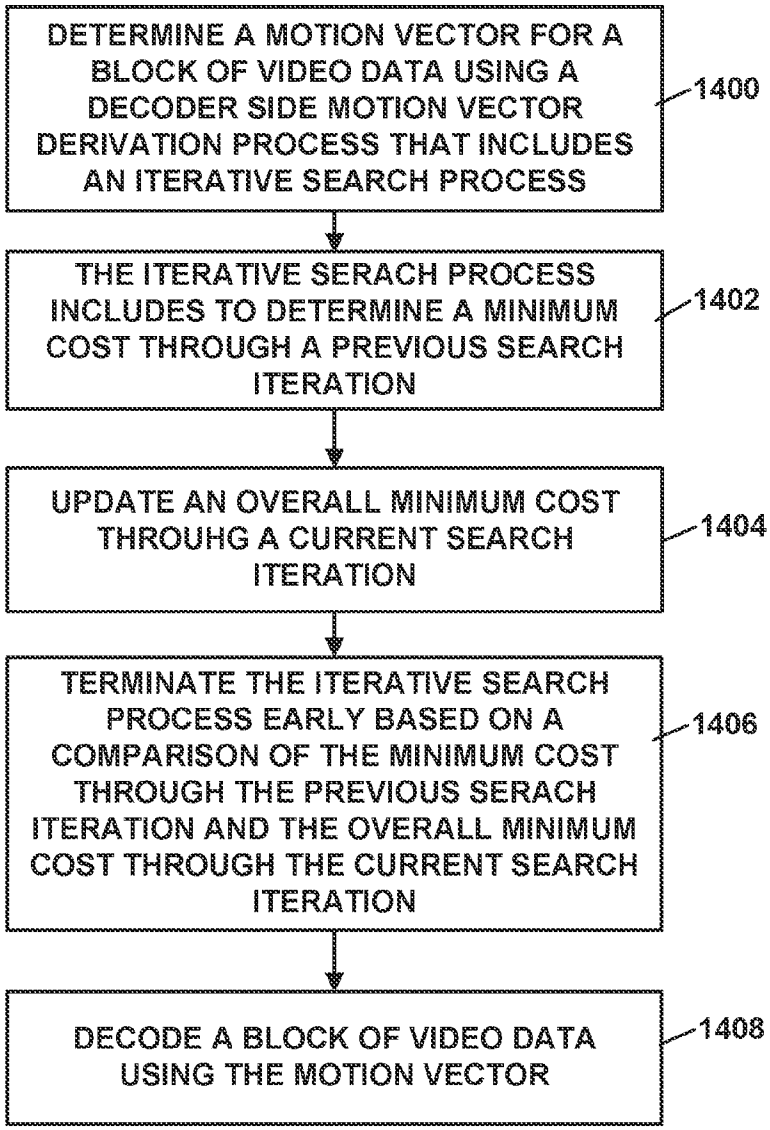

DETERMINE A MOTION VECTOR FOR A BLOCK OF VIDEO DATA USING A DECODER SIDE MOTION VECTOR DERIVATION PROCESS THAT INCLUDES AN ITERATIVE SEARCH PROCESS
1400
THE ITERATIVE SERACH PROCESS INCLUDES TO DETERMINE A MINIMUM COST THROUGH A PREVIOUS SEARCH ITERATION
1402
UPDATE AN OVERALL MINIMUM COST THROUHG A CURRENT SEARCH ITERATION
1404
TERMINATE THE ITERATIVE SEARCH PROCESS EARLY BASED ON A COMPARISON OF THE MINIMUM COST THROUGH THE PREVIOUS SERACH ITERATION AND THE OVERALL MINIMUM COST THROUGH THE CURRENT SEARCH ITERATION
1406
DECODE A BLOCK OF VIDEO DATA USING THE MOTION VECTOR
1408

FIG. 14

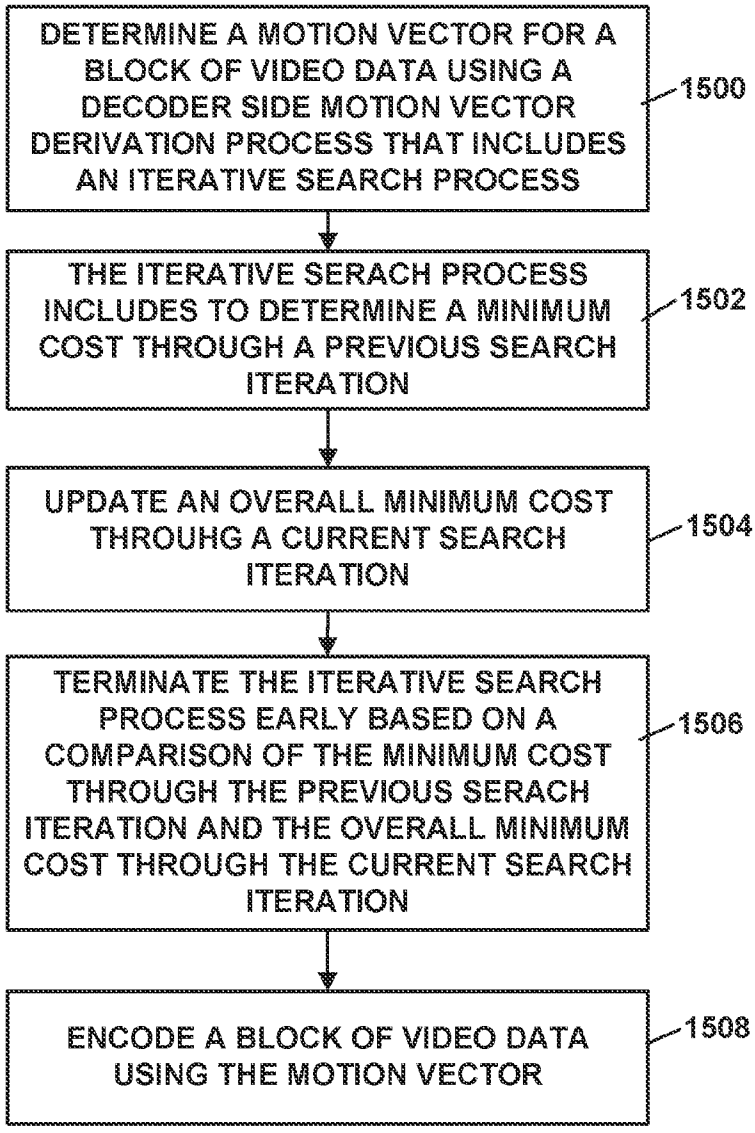

DETERMINE A MOTION VECTOR FOR A BLOCK OF VIDEO DATA USING A DECODER SIDE MOTION VECTOR DERIVATION PROCESS THAT INCLUDES AN ITERATIVE SEARCH PROCESS
1500
THE ITERATIVE SERACH PROCESS INCLUDES TO DETERMINE A MINIMUM COST THROUGH A PREVIOUS SEARCH ITERATION
1502
UPDATE AN OVERALL MINIMUM COST THROUHG A CURRENT SEARCH ITERATION
1504
TERMINATE THE ITERATIVE SEARCH PROCESS EARLY BASED ON A COMPARISON OF THE MINIMUM COST THROUGH THE PREVIOUS SERACH ITERATION AND THE OVERALL MINIMUM COST THROUGH THE CURRENT SEARCH ITERATION
1506
ENCODE A BLOCK OF VIDEO DATA USING THE MOTION VECTOR
1508

FIG. 15