ABSTRACT

The present technique relates to an image processing device and method capable of suppressing a decrease in encoding efficiency. The image processing device includes: a predictive vector generating unit that generates a predictive vector of a current parallax vector of a current block used in prediction using correlation in a parallax direction using a reference parallax vector referred when generating a predictive motion vector, when encoding the current parallax vector; and a difference vector generating unit that generates a difference vector between the current parallax vector and the predictive vector generated by the predictive vector generating unit. The present disclosure can be applied to an image processing device.

CLAIMS

1. An image processing device comprising:

a predictive vector generating unit that generates a predictive vector of a current parallax vector of a current block used in prediction using correlation in a parallax direction using a reference parallax vector referred when generating a predictive motion vector, when encoding the current parallax vector; and

a difference vector generating unit that generates a difference vector between the current parallax vector and the predictive vector generated by the predictive vector generating unit.

2. The image processing device according to claim 1, wherein

the predictive vector generating unit generates a predictive vector of the current parallax vector using a parallax vector of a co-located block included in a co-located picture of a time different from a current picture of the same view as a current view.

3. The image processing device according to claim 2, wherein

the predictive vector generating unit sets the co-located block to be available when a property of a vector of the current block is identical to a property of a vector of the co-located block.

4. The image processing device according to claim 3, wherein

the property of the vector is a type of a vector, and

the predictive vector generating unit sets the co-located block to be available when the property of the vector of the current block is a parallax vector and the property of the vector of the co-located block is a parallax vector.

5. The image processing device according to claim 3, wherein

the predictive motion vector generating unit determines the property of the vector of the current block and the property of the vector of the co-located block using POC (Picture Order Count) that indicates an output order of pictures.

6. The image processing device according to claim 5, wherein

the predictive motion vector generating unit determines the property of the vector of the current block and the property of the vector of the co-located block using the POC of the current picture, the POC of a current reference picture referred from the current picture, the POC of the co-located picture, and the POC of a co-located reference picture referred from the co-located picture.

7. The image processing device according to claim 6, wherein

the predictive motion vector generating unit determines that the property of the vector of the current block and the property of the vector of the co-located block are parallax vectors when the POC of the current picture is identical to the POC of the current reference picture referred from the current picture and the POC of the co-located picture is identical to the POC of the co-located reference picture referred from the co-located picture.

8. The image processing device according to claim 2, wherein

the predictive vector generating unit sets the co-located block to be not available when the property of the vector of the current block is different from the property of the vector of the co-located block.

9. The image processing device according to claim 8, wherein

the property of the vector is a type of a reference picture, and

the predictive vector generating unit sets the co-located block to be not available when the type of the reference picture of the current block is different from the type of the reference picture of the co-located block.

10. The image processing device according to claim 8, wherein

the property of the vector is a type of a reference picture, and

the predictive vector generating unit skips a process of searching a reference index when the type of the reference picture of the current block is a long reference type and the type of the reference picture of the co-located block is a long reference type.

11. The image processing device according to claim 1, wherein

the predictive vector generating unit generates a predictive vector of the current parallax vector using a parallax vector of a reference block included in a picture of the same time as a current picture of a view different from the current view.

12. The image processing device according to claim 1, wherein

the predictive vector generating unit scales the reference parallax vector based on a positional relationship between a current picture and a reference picture referred when generating a predictive motion vector to generate a predictive vector of the current parallax vector.

13. The image processing device according to claim 1, wherein

the predictive vector generating unit generates a predictive vector of the current motion vector using a reference motion vector referred when generating a predictive motion vector, when encoding the current motion vector of the current block used in prediction using correlation in a temporal direction, and

the difference vector generating unit generates a difference vector between the current motion vector and the predictive vector generated by the predictive vector generating unit.

14. The image processing device according to claim 13, wherein

the predictive vector generating unit generates the predictive vector of the current motion vector using a motion vector of the reference block included in a picture of the same time as the current picture of a view different from the current view.

15. The image processing device according to claim 13, wherein

the predictive vector generating unit generates a predictive vector of the current motion vector using a motion vector of a reference block included in a picture of a time different from the current picture of the same view as the current view.

16. The image processing device according to claim 15, wherein

the predictive vector generating unit scales the reference motion vector based on a positional relationship between the current picture and a reference picture referred when generating a predictive motion vector to generate a predictive vector of the current motion vector.

17. The image processing device according to claim 1, wherein

the predictive vector generating unit generates the predictive vector using a vector of a block located at the same position as the current block in a state where a position of a pixel of a picture of the same time as the current picture of a view different from the current view is shifted.

18. The image processing device according to claim 17, wherein

the predictive vector generating unit sets a shift amount of the image according to a parallax vector of a neighboring region of the current block.

19. The image processing device according to claim 18, wherein

the predictive vector generating unit uses a parallax vector in an X-direction, of the neighboring block in which the value of a parallax vector in a Y-direction is not zero as the shift amount.

20. The image processing device according to claim 18, wherein

the predictive vector generating unit uses a value calculated from parallax vectors in an X-direction, of a plurality of the neighboring blocks in which the value of a parallax vector in a Y-direction is not zero as the shift amount.

21. The image processing device according to claim 20, wherein

the predictive vector generating unit uses an average value or a median value of the parallax vectors in the X-direction, of the plurality of the neighboring blocks in which the value of the parallax vector in the Y-direction is not zero as the shift amount of the image.

22. The image processing device according to claim 17, wherein

the predictive vector generating unit sets the shift amount of the image according to a global parallax vector.

23. An image processing method of an image processing device, for allowing the image processing device to execute:

generating a predictive vector of a current parallax vector of a current block used in prediction using correlation in a parallax direction using a reference parallax vector referred when generating a predictive motion vector, when encoding the current parallax vector; and

generating a difference vector between the current parallax vector and the generated predictive vector.

24. An image processing device comprising:

a predictive vector generating unit that generates a predictive vector of a current parallax vector of a current block used in prediction using correlation in a parallax direction using a reference parallax vector referred when generating a predictive motion vector, when decoding the current parallax vector; and

an arithmetic unit that performs an operation of adding the predictive vector generated by the predictive vector generating unit to a difference vector between the current parallax vector and the predictive vector to reconstruct the current parallax vector.

25. An image processing method of an image processing device, for allowing the image processing device to execute:

generating a predictive vector of a current parallax vector of a current block used in prediction using correlation in a parallax direction using a reference parallax vector referred when generating a predictive motion vector, when decoding the current parallax vector; and

performing an operation of adding the generated predictive vector to a difference vector between the current parallax vector and the predictive vector to reconstruct the current parallax vector.

26. An image processing device comprising:

a predictive vector generating unit that sets a co-located block to be not available when a type of a reference picture of a current block is different from a type of the reference picture of a co-located block included in a co-located picture of a different time from a current picture when encoding a current motion vector of the current block used in prediction using correlation in a temporal direction and generates a predictive vector of the current motion vector using a reference motion vector referred when generating a predictive motion vector; and

a difference vector generating unit that generates a difference vector between the current motion vector and the predictive vector generated by the predictive vector generating unit.

27. An image processing method of an image processing device, for allowing the image processing device to execute:

setting a co-located block to be not available when a type of a reference picture of a current block is different from a type of the reference picture of a co-located block included in a co-located picture of a different time from a current picture when encoding a current motion vector of the current block used in prediction using correlation in a temporal direction, and generating a predictive vector of the current motion vector using a reference motion vector referred when generating a predictive motion vector; and

generating a difference vector between the current motion vector and the generated predictive vector.

Dated this December 23, 2013

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FIG. 1

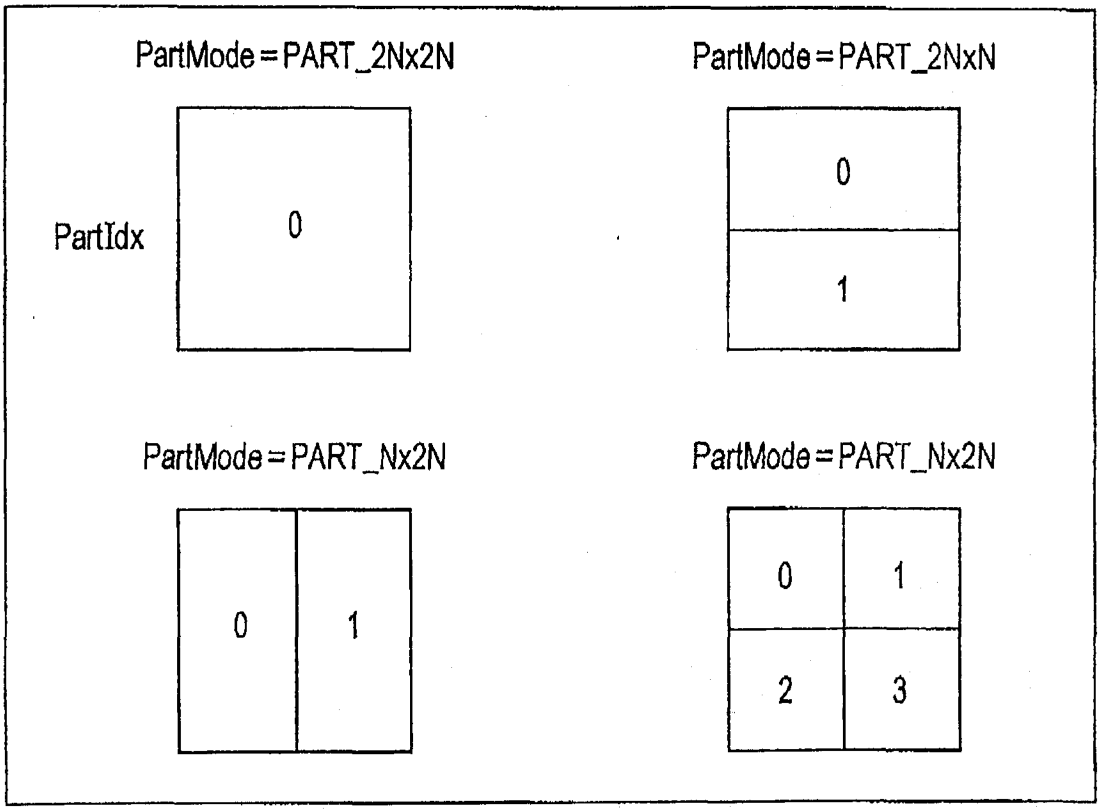

PartMode=PART_2Nx2N
PartIdx
0
PartMode=PART_2NxN
0
1
PartMode=PART_Nx2N
0
1
PartMode=PART_Nx2N
0
1
2
3

FIG. 2

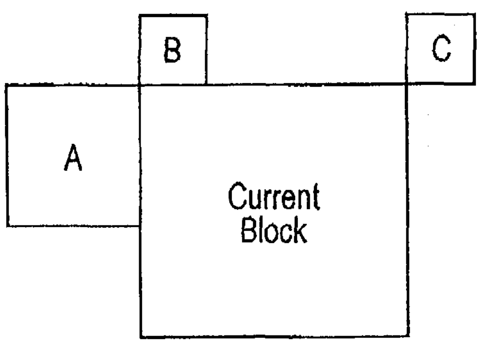

B
C
A
Current Block

FIG. 3

refIdxLX	refIdxLA	refIdxLB	refIdxLC
refIdxLA	x	−1	−1
refIdxLB	−1	x	−1
refIdxLC	x	−1	−1
refIdxLA	x	x	−1
refIdxLA	x	−1	x
refIdxLB	−1	x	x
0	−1	−1	−1
min(refIdxLB,refIdxLC)	−1	x	Y
min(refIdxLA,refIdxLC)	x	−1	y
min(refIdxLA,refIdxLB)	x	−1	y
min(min(refIdxLA,refIdxLB),refIdxLC)	x	y	z

FIG. 4

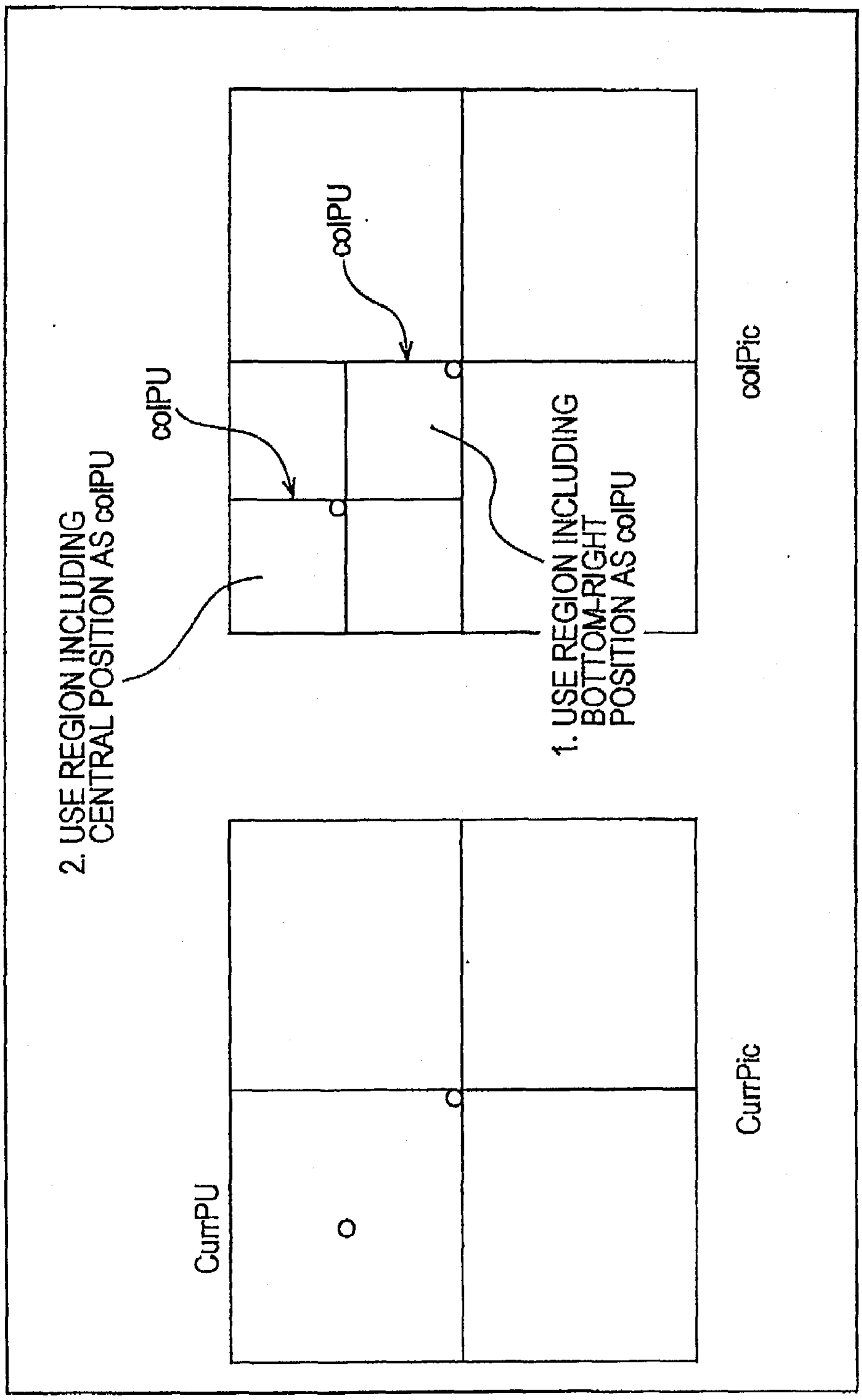

2. USE REGION INCLUDING CENTRAL POSITION AS colPU
colPU
colPU
1. USE REGION INCLUDING BOTTOM-RIGHT POSITION AS colPU
colPic
CurrPU
CurrPic

FIG. 5

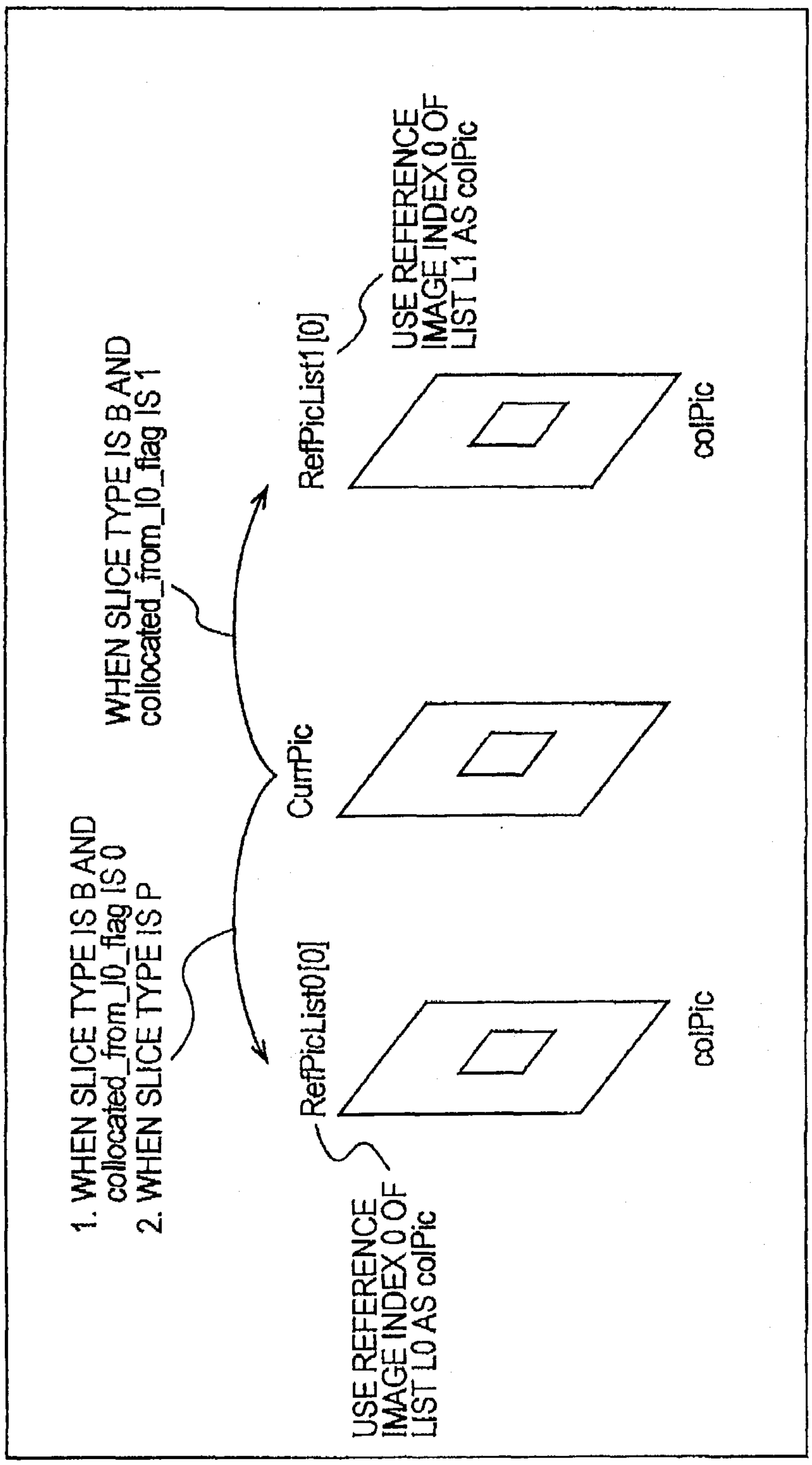

1. WHEN SLICE TYPE IS B AND collocated_from_l0_flag IS 0
2. WHEN SLICE TYPE IS P
WHEN SLICE TYPE IS B AND collocated_from_l0_flag IS 1
RefPicList0[0]
CurrPic
RefPicList1[0]
USE REFERENCE IMAGE INDEX 0 OF LIST L0 AS colPic
USE REFERENCE IMAGE INDEX 0 OF LIST L1 AS colPic
colPic
colPic

FIG. 6

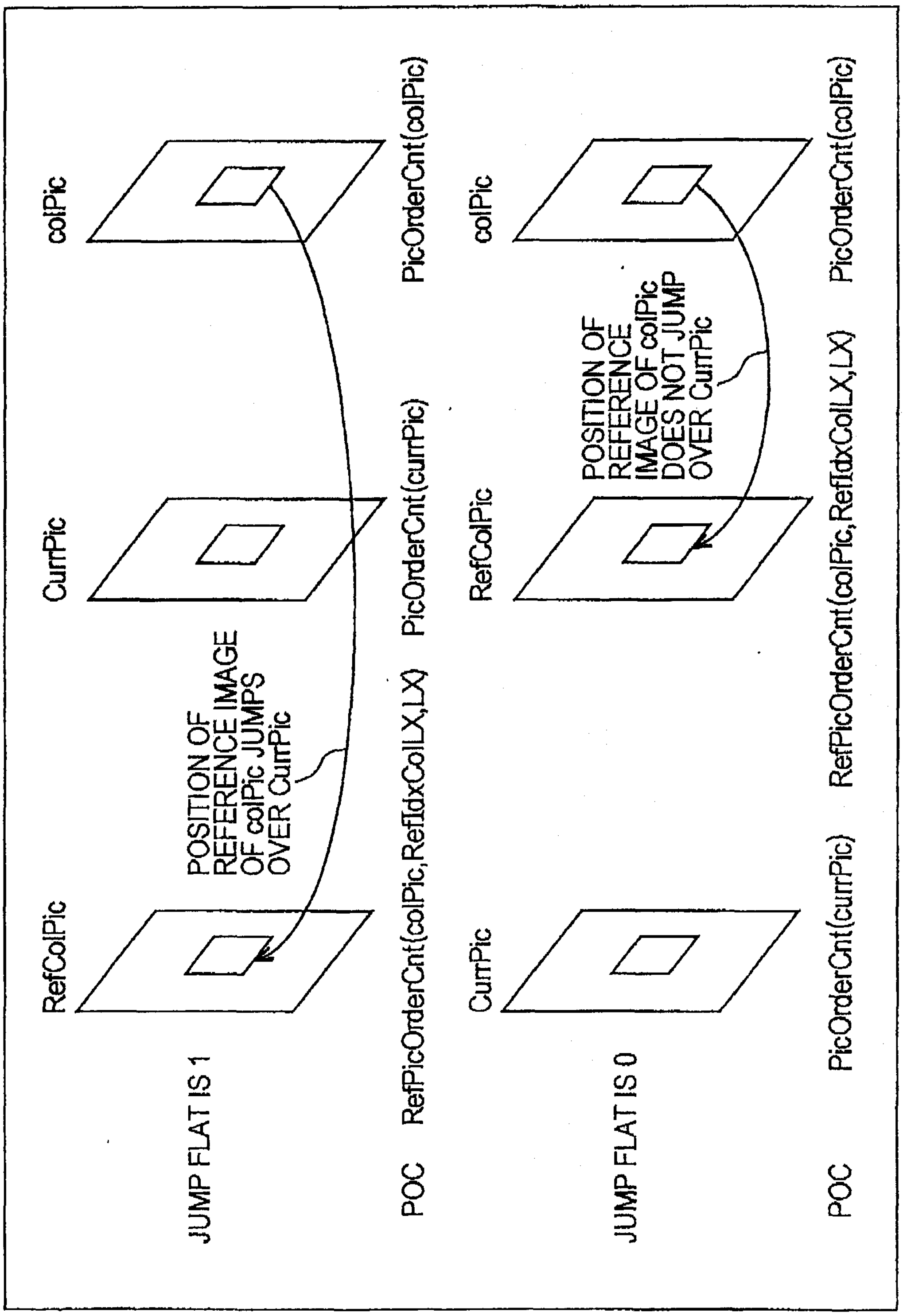

JUMP FLAT IS 1
RefColPic
CurrPic
colPic
POSITION OF REFERENCE IMAGE OF colPic JUMPS OVER CurrPic
POC
RefPicOrderCnt(colPic,RefIdxColLX,LX)
PicOrderCnt(currPic)
PicOrderCnt(colPic)
JUMP FLAT IS 0
CurrPic
RefColPic
colPic
POSITION OF REFERENCE IMAGE OF colPic DOES NOT JUMP OVER CurrPic
POC
PicOrderCnt(currPic)
RefPicOrderCnt(colPic,RefIdxColLX,LX)
PicOrderCnt(colPic)

FIG. 7

A = TEMPORAL DISTANCE BETWEEN TARGET PICTURE AND PICTURE THAT TARGET PICTURE REFERS TO

B = TEMPORAL DISTANCE BETWEEN PICTURE USED IN TEMPORAL CORRELATION AND PICTURE THAT TEMPORAL CORRELATION REGION REFERS TO

mvCol = MOTION VECTOR OF TEMPORAL CORRELATION REGION
pmv = PREDICTIVE VECTOR OF TARGET REGION

WHEN A AND B ARE IDENTICAL pmv = mvCol
WHEN A AND B ARE NOT IDENTICAL pmv = mvCol * A/B

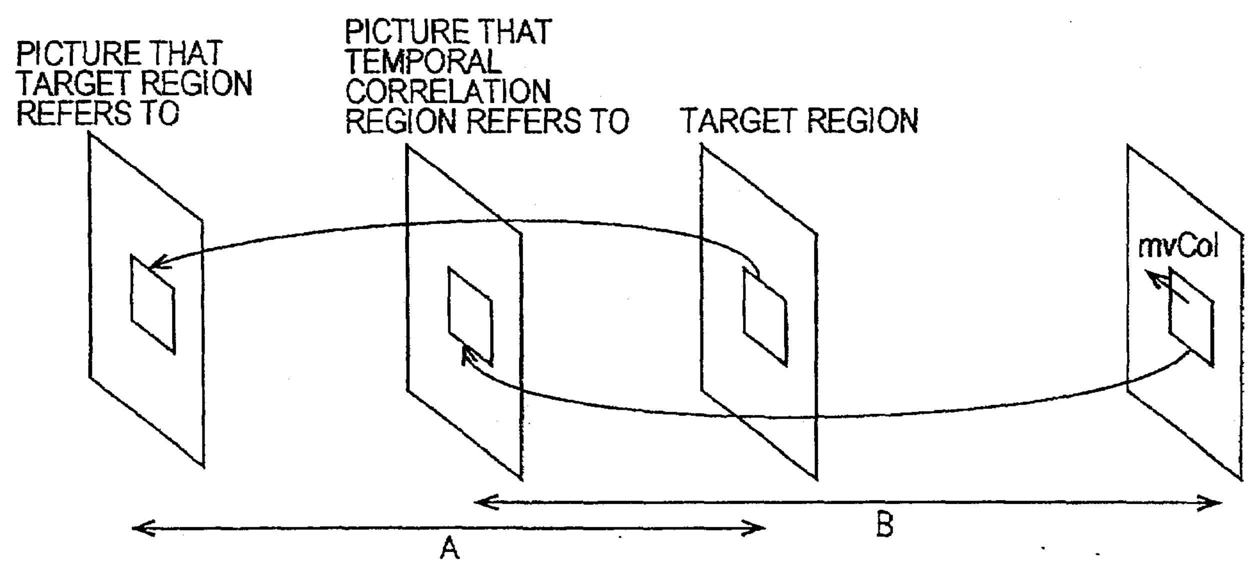


FIG. 8

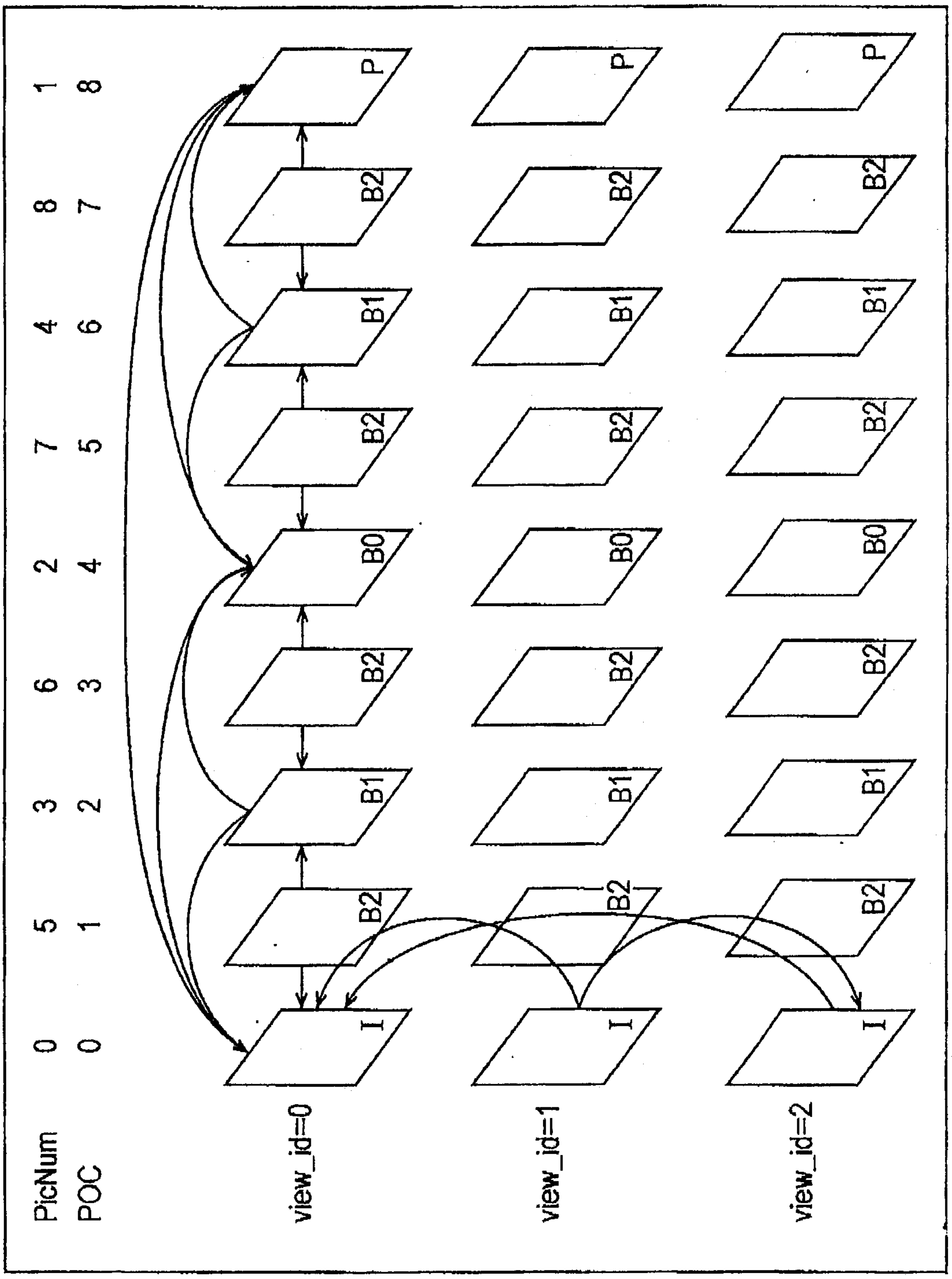

PicNum 0 5 3 6 2 7 4 8 1
POC 0 1 2 3 4 5 6 7 8
view_id=0
view_id=1
view_id=2
I
B2
B1
B2
B0
B2
B1
B2
P

FIG. 9

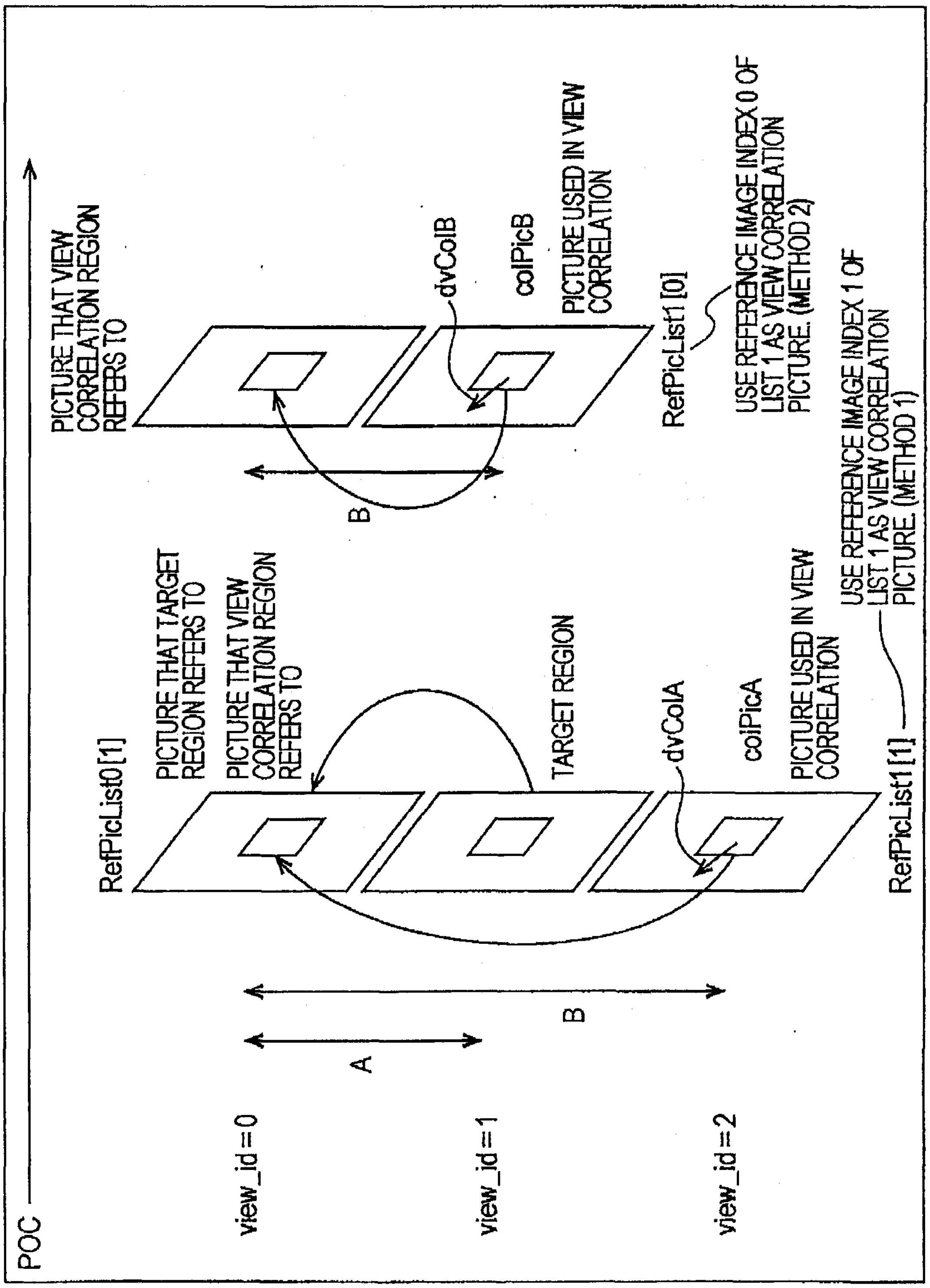

POC
view_id=0
view_id=1
view_id=2
A
B
B
RefPicList0 [1]
PICTURE THAT TARGET REGION REFERS TO
PICTURE THAT VIEW CORRELATION REGION REFERS TO
TARGET REGION
dvColA
colPicA
PICTURE USED IN VIEW CORRELATION
RefPicList1 [1]
USE REFERENCE IMAGE INDEX 1 OF LIST 1 AS VIEW CORRELATION PICTURE. (METHOD 1)
PICTURE THAT VIEW CORRELATION REGION REFERS TO
dvColB
colPicB
PICTURE USED IN VIEW CORRELATION
RefPicList1 [0]
USE REFERENCE IMAGE INDEX 0 OF LIST 1 AS VIEW CORRELATION PICTURE. (METHOD 2)

FIG. 10

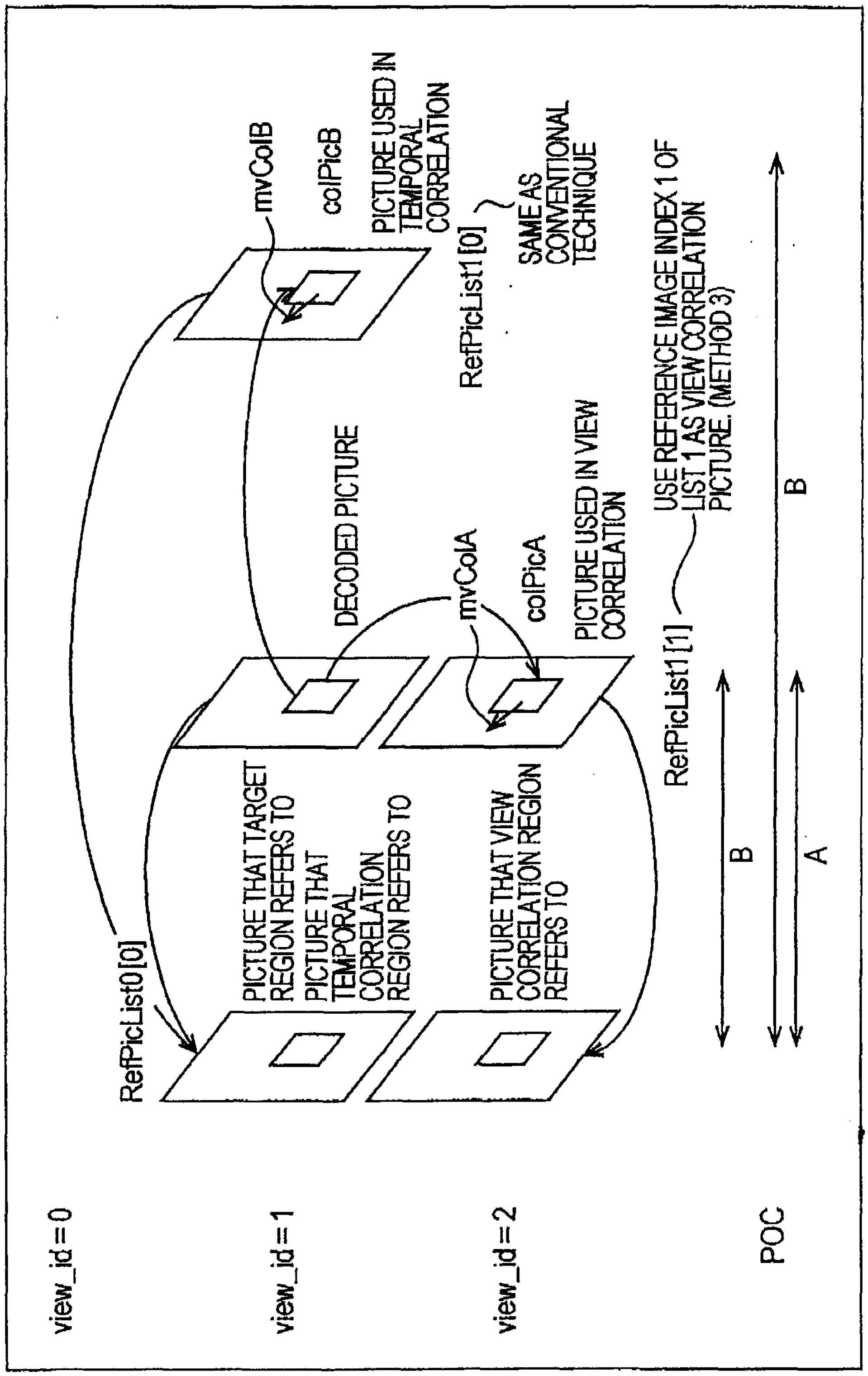

view_id=0
view_id=1
view_id=2
POC
RefPicList0[0]
PICTURE THAT TARGET REGION REFERS TO
PICTURE THAT TEMPORAL CORRELATION REGION REFERS TO
PICTURE THAT VIEW CORRELATION REGION REFERS TO
B
A
RefPicList1[1]
DECODED PICTURE
mvColA
colPicA
PICTURE USED IN VIEW CORRELATION
USE REFERENCE IMAGE INDEX 1 OF LIST 1 AS VIEW CORRELATION PICTURE. (METHOD 3)
B
RefPicList1[0]
SAME AS CONVENTIONAL TECHNIQUE
mvColB
colPicB
PICTURE USED IN TEMPORAL CORRELATION

FIG. 11

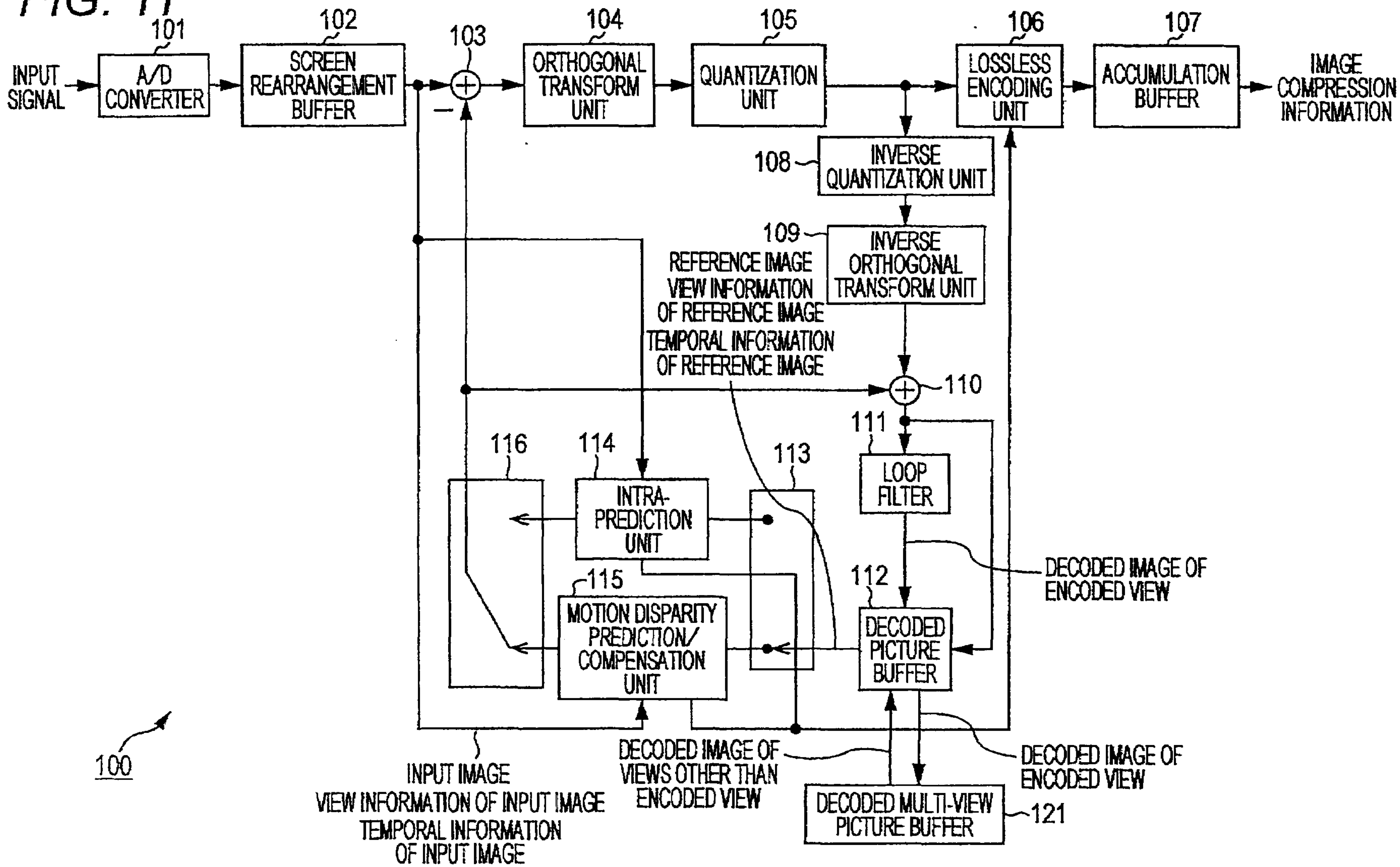

INPUT SIGNAL
101
A/D CONVERTER
102
SCREEN REARRANGEMENT BUFFER
103
−
104
ORTHOGONAL TRANSFORM UNIT
105
QUANTIZATION UNIT
106
LOSSLESS ENCODING UNIT
107
ACCUMULATION BUFFER
IMAGE COMPRESSION INFORMATION
108
INVERSE QUANTIZATION UNIT
109
INVERSE ORTHOGONAL TRANSFORM UNIT
REFERENCE IMAGE
VIEW INFORMATION OF REFERENCE IMAGE
TEMPORAL INFORMATION OF REFERENCE IMAGE
110
111
LOOP FILTER
112
DECODED PICTURE BUFFER
DECODED IMAGE OF ENCODED VIEW
113
114
INTRA-PREDICTION UNIT
115
MOTION DISPARITY PREDICTION/ COMPENSATION UNIT
116
DECODED IMAGE OF VIEWS OTHER THAN ENCODED VIEW
DECODED IMAGE OF ENCODED VIEW
DECODED MULTI-VIEW PICTURE BUFFER
121
INPUT IMAGE
VIEW INFORMATION OF INPUT IMAGE
TEMPORAL INFORMATION OF INPUT IMAGE
100

FIG. 12

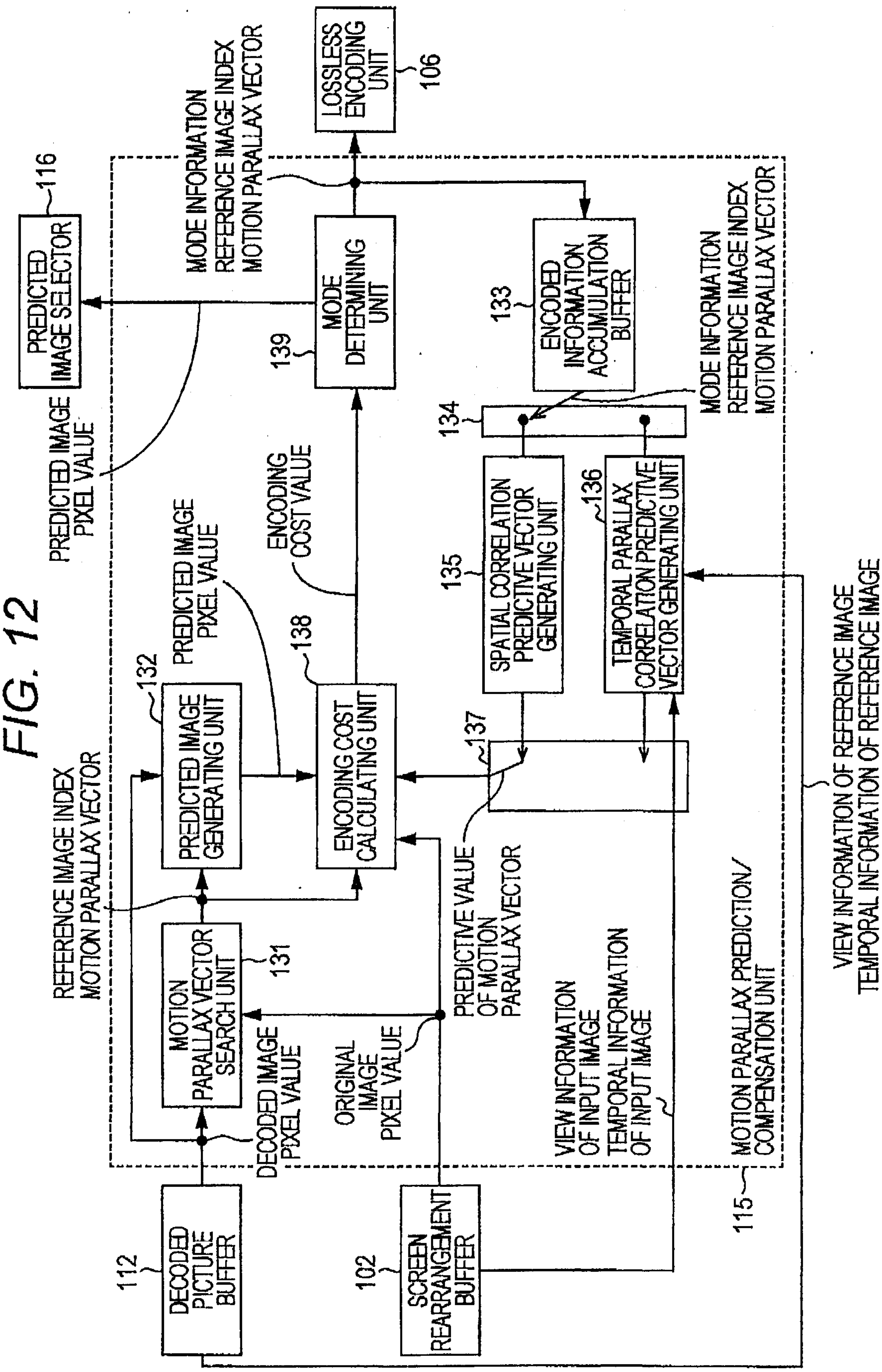

PREDICTED IMAGE SELECTOR
116
PREDICTED IMAGE PIXEL VALUE
LOSSLESS ENCODING UNIT
106
MODE INFORMATION
REFERENCE IMAGE INDEX
MOTION PARALLAX VECTOR
MODE DETERMINING UNIT
139
ENCODED INFORMATION ACCUMULATION BUFFER
133
MODE INFORMATION
REFERENCE IMAGE INDEX
MOTION PARALLAX VECTOR
134
ENCODING COST VALUE
SPATIAL CORRELATION PREDICTIVE VECTOR GENERATING UNIT
135
TEMPORAL PARALLAX CORRELATION PREDICTIVE VECTOR GENERATING UNIT
136
PREDICTED IMAGE PIXEL VALUE
138
ENCODING COST CALCULATING UNIT
132
PREDICTED IMAGE GENERATING UNIT
137
REFERENCE IMAGE INDEX
MOTION PARALLAX VECTOR
MOTION PARALLAX VECTOR SEARCH UNIT
131
PREDICTIVE VALUE OF MOTION PARALLAX VECTOR
DECODED IMAGE PIXEL VALUE
ORIGINAL IMAGE PIXEL VALUE
VIEW INFORMATION OF INPUT IMAGE
TEMPORAL INFORMATION OF INPUT IMAGE
MOTION PARALLAX PREDICTION/ COMPENSATION UNIT
115
VIEW INFORMATION OF REFERENCE IMAGE
TEMPORAL INFORMATION OF REFERENCE IMAGE
112
DECODED PICTURE BUFFER
102
SCREEN REARRANGEMENT BUFFER

FIG. 13

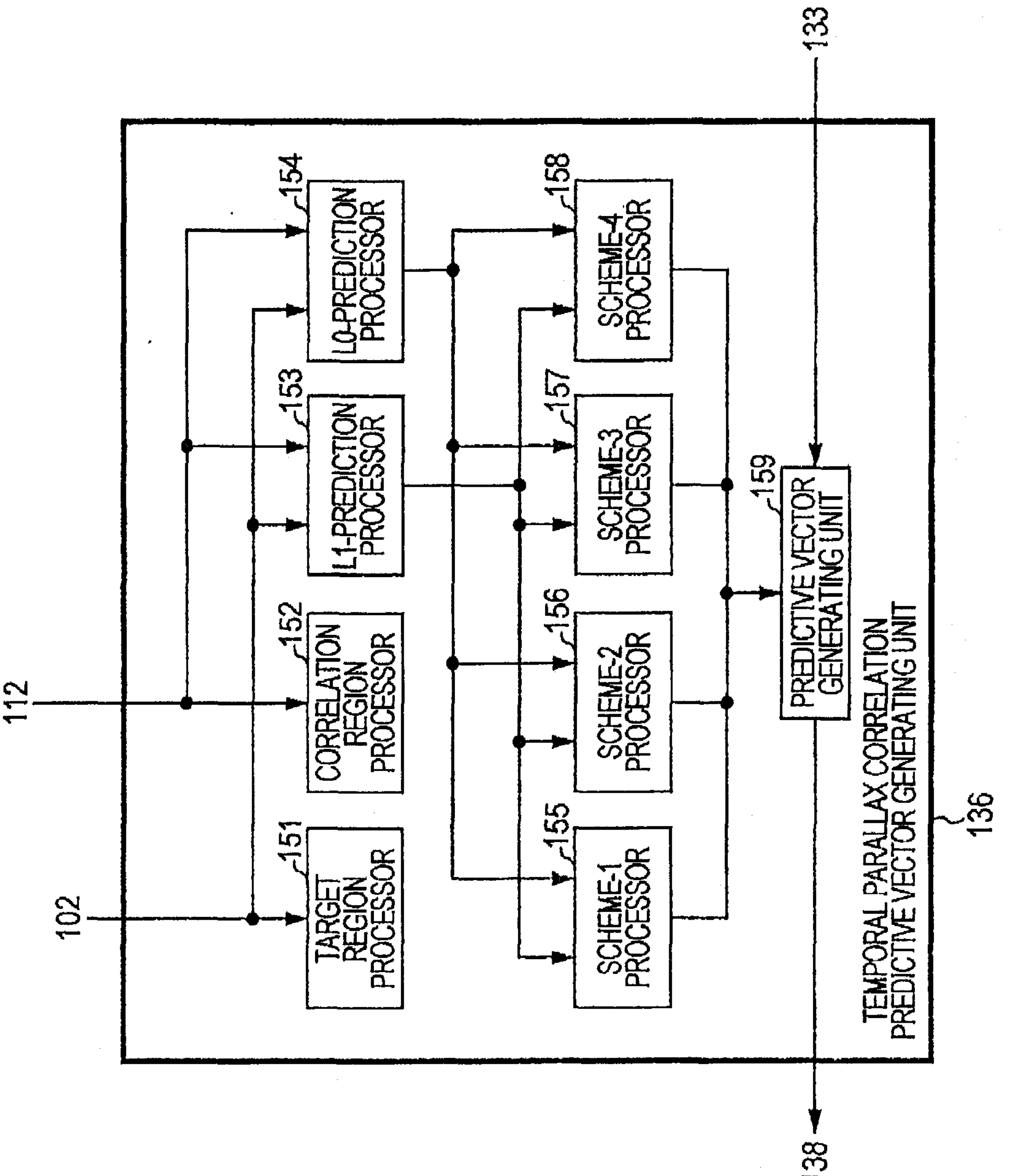

102
112
133
138
TARGET REGION PROCESSOR
151
CORRELATION REGION PROCESSOR
152
L1-PREDICTION PROCESSOR
153
L0-PREDICTION PROCESSOR
154
SCHEME-1 PROCESSOR
155
SCHEME-2 PROCESSOR
156
SCHEME-3 PROCESSOR
157
SCHEME-4 PROCESSOR
158
PREDICTIVE VECTOR GENERATING UNIT
159
TEMPORAL PARALLAX CORRELATION PREDICTIVE VECTOR GENERATING UNIT
136

FIG. 14

TARGET REGION		REFERENCE IMAGE OF TARGET REGION		CORRELATION REGION		REFERENCE IMAGE OF CORRELATION REGION		
VIEW ID	POC	VIEW ID	POC	VIEW ID	POC	VIEW ID	POC	
A	E	C	E	B	E	D	E	SCHEME 1
A	D	B	D	A	E	C	E	SCHEME 2
A	C	A	D	B	C	B	E	SCHEME 3
A	B	A	C	A	D	A	E	SCHEME 4

FIG. 15

- Availability decision using POC

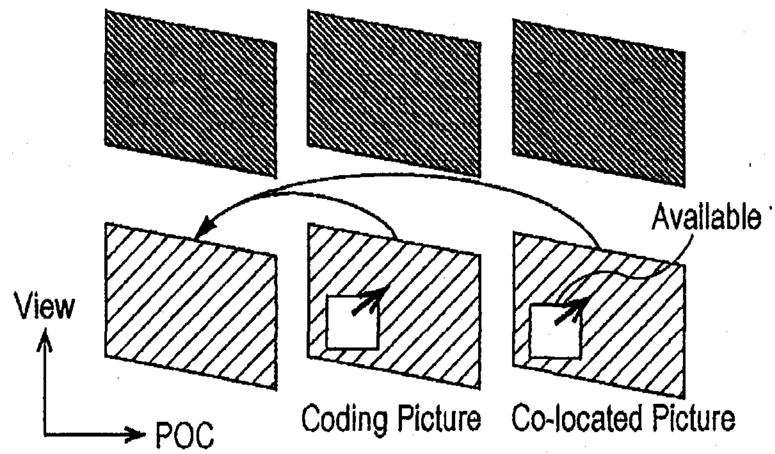
  1. (CurrPOC!=CurrRefPOC) && (ColPOC!=ColRefPOC)
  ⇒Both coding vector and co-located vector are motion vector.

  2. (CurrPOC==CurRefPOC) && (ColPOC==ColRefPOC)
  ⇒Both coding vector and co-located vector are Inter-view vector.

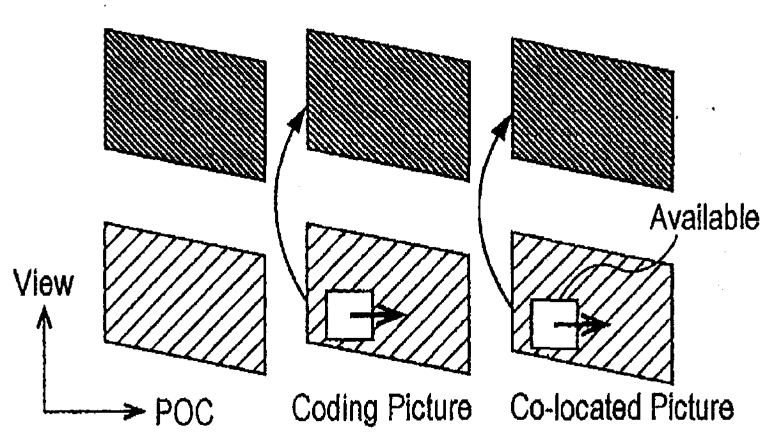
CurrPOC:POC of current picture
ColPOC:POC of co-located picture
CurrRefPOC:POC of picture referred from current picture
ColRefPOC:POC of picture referred from co-located picture

Availability of co-located vector	Coding vector	Co-located vector
Available	Motion vector	Motion vector
Not-available	Motion vector	Inter-view vector
Not-available	Inter-view vector	Motion vector
Available	Inter-view vector	Inter-view vector

FIG. 16


Available
View
POC
Coding Picture
Co-located Picture

A


Available
View
POC
Coding Picture
Co-located Picture

B

FIG. 17

seq_parameter_set_rbsp() {	Descriptor
profile_idc	u(8)
reserved_zero_8bits /* equal to0 */	u(8)
level_idc	u(8)
seq_parameter_set_id	ue(v)
pic_width_in_luma_samples	u(16)
pic_height_in_luma_samples	u(16)
bit_depth_luma_minus8	ue(v)
bit_depth_chroma_minus8	ue(v)
log2_max_frame_num_minus4	ue(v)
pic_order_cnt_type	ue(v)
if(pic_order_cnt_type= = 0)	
log2_max_pic_order_cnt_lsb_minus4	ue(v)
else if(pic_order_cnt_type = = 1) {	
delta_pic_order_always_zero_flag	u(1)
offset_for_non_ref_pic	se(v)
num_ref_frames_in_pic_order_cnt_cycle	ue(v)
for(i = 0; i <num_ref_frames_in_pic_order_cnt_cycle; i++)	
offset_for_ref_frame [i]	se(v)
}	
max_num_ref_frames	ue(v)
gaps_in_frame_num_value_allowed_flag	u(1)
log2_min_coding_block_size_minus3	ue(v)
log2_diff_max_min_coding_block_size	ue(v)
log2_min_transform_block_size_minus2	ue(v)
log2_diff_max_min_transform_block_size	ue(v)
max_transform_hierarchy_depth_inter	ue(v)
max_transform_hierarchy_depth_intra	ue(v)
adaptive_ loop_filter_enabled_flag	u(1)
cu_qp_delta_enabled_flag	u(1)
num_views	
for(i=0;i< num_views ;i++){	
view_id [i]	
num_ref_views_l0[i]	
for(j=0;j<num_ref_views_l0[i];j++)	
ref_view_id_l0[i][j]	
num_ref_views_l1[i]	
for(j=0;j<num_ref_views_l1[i];j++)	
ref_view_id_l1[i][j]	
}	
rbsp_trailing_bits ( )	
}	

TOTAL NUMBER OF VIEWS

ID FOR IDENTIFYING VIEWS

NUMBER OF PARALLAX PREDICTIONS IN LIST L0

ID OF VIEW REFERRED TO IN PARALLAX PREDICTION IN LIST L0

NUMBER OF PARALLAX PREDICTIONS IN LIST L1

ID OF VIEW REFERRED TO IN PARALLAX PREDICTION IN LIST L1

FIG. 18

slice_header( ) {	Descriptor
first_tb_in_slice	ue(v)
entropy_slice_flag	u(1)
if(!entropy_slice_flag) {	
slice_type	ue(v)
pic_parameter_set_id	ue(v)
frame_num	u(v)
view_id	u(v)
if(IdrPicFlag)	
idr_pic_id	ue(v)
if(pic_order_cnt_type = = 0)	
pic_order_cnt_lsb /*	u(v)
if(slice_type= = P ||slice_type= = B) {	
num_ref_idx_active_override_flag	u(1)
if(num_ref_idx_active_override_flag) {	
num_ref_idx_l0_active_minus1	ue(v)
if(slice_type= = B)	
num_ref_idx_l1_active_minus1	ue(v)
}	
}	
ref_pic_list_modification( )	
ref_pic_list_combination( )	
if(nal_ref_idc!= 0)	
dec_ref_pic_marking()	
if(entropy_coding_mode_flag&&slice_type!= I)	
cabac_init_idc	ue(v)
slice_qp_delta	se(v)
if(adaptive_loop_filter_enabled_flag)	
alf_param()	
if(deblocking_filter_control_present_flag) {	
disable_deblocking_filter_idc	
if(disable_deblocking_filter_idc!= 1) {	
slice_alpha_c0_offset_div2	
slice_beta_offset_div2	
}	
}	
if(slice_type= = B)	
collocated_from_l0_flag	u(1)
} else	
if(entropy_coding_mode_flag&&slice_type!= I)	
cabac_init_idc	ue(v)
}	

ID FOR IDENTIFYING VIEWS

FIG. 19

prediction_unit(x0,y0,log2PUWidth,log2PUHeight, PartIdx, InferredMergeFlag) {	Descriptor
if(skip_flag[x0][y0]) {	
if(NumMergeCand > 1)	
merge_idx[x0][y0]	ue(v) | ae(v)
} else if(PredMode = = MODE_INTRA) {	
prev_intra_luma_pred_flag[x0][y0]	u(1) | ae(v)
if(!prev_intra_luma_pred_flag[x0][y0]	
if(NumMPMCand > 1)	
mpm_idx[x0][y0]	u(1) | ae(v)
else	
rem_intra_luma_pred_mode[x0][y0]	ue(v) | ae(v)
intra_chroma_pred_mode[x0][y0]	ue(v) | ae(v)
} else { /* MODE_INTER*/	
if(!InferredMergeFlag)	
merge_flag[x0][y0]	u(1) | ae(v)
if(merge_flag[x0][y0] && NumMergeCand > 1) {	
merge_idx[x0][y0]	ue(v) | ae(v)
} else {	
if(slice_type = = B)	
inter_pred_flag[x0][y0]	ue(v) | ae(v)
if(inter_pred_flag[x0][y0] = = Pred_LC) {	
if(num_ref_idx_lc_active_minus1 > 0)	
ref_idx_lc[x0][y0]	ue(v) | ae(v)
mvd_lc[x0][y0][0]	se(v) | ae(v)
mvd_lc[x0][y0][1]	se(v) | ae(v)
if(NumMVPCand(LcToLx) > 1)	
mvp_idx_lc[x0][y0]	ue(v) | ae(v)
}	
else { /* Pred_L0 or Pred_BI */	
if(num_ref_idx_lc_active_minus1 > 0)	
ref_idx_l0[x0][y0]	ue(v) | ae(v)
mvd_l0[x0][y0][0]	se(v) | ae(v)
mvd_l0[x0][y0][1]	se(v) | ae(v)
if(NumMVPCand(L0) > 1)	
mvp_idx_l0[x0][y0]	ue(v) | ae(v)
}	
if(inter_pred_flag[x0][y0] = = Pred_BI) {	
if(num_ref_idx_l1_active_minus1 > 0)	
ref_idx_l1[x0][y0]	ue(v) | ae(v)
mvd_l1[x0][y0][0]	se(v) | ae(v)
mvd_l1[x0][y0][1]	se(v) | ae(v)
if(NumMVPCand(L1) > 1)	
mvp_idx_l1[x0][y0]	ue(v) | ae(v)
}	
}	
}	
}	

EXPAND TYPE OF SYNTAX OR CHANGE PROCESSING CONTENT (merge_idx, skip)

EXPAND TYPE OF SYNTAX OR CHANGE PROCESSING CONTENT (merge_idx, inter)

EXPAND TYPE OF SYNTAX OR CHANGE PROCESSING CONTENT (mvp_idx_lc)

EXPAND TYPE OF SYNTAX OR CHANGE PROCESSING CONTENT (mvp_idx_l0)

EXPAND TYPE OF SYNTAX OR CHANGE PROCESSING CONTENT (mvp_idx_l1)

FIG. 20

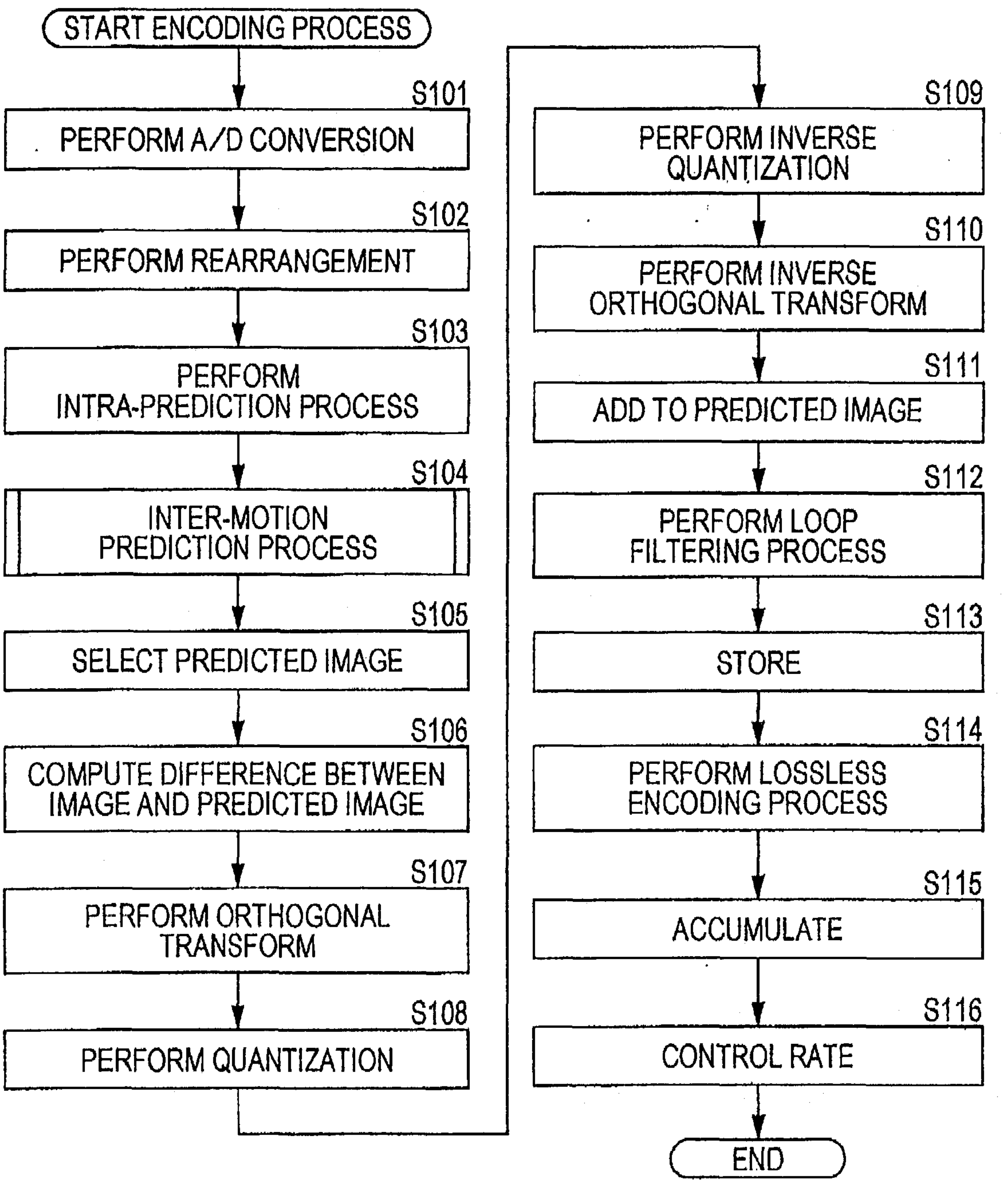

START ENCODING PROCESS
S101
PERFORM A/D CONVERSION
S102
PERFORM REARRANGEMENT
S103
PERFORM INTRA-PREDICTION PROCESS
S104
INTER-MOTION PREDICTION PROCESS
S105
SELECT PREDICTED IMAGE
S106
COMPUTE DIFFERENCE BETWEEN IMAGE AND PREDICTED IMAGE
S107
PERFORM ORTHOGONAL TRANSFORM
S108
PERFORM QUANTIZATION
S109
PERFORM INVERSE QUANTIZATION
S110
PERFORM INVERSE ORTHOGONAL TRANSFORM
S111
ADD TO PREDICTED IMAGE
S112
PERFORM LOOP FILTERING PROCESS
S113
STORE
S114
PERFORM LOSSLESS ENCODING PROCESS
S115
ACCUMULATE
S116
CONTROL RATE
END

FIG. 21

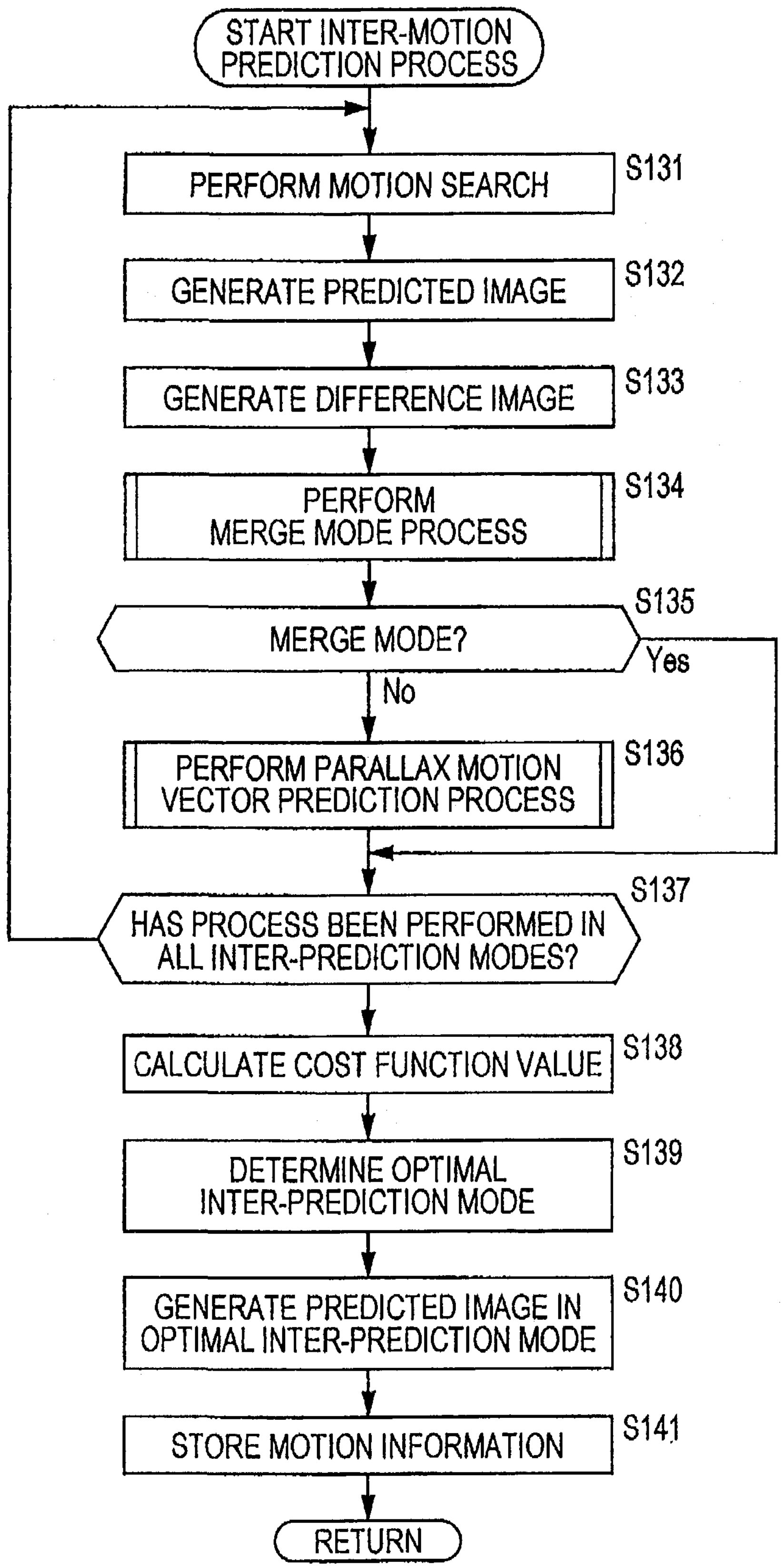

START INTER-MOTION PREDICTION PROCESS
PERFORM MOTION SEARCH
S131
GENERATE PREDICTED IMAGE
S132
GENERATE DIFFERENCE IMAGE
S133
PERFORM MERGE MODE PROCESS
S134
MERGE MODE?
S135
Yes
No
PERFORM PARALLAX MOTION VECTOR PREDICTION PROCESS
S136
HAS PROCESS BEEN PERFORMED IN ALL INTER-PREDICTION MODES?
S137
CALCULATE COST FUNCTION VALUE
S138
DETERMINE OPTIMAL INTER-PREDICTION MODE
S139
GENERATE PREDICTED IMAGE IN OPTIMAL INTER-PREDICTION MODE
S140
STORE MOTION INFORMATION
S141
RETURN

FIG. 22

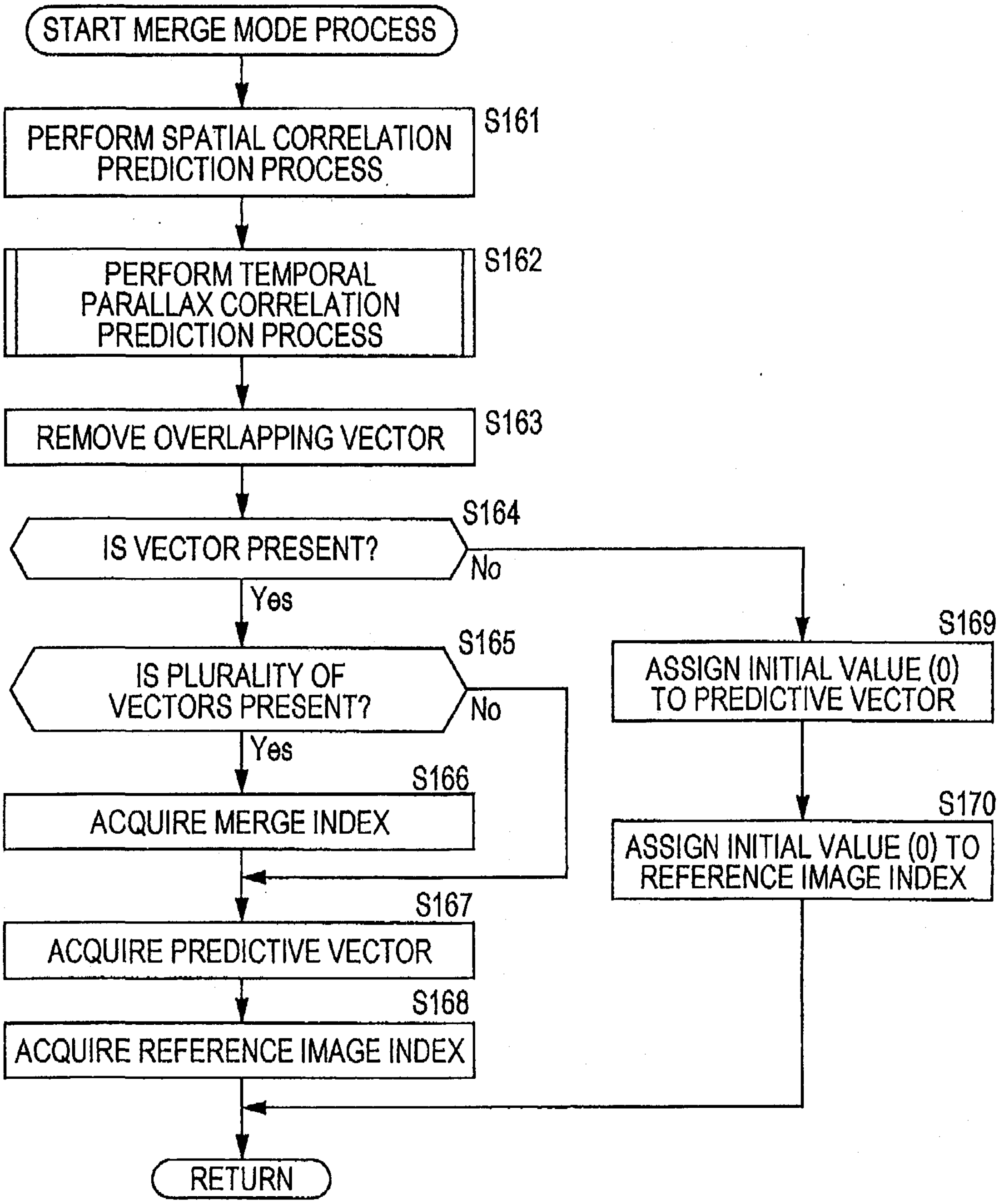

START MERGE MODE PROCESS
PERFORM SPATIAL CORRELATION PREDICTION PROCESS
S161
PERFORM TEMPORAL PARALLAX CORRELATION PREDICTION PROCESS
S162
REMOVE OVERLAPPING VECTOR
S163
IS VECTOR PRESENT?
S164
No
Yes
IS PLURALITY OF VECTORS PRESENT?
S165
No
Yes
ACQUIRE MERGE INDEX
S166
ACQUIRE PREDICTIVE VECTOR
S167
ACQUIRE REFERENCE IMAGE INDEX
S168
ASSIGN INITIAL VALUE (0) TO PREDICTIVE VECTOR
S169
ASSIGN INITIAL VALUE (0) TO REFERENCE IMAGE INDEX
S170
RETURN

FIG. 23

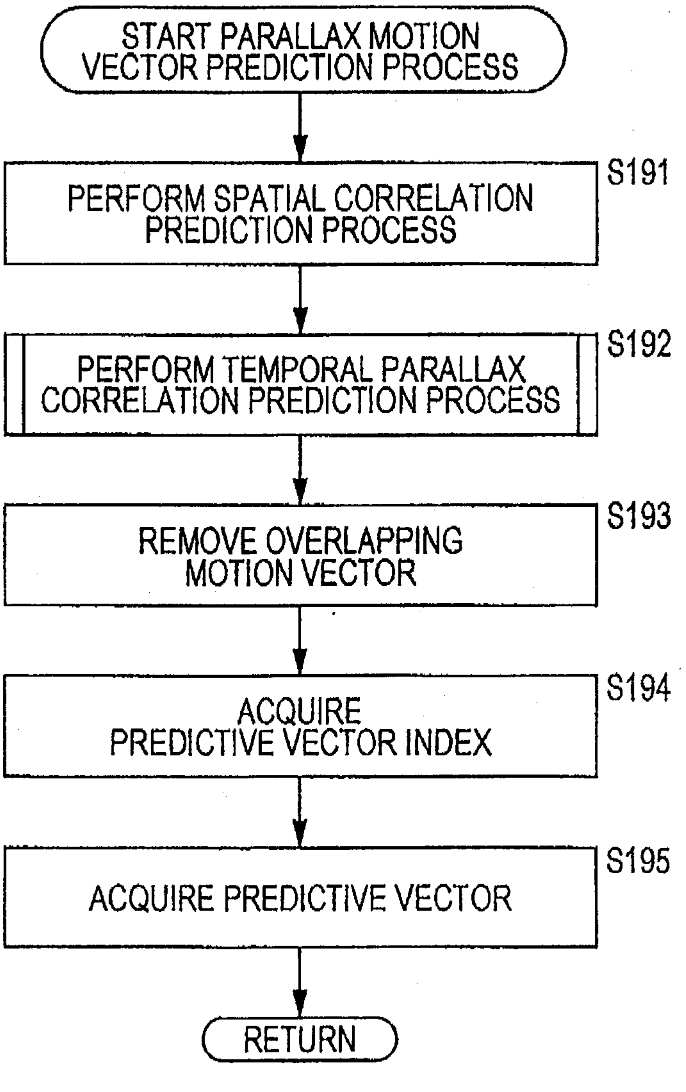

START PARALLAX MOTION VECTOR PREDICTION PROCESS
S191
PERFORM SPATIAL CORRELATION PREDICTION PROCESS
S192
PERFORM TEMPORAL PARALLAX CORRELATION PREDICTION PROCESS
S193
REMOVE OVERLAPPING MOTION VECTOR
S194
ACQUIRE PREDICTIVE VECTOR INDEX
S195
ACQUIRE PREDICTIVE VECTOR
RETURN

FIG. 24

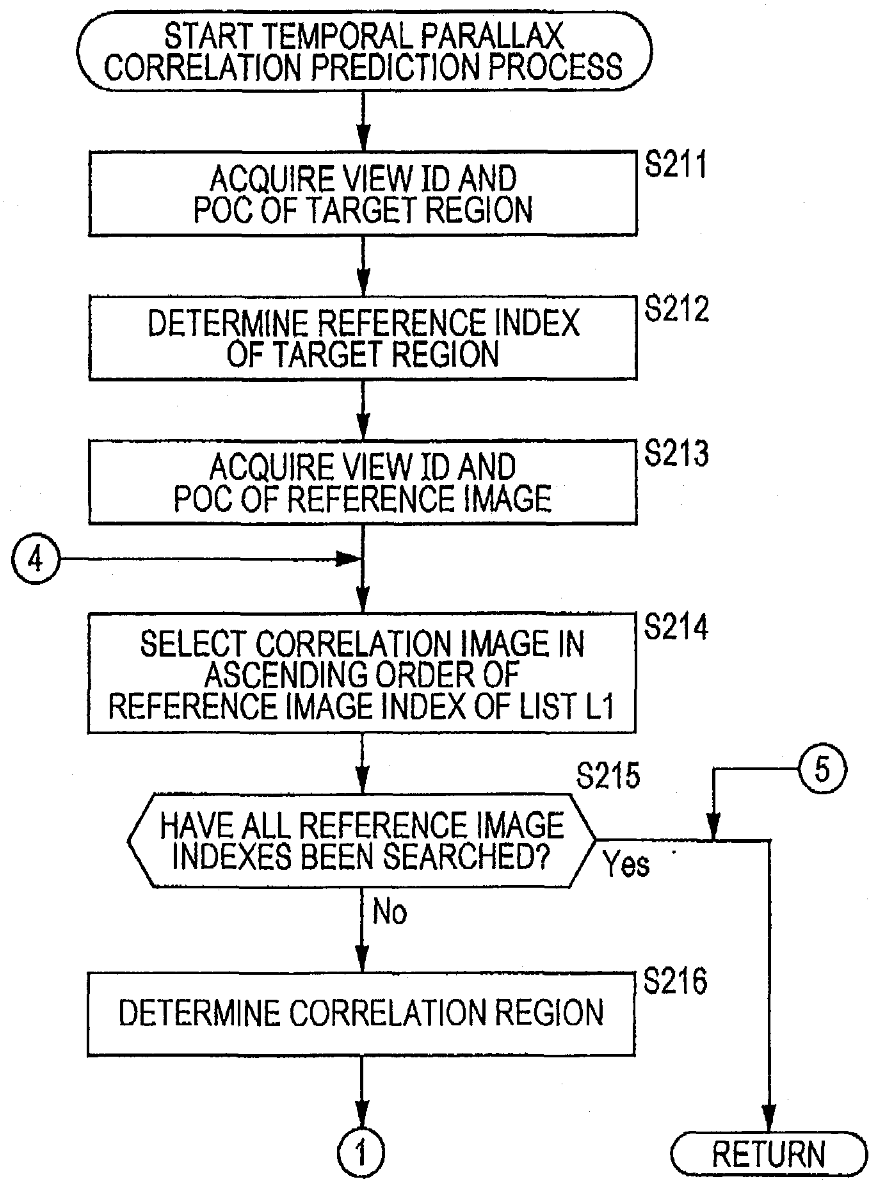

START TEMPORAL PARALLAX CORRELATION PREDICTION PROCESS
ACQUIRE VIEW ID AND POC OF TARGET REGION
S211
DETERMINE REFERENCE INDEX OF TARGET REGION
S212
ACQUIRE VIEW ID AND POC OF REFERENCE IMAGE
S213
4
SELECT CORRELATION IMAGE IN ASCENDING ORDER OF REFERENCE IMAGE INDEX OF LIST L1
S214
S215
5
HAVE ALL REFERENCE IMAGE INDEXES BEEN SEARCHED?
Yes
No
DETERMINE CORRELATION REGION
S216
1
RETURN

FIG. 25

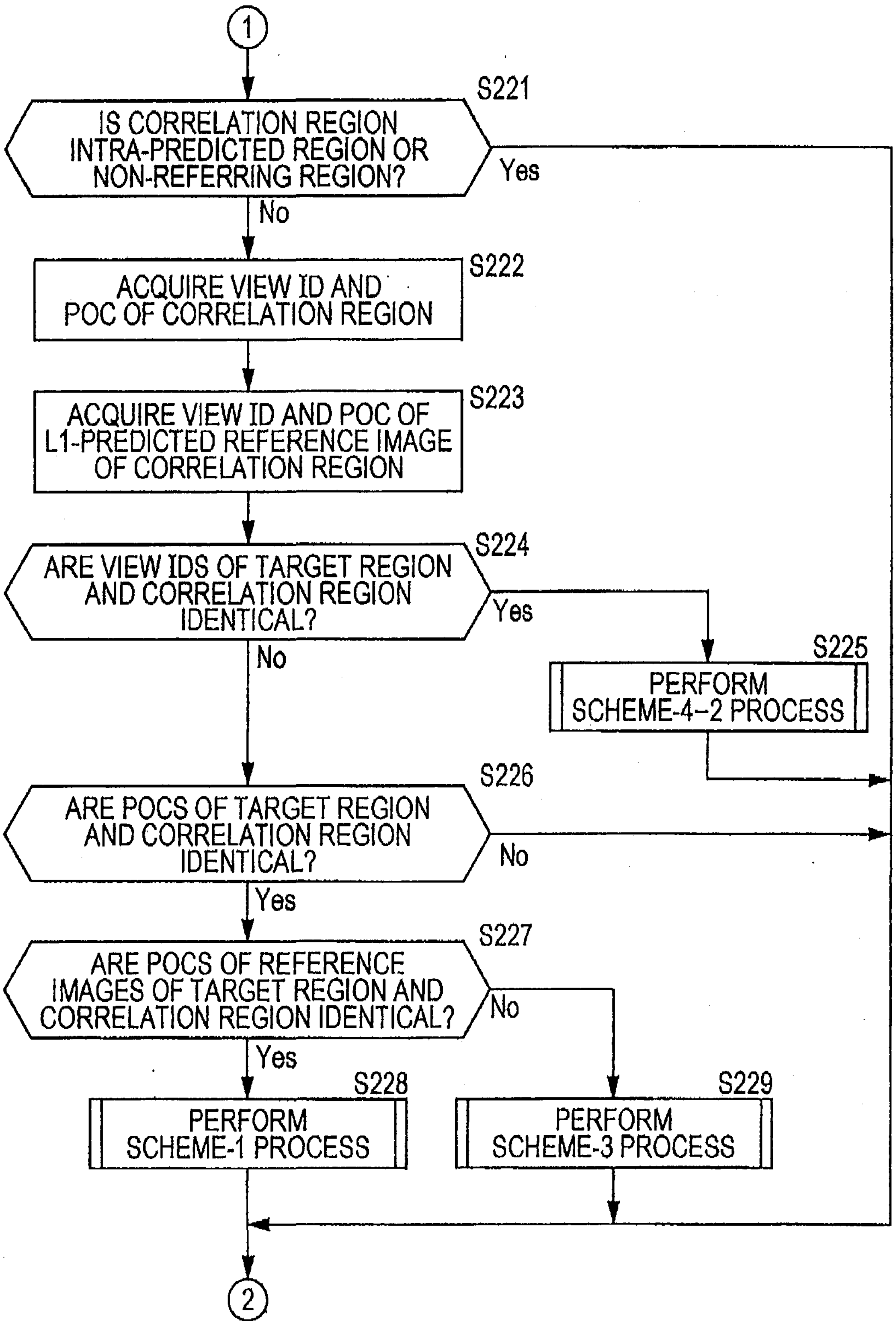

1
S221
IS CORRELATION REGION INTRA-PREDICTED REGION OR NON-REFERRING REGION?
Yes
No
S222
ACQUIRE VIEW ID AND POC OF CORRELATION REGION
S223
ACQUIRE VIEW ID AND POC OF L1-PREDICTED REFERENCE IMAGE OF CORRELATION REGION
S224
ARE VIEW IDS OF TARGET REGION AND CORRELATION REGION IDENTICAL?
Yes
No
S225
PERFORM SCHEME-4-2 PROCESS
S226
ARE POCS OF TARGET REGION AND CORRELATION REGION IDENTICAL?
No
Yes
S227
ARE POCS OF REFERENCE IMAGES OF TARGET REGION AND CORRELATION REGION IDENTICAL?
No
Yes
S228
PERFORM SCHEME-1 PROCESS
S229
PERFORM SCHEME-3 PROCESS
2

FIG. 26

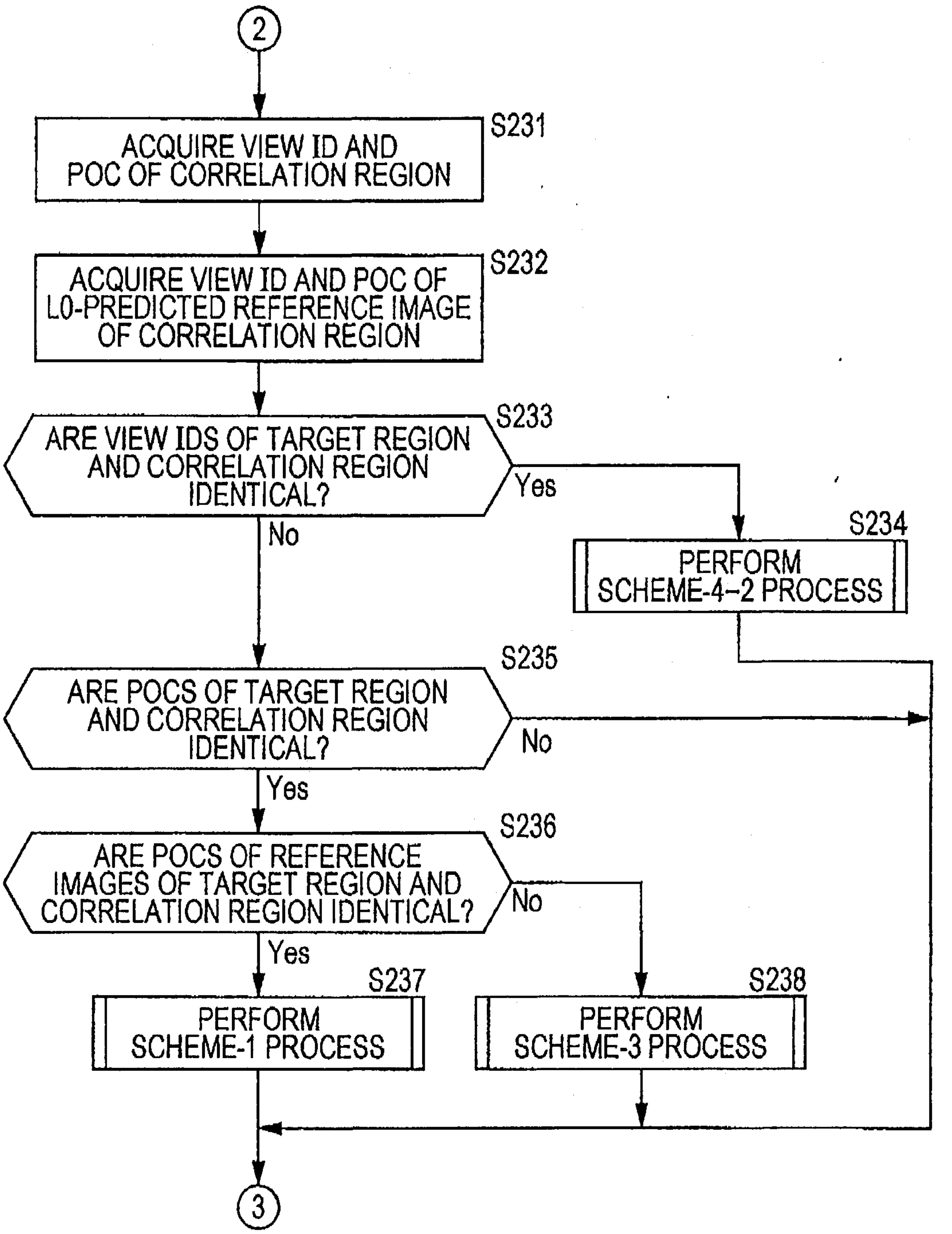

2
S231
ACQUIRE VIEW ID AND POC OF CORRELATION REGION
S232
ACQUIRE VIEW ID AND POC OF L0-PREDICTED REFERENCE IMAGE OF CORRELATION REGION
S233
ARE VIEW IDS OF TARGET REGION AND CORRELATION REGION IDENTICAL?
Yes
No
S234
PERFORM SCHEME-4-2 PROCESS
S235
ARE POCS OF TARGET REGION AND CORRELATION REGION IDENTICAL?
No
Yes
S236
ARE POCS OF REFERENCE IMAGES OF TARGET REGION AND CORRELATION REGION IDENTICAL?
No
Yes
S237
PERFORM SCHEME-1 PROCESS
S238
PERFORM SCHEME-3 PROCESS
3

FIG. 27

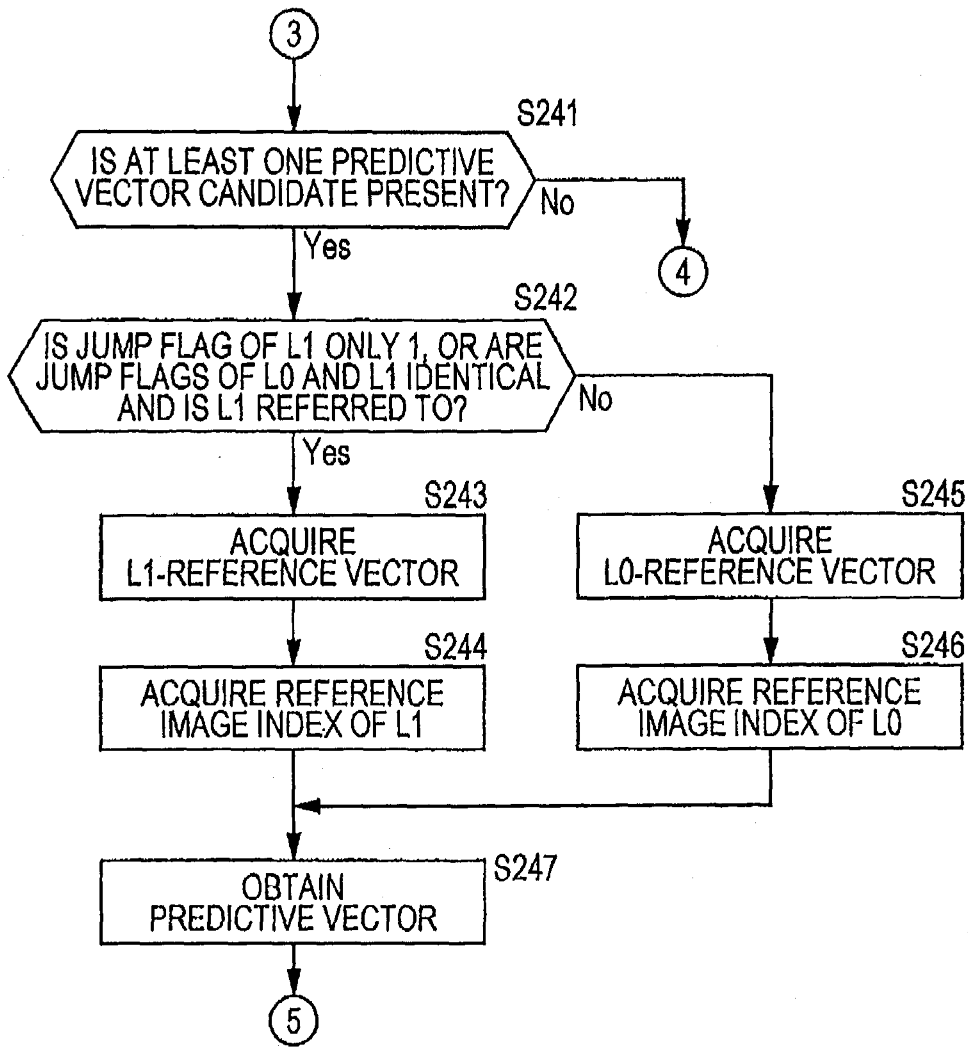

3
S241
IS AT LEAST ONE PREDICTIVE VECTOR CANDIDATE PRESENT?
No
4
Yes
S242
IS JUMP FLAG OF L1 ONLY 1, OR ARE JUMP FLAGS OF L0 AND L1 IDENTICAL AND IS L1 REFERRED TO?
No
Yes
S243
ACQUIRE L1-REFERENCE VECTOR
S245
ACQUIRE L0-REFERENCE VECTOR
S244
ACQUIRE REFERENCE IMAGE INDEX OF L1
S246
ACQUIRE REFERENCE IMAGE INDEX OF L0
S247
OBTAIN PREDICTIVE VECTOR
5

FIG. 28

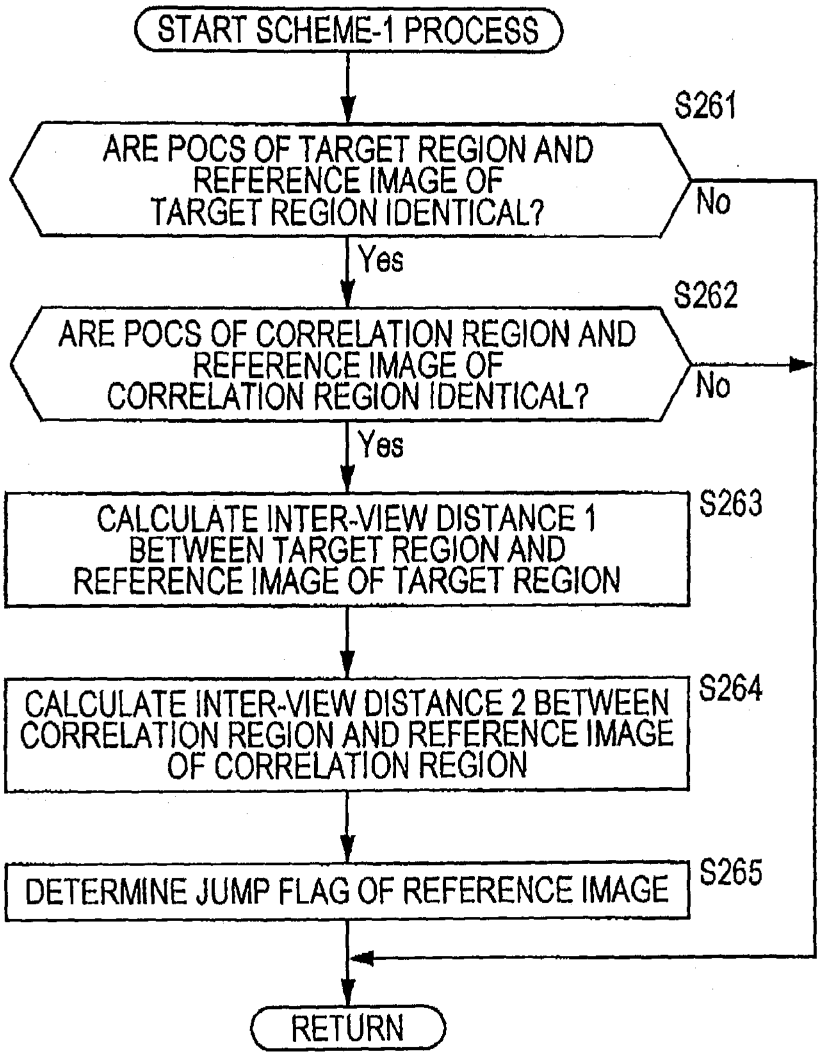

START SCHEME-1 PROCESS
S261
ARE POCS OF TARGET REGION AND REFERENCE IMAGE OF TARGET REGION IDENTICAL?
No
Yes
S262
ARE POCS OF CORRELATION REGION AND REFERENCE IMAGE OF CORRELATION REGION IDENTICAL?
No
Yes
S263
CALCULATE INTER-VIEW DISTANCE 1 BETWEEN TARGET REGION AND REFERENCE IMAGE OF TARGET REGION
S264
CALCULATE INTER-VIEW DISTANCE 2 BETWEEN CORRELATION REGION AND REFERENCE IMAGE OF CORRELATION REGION
S265
DETERMINE JUMP FLAG OF REFERENCE IMAGE
RETURN

FIG. 29

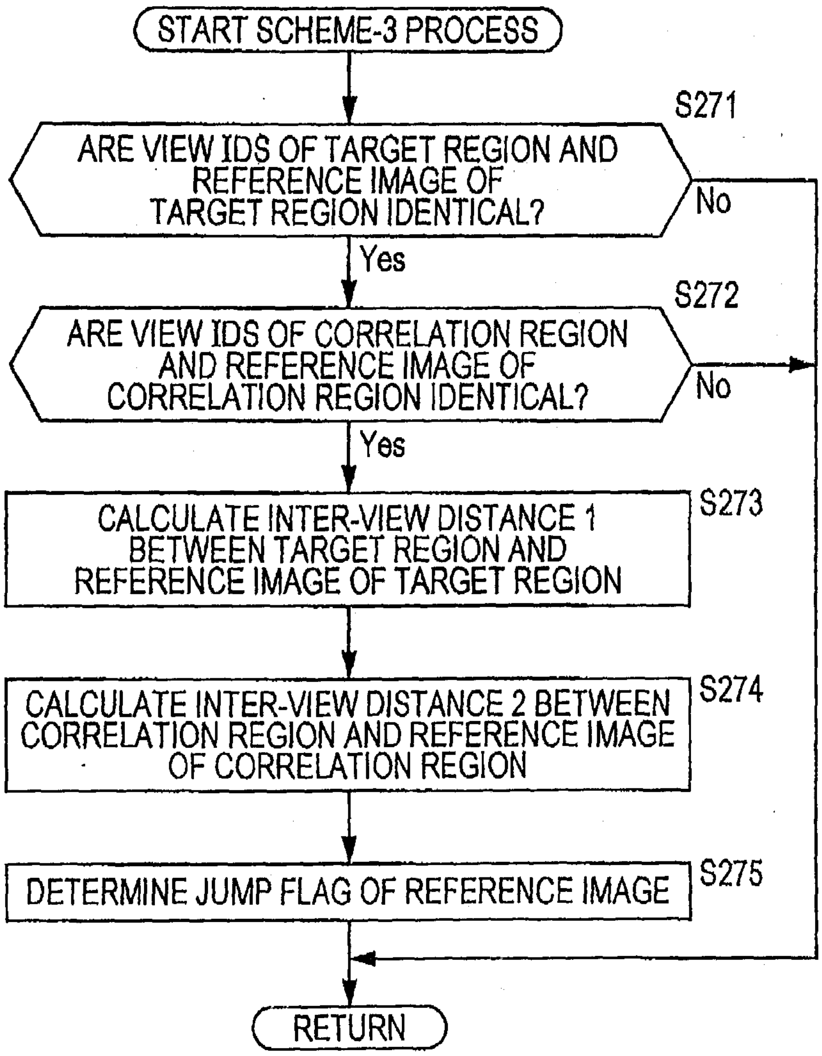

START SCHEME-3 PROCESS
S271
ARE VIEW IDS OF TARGET REGION AND REFERENCE IMAGE OF TARGET REGION IDENTICAL?
No
Yes
S272
ARE VIEW IDS OF CORRELATION REGION AND REFERENCE IMAGE OF CORRELATION REGION IDENTICAL?
No
Yes
S273
CALCULATE INTER-VIEW DISTANCE 1 BETWEEN TARGET REGION AND REFERENCE IMAGE OF TARGET REGION
S274
CALCULATE INTER-VIEW DISTANCE 2 BETWEEN CORRELATION REGION AND REFERENCE IMAGE OF CORRELATION REGION
S275
DETERMINE JUMP FLAG OF REFERENCE IMAGE
RETURN

FIG. 30

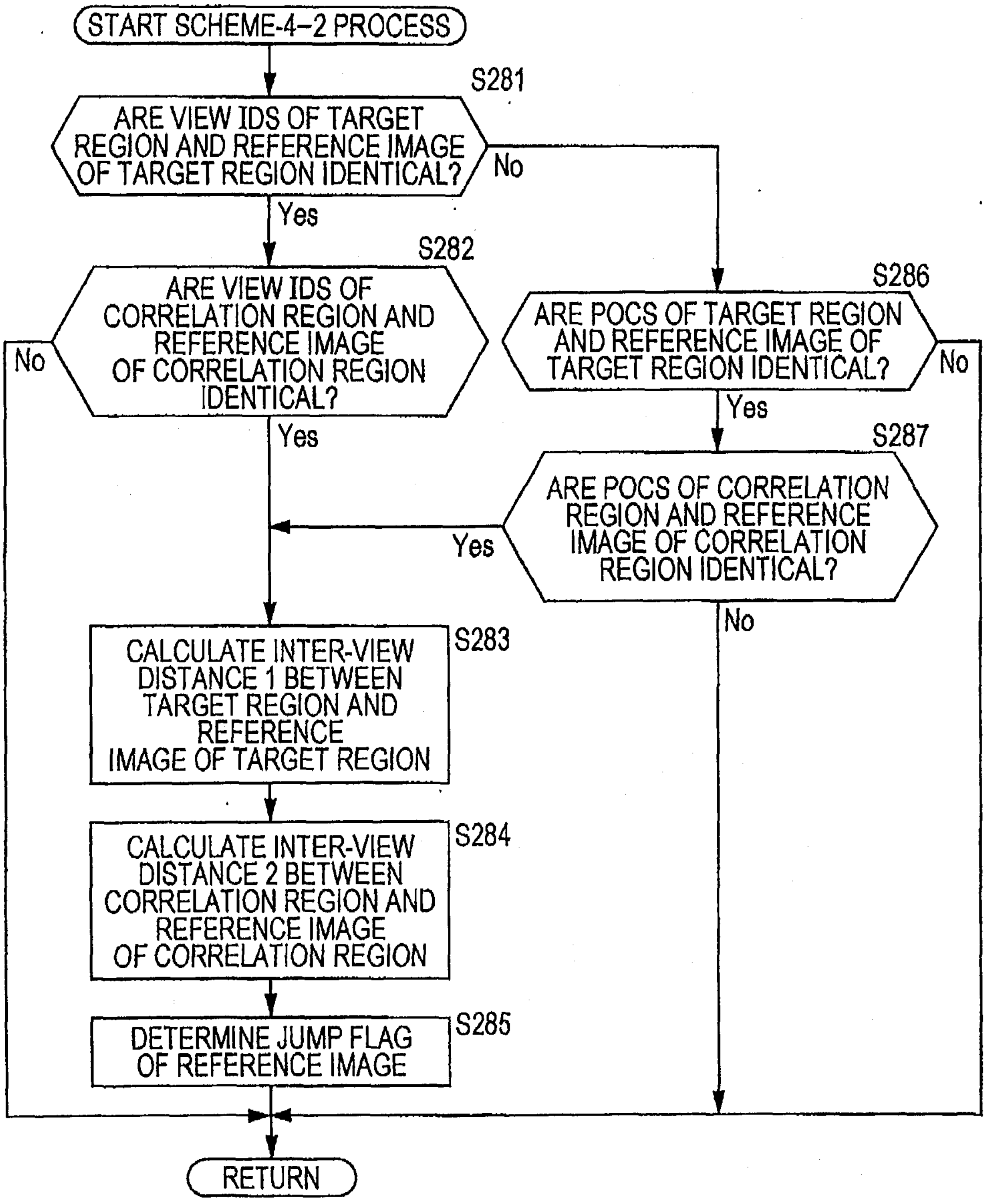

START SCHEME-4-2 PROCESS
S281
ARE VIEW IDS OF TARGET REGION AND REFERENCE IMAGE OF TARGET REGION IDENTICAL?
No
Yes
S282
ARE VIEW IDS OF CORRELATION REGION AND REFERENCE IMAGE OF CORRELATION REGION IDENTICAL?
No
Yes
S286
ARE POCS OF TARGET REGION AND REFERENCE IMAGE OF TARGET REGION IDENTICAL?
No
Yes
S287
ARE POCS OF CORRELATION REGION AND REFERENCE IMAGE OF CORRELATION REGION IDENTICAL?
Yes
No
S283
CALCULATE INTER-VIEW DISTANCE 1 BETWEEN TARGET REGION AND REFERENCE IMAGE OF TARGET REGION
S284
CALCULATE INTER-VIEW DISTANCE 2 BETWEEN CORRELATION REGION AND REFERENCE IMAGE OF CORRELATION REGION
S285
DETERMINE JUMP FLAG OF REFERENCE IMAGE
RETURN

FIG. 31

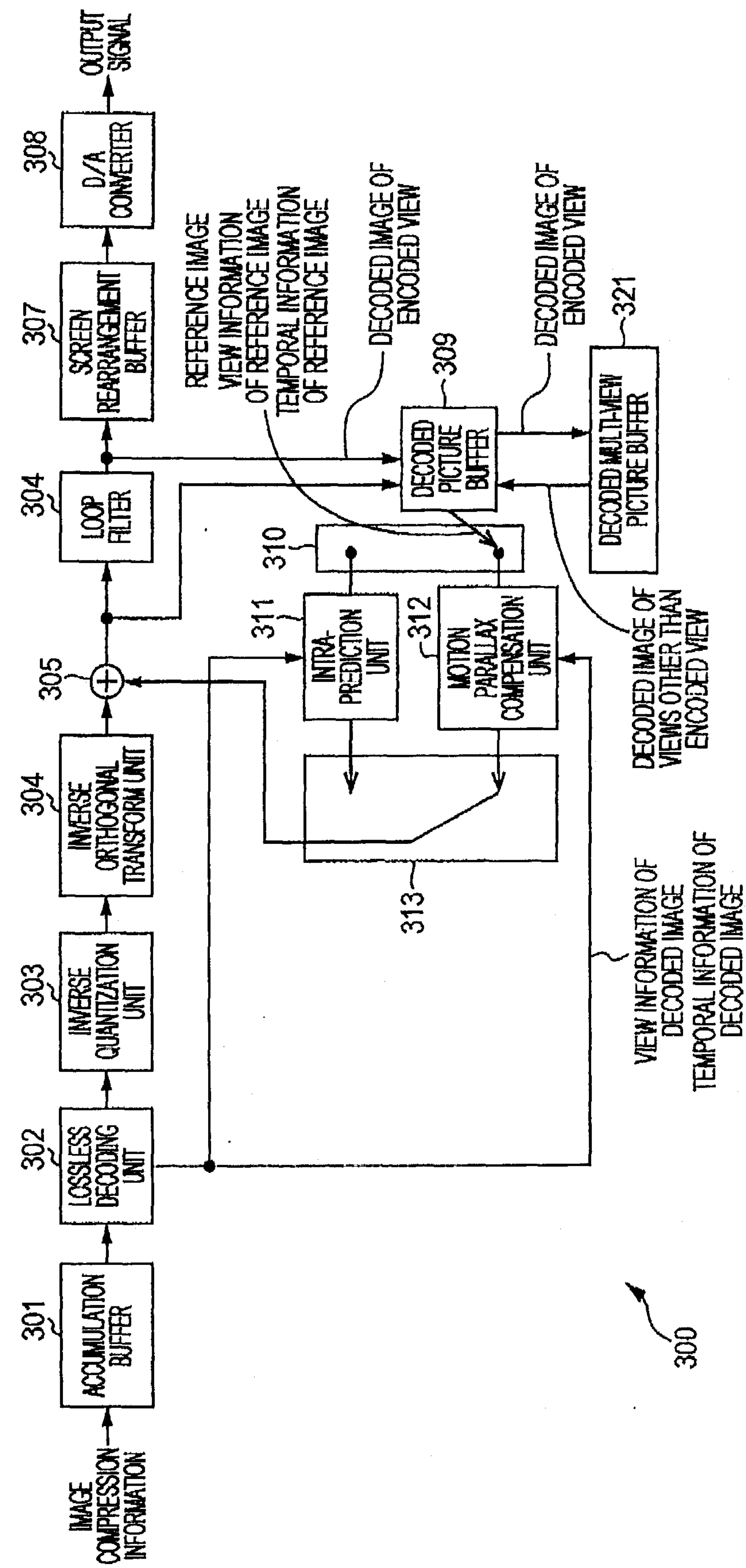


IMAGE COMPRESSION INFORMATION
301
ACCUMULATION BUFFER
302
LOSSLESS DECODING UNIT
303
INVERSE QUANTIZATION UNIT
304
INVERSE ORTHOGONAL TRANSFORM UNIT
305
304
LOOP FILTER
307
SCREEN REARRANGEMENT BUFFER
308
D/A CONVERTER
OUTPUT SIGNAL
REFERENCE IMAGE
VIEW INFORMATION OF REFERENCE IMAGE
TEMPORAL INFORMATION OF REFERENCE IMAGE
DECODED IMAGE OF ENCODED VIEW
309
DECODED PICTURE BUFFER
DECODED IMAGE OF ENCODED VIEW
321
DECODED MULTI-VIEW PICTURE BUFFER
310
311
INTRA-PREDICTION UNIT
312
MOTION PARALLAX COMPENSATION UNIT
DECODED IMAGE OF VIEWS OTHER THAN ENCODED VIEW
313
VIEW INFORMATION OF DECODED IMAGE
TEMPORAL INFORMATION OF DECODED IMAGE
300

FIG. 32

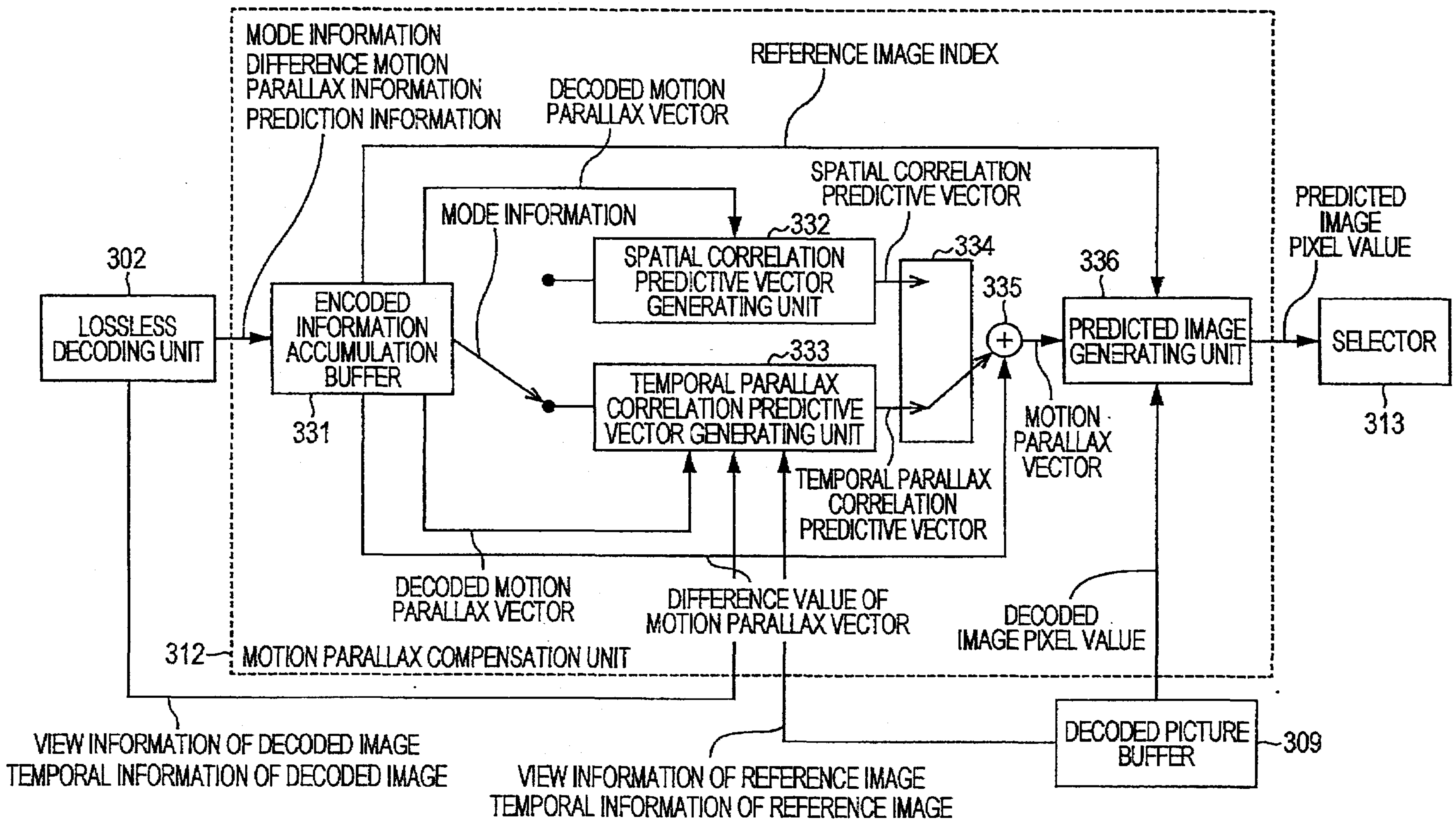

MODE INFORMATION
DIFFERENCE MOTION PARALLAX INFORMATION
PREDICTION INFORMATION
DECODED MOTION PARALLAX VECTOR
REFERENCE IMAGE INDEX
SPATIAL CORRELATION PREDICTIVE VECTOR
MODE INFORMATION
332
SPATIAL CORRELATION PREDICTIVE VECTOR GENERATING UNIT
334
335
336
PREDICTED IMAGE PIXEL VALUE
302
LOSSLESS DECODING UNIT
ENCODED INFORMATION ACCUMULATION BUFFER
331
333
TEMPORAL PARALLAX CORRELATION PREDICTIVE VECTOR GENERATING UNIT
PREDICTED IMAGE GENERATING UNIT
SELECTOR
313
MOTION PARALLAX VECTOR
TEMPORAL PARALLAX CORRELATION PREDICTIVE VECTOR
DECODED MOTION PARALLAX VECTOR
DIFFERENCE VALUE OF MOTION PARALLAX VECTOR
DECODED IMAGE PIXEL VALUE
312
MOTION PARALLAX COMPENSATION UNIT
DECODED PICTURE BUFFER
309
VIEW INFORMATION OF DECODED IMAGE
TEMPORAL INFORMATION OF DECODED IMAGE
VIEW INFORMATION OF REFERENCE IMAGE
TEMPORAL INFORMATION OF REFERENCE IMAGE

FIG. 33

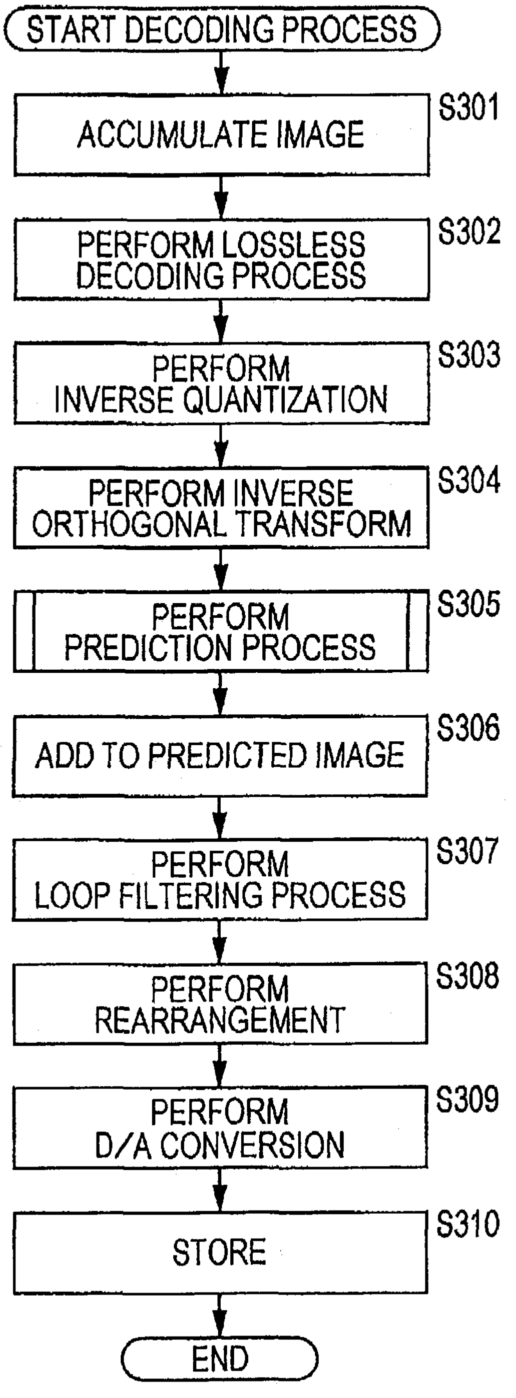

START DECODING PROCESS
ACCUMULATE IMAGE
S301
PERFORM LOSSLESS DECODING PROCESS
S302
PERFORM INVERSE QUANTIZATION
S303
PERFORM INVERSE ORTHOGONAL TRANSFORM
S304
PERFORM PREDICTION PROCESS
S305
ADD TO PREDICTED IMAGE
S306
PERFORM LOOP FILTERING PROCESS
S307
PERFORM REARRANGEMENT
S308
PERFORM D/A CONVERSION
S309
STORE
S310
END

FIG. 34

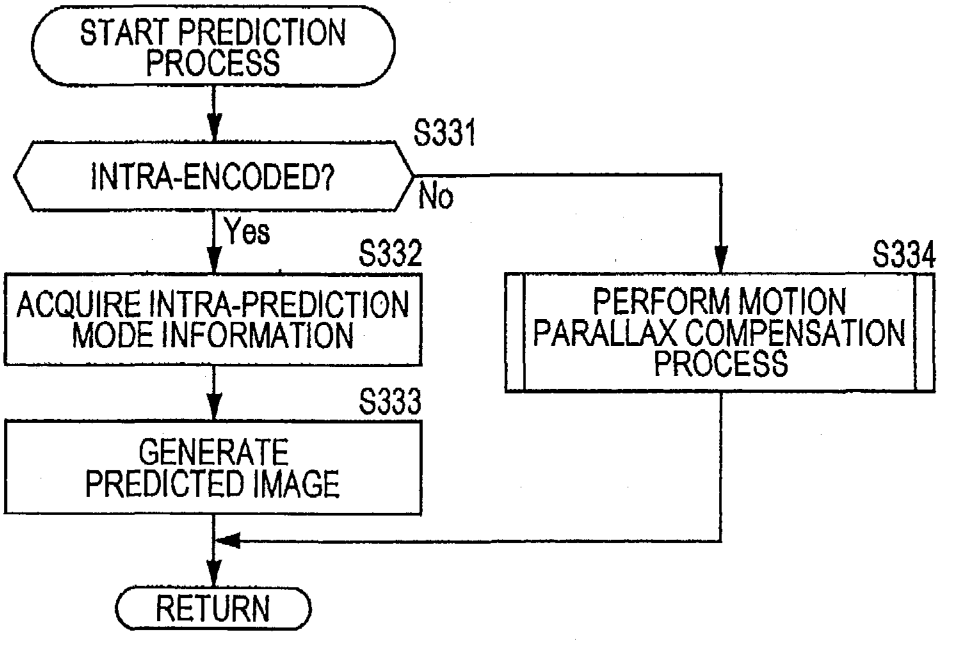

START PREDICTION PROCESS
S331
INTRA-ENCODED?
No
Yes
S332
ACQUIRE INTRA-PREDICTION MODE INFORMATION
S333
GENERATE PREDICTED IMAGE
S334
PERFORM MOTION PARALLAX COMPENSATION PROCESS
RETURN

FIG. 35

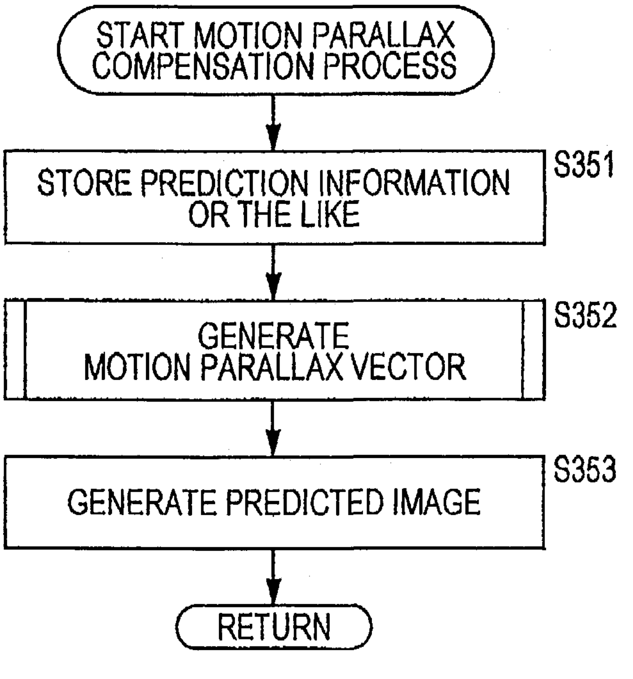

START MOTION PARALLAX COMPENSATION PROCESS
S351
STORE PREDICTION INFORMATION OR THE LIKE
S352
GENERATE MOTION PARALLAX VECTOR
S353
GENERATE PREDICTED IMAGE
RETURN

FIG. 36

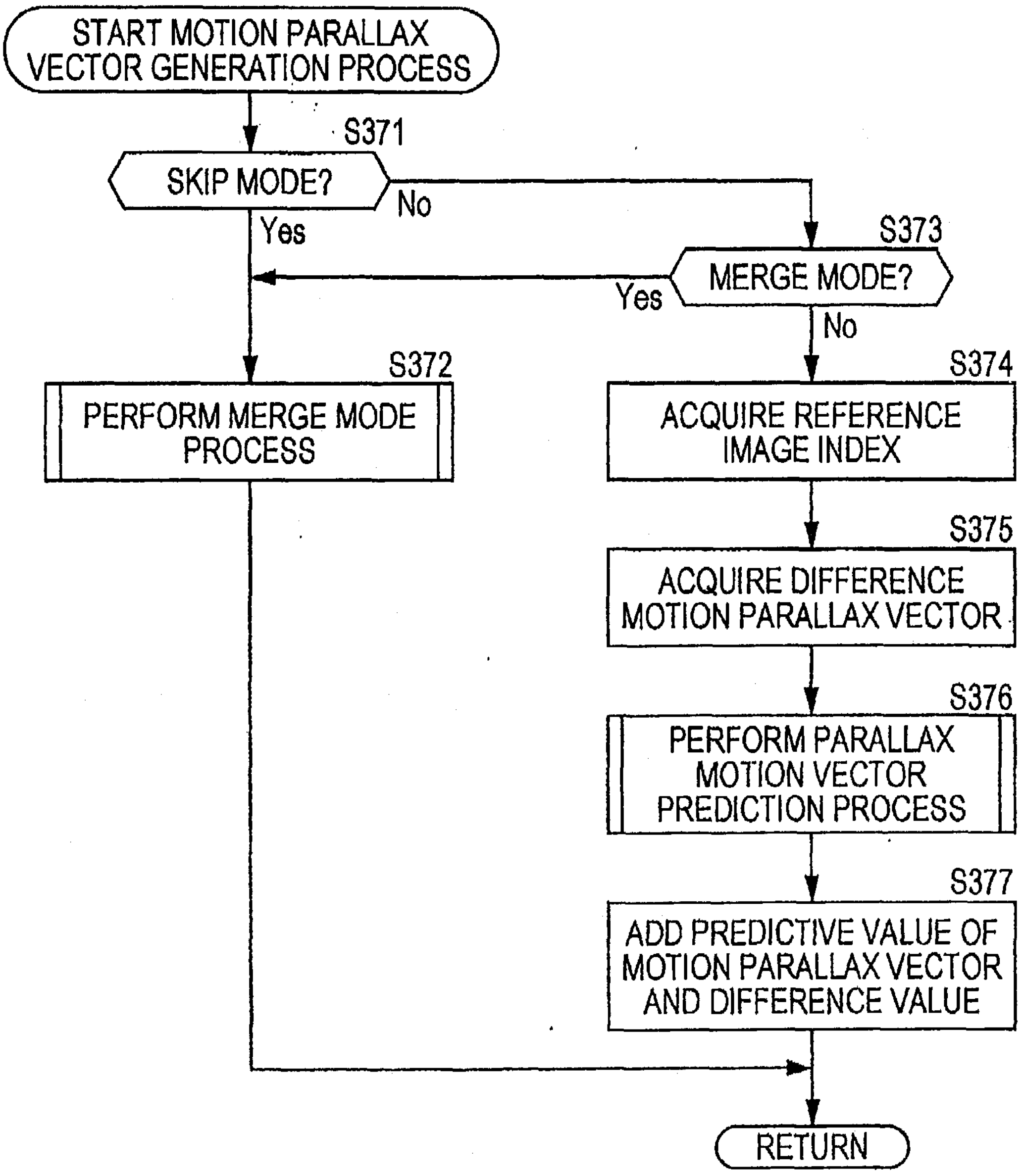
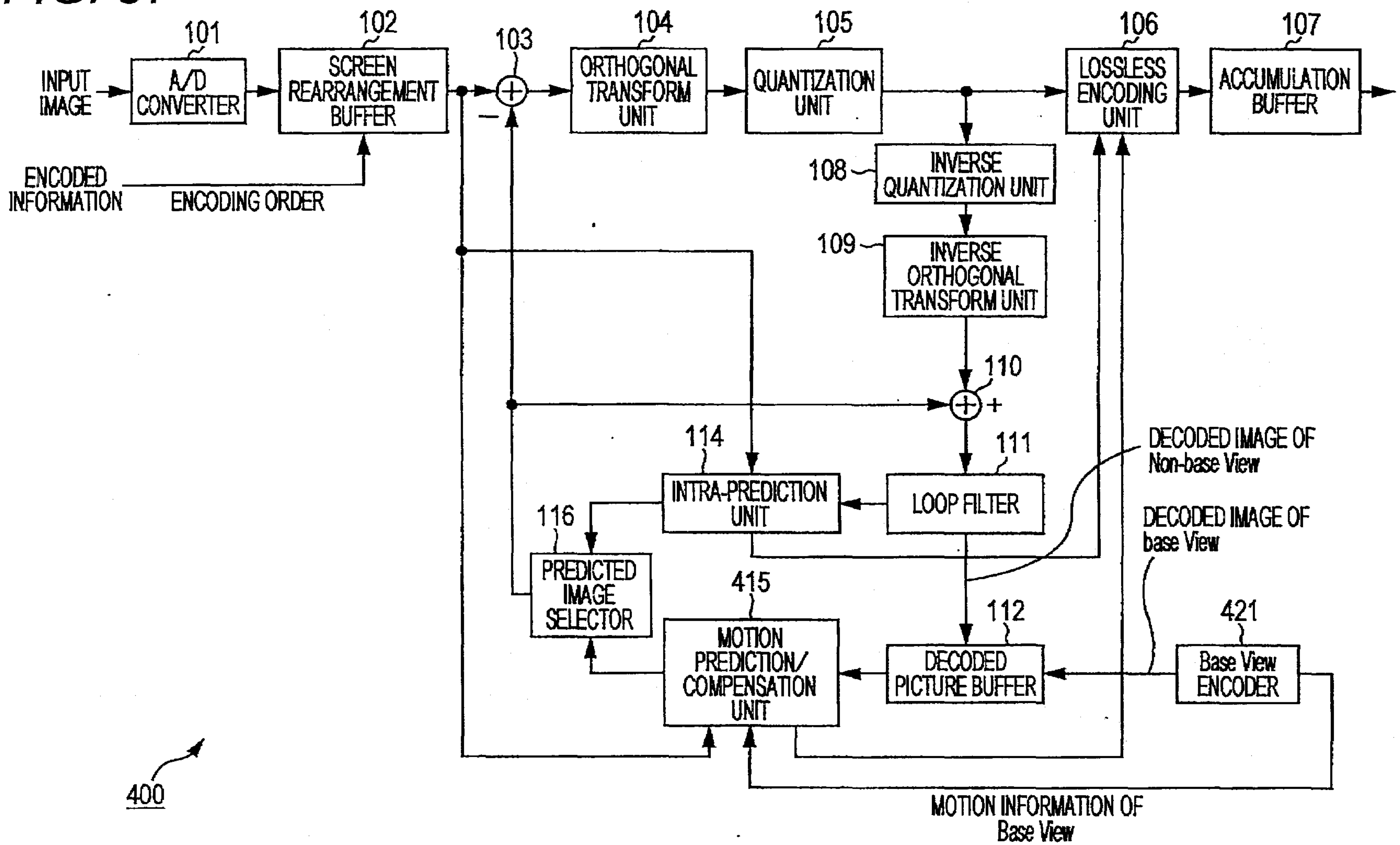

START MOTION PARALLAX VECTOR GENERATION PROCESS
S371
SKIP MODE?
No
Yes
S373
MERGE MODE?
Yes
No
S372
PERFORM MERGE MODE PROCESS
S374
ACQUIRE REFERENCE IMAGE INDEX
S375
ACQUIRE DIFFERENCE MOTION PARALLAX VECTOR
S376
PERFORM PARALLAX MOTION VECTOR PREDICTION PROCESS
S377
ADD PREDICTIVE VALUE OF MOTION PARALLAX VECTOR AND DIFFERENCE VALUE
RETURN

FIG. 37


INPUT IMAGE
101
A/D CONVERTER
102
SCREEN REARRANGEMENT BUFFER
ENCODED INFORMATION
ENCODING ORDER
103
104
ORTHOGONAL TRANSFORM UNIT
105
QUANTIZATION UNIT
106
LOSSLESS ENCODING UNIT
107
ACCUMULATION BUFFER
108
INVERSE QUANTIZATION UNIT
109
INVERSE ORTHOGONAL TRANSFORM UNIT
110
111
LOOP FILTER
114
INTRA-PREDICTION UNIT
116
PREDICTED IMAGE SELECTOR
415
MOTION PREDICTION/ COMPENSATION UNIT
112
DECODED PICTURE BUFFER
421
Base View ENCODER
DECODED IMAGE OF Non-base View
DECODED IMAGE OF base View
MOTION INFORMATION OF Base View
400

SP333690

FIG. 38

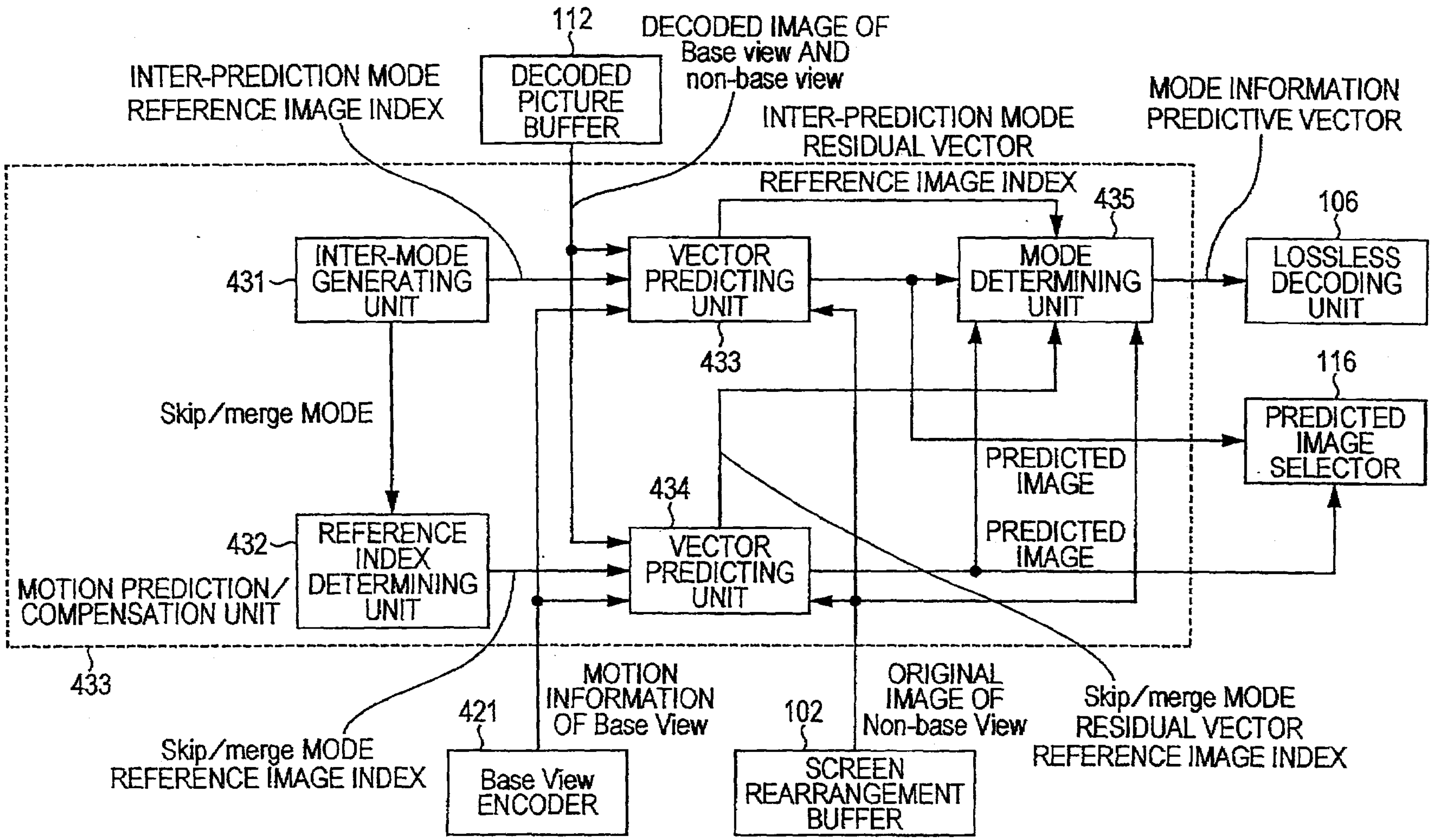


FIG. 39

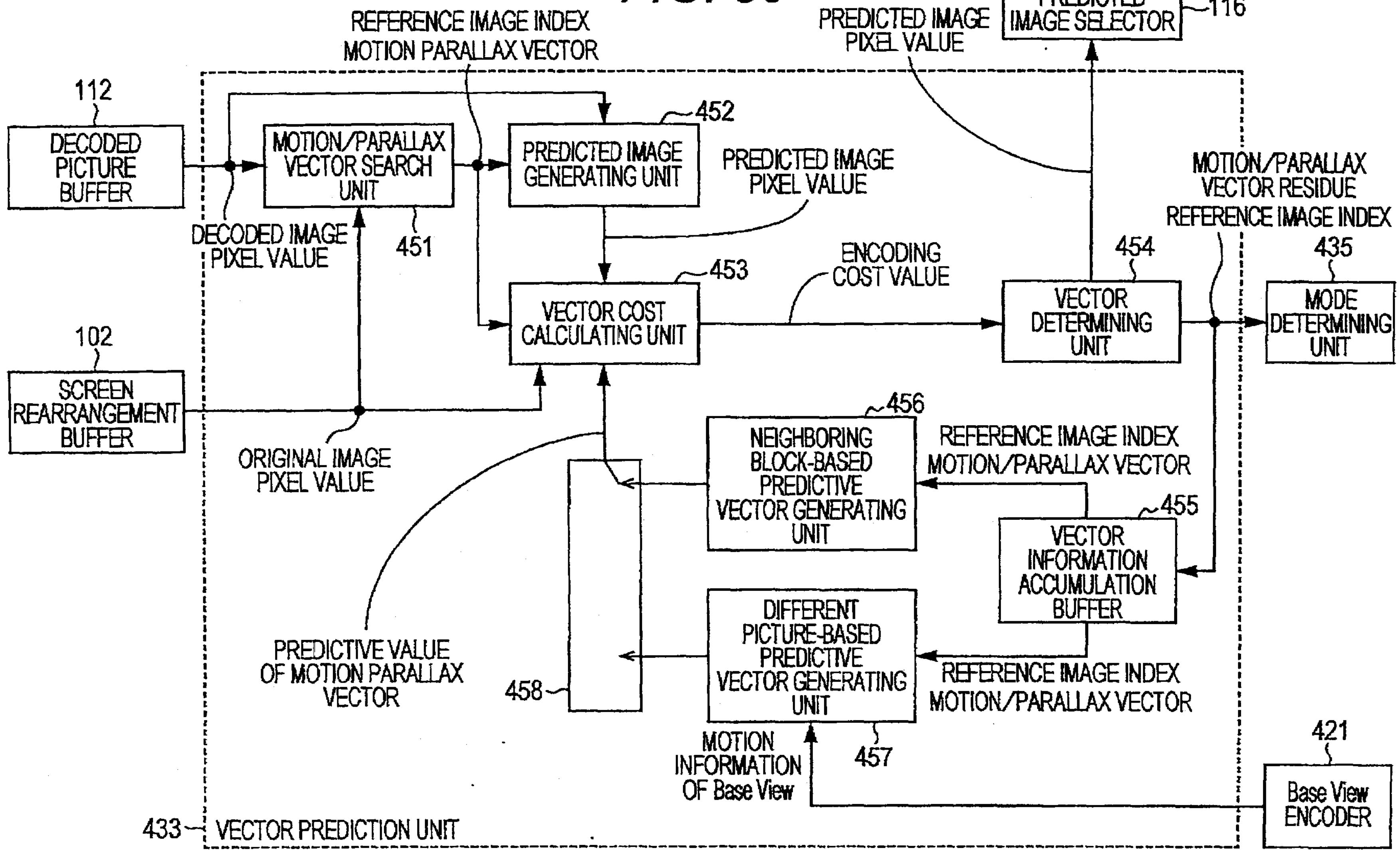

112
DECODED PICTURE BUFFER
102
SCREEN REARRANGEMENT BUFFER
DECODED IMAGE PIXEL VALUE
ORIGINAL IMAGE PIXEL VALUE
REFERENCE IMAGE INDEX
MOTION PARALLAX VECTOR
MOTION/PARALLAX VECTOR SEARCH UNIT
451
PREDICTED IMAGE GENERATING UNIT
452
PREDICTED IMAGE PIXEL VALUE
VECTOR COST CALCULATING UNIT
453
ENCODING COST VALUE
VECTOR DETERMINING UNIT
454
PREDICTED IMAGE PIXEL VALUE
PREDICTED IMAGE SELECTOR
116
MOTION/PARALLAX VECTOR RESIDUE
REFERENCE IMAGE INDEX
MODE DETERMINING UNIT
435
NEIGHBORING BLOCK-BASED PREDICTIVE VECTOR GENERATING UNIT
456
REFERENCE IMAGE INDEX
MOTION/PARALLAX VECTOR
VECTOR INFORMATION ACCUMULATION BUFFER
455
DIFFERENT PICTURE-BASED PREDICTIVE VECTOR GENERATING UNIT
457
REFERENCE IMAGE INDEX
MOTION/PARALLAX VECTOR
MOTION INFORMATION OF Base View
PREDICTIVE VALUE OF MOTION PARALLAX VECTOR
458
421
Base View ENCODER
433
VECTOR PREDICTION UNIT

FIG. 40

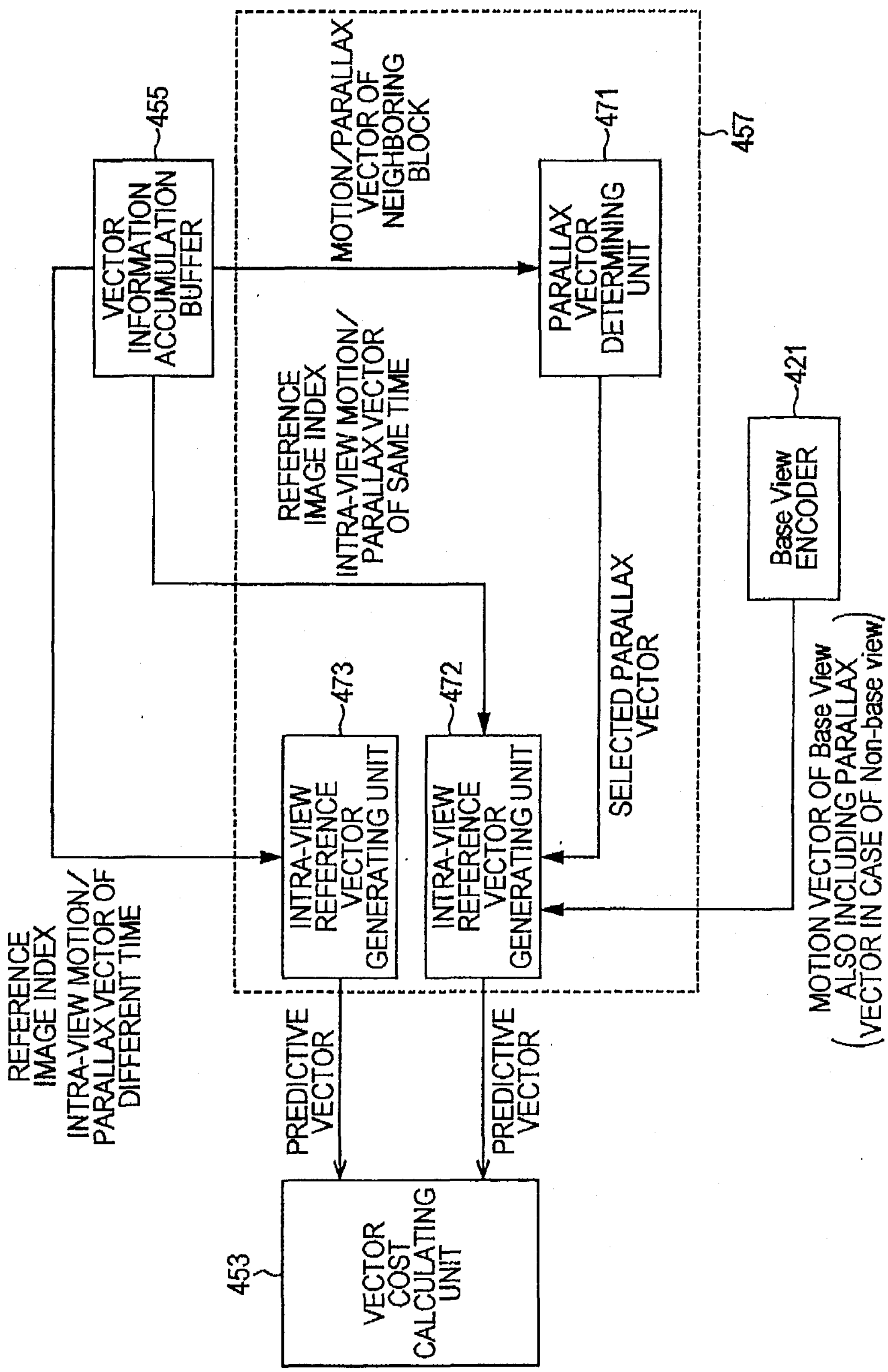

VECTOR INFORMATION ACCUMULATION BUFFER
455
MOTION/PARALLAX VECTOR OF NEIGHBORING BLOCK
PARALLAX VECTOR DETERMINING UNIT
471
457
REFERENCE IMAGE INDEX
INTRA-VIEW MOTION/ PARALLAX VECTOR OF SAME TIME
Base View ENCODER
421
SELECTED PARALLAX VECTOR
MOTION VECTOR OF Base View
(ALSO INCLUDING PARALLAX VECTOR IN CASE OF Non-base view)
INTRA-VIEW REFERENCE VECTOR GENERATING UNIT
473
INTRA-VIEW REFERENCE VECTOR GENERATING UNIT
472
REFERENCE IMAGE INDEX
INTRA-VIEW MOTION/ PARALLAX VECTOR OF DIFFERENT TIME
PREDICTIVE VECTOR
PREDICTIVE VECTOR
VECTOR COST CALCULATING UNIT
453

FIG. 41

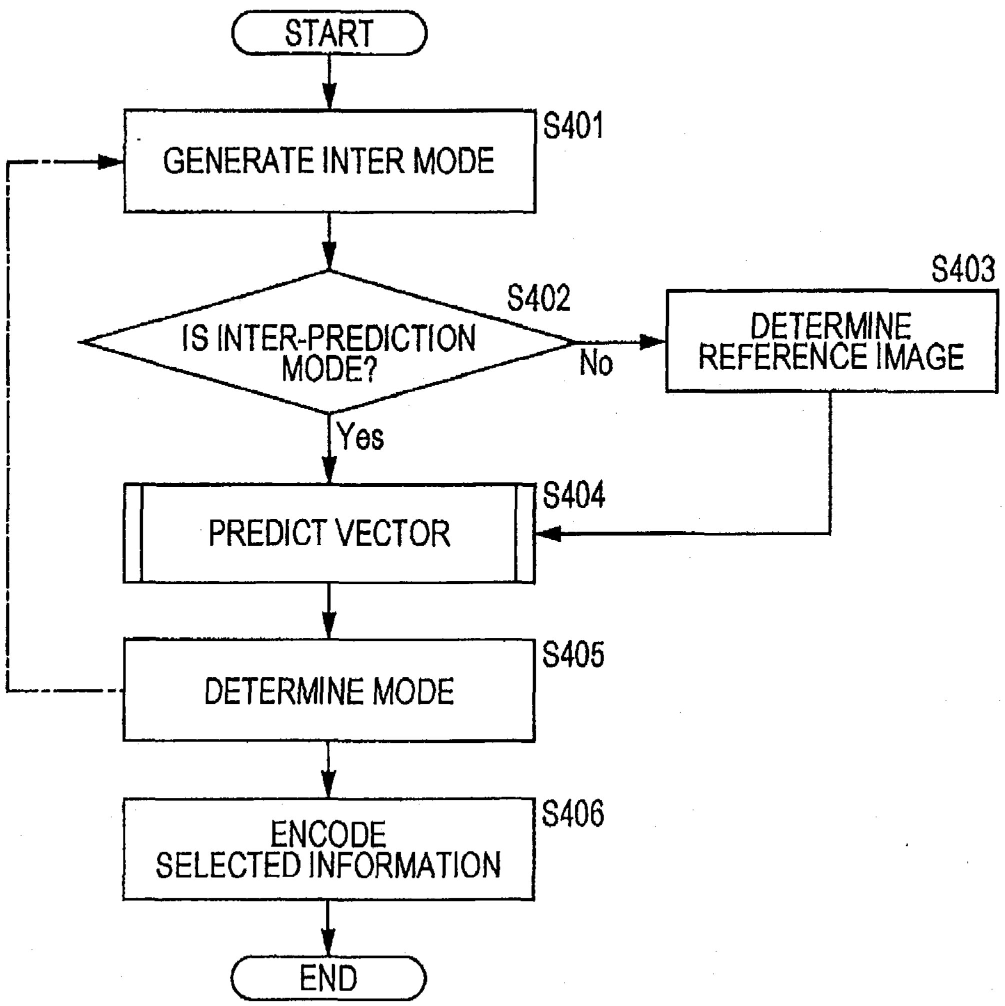

START
S401
GENERATE INTER MODE
S402
IS INTER-PREDICTION MODE?
No
S403
DETERMINE REFERENCE IMAGE
Yes
S404
PREDICT VECTOR
S405
DETERMINE MODE
S406
ENCODE SELECTED INFORMATION
END

FIG. 42

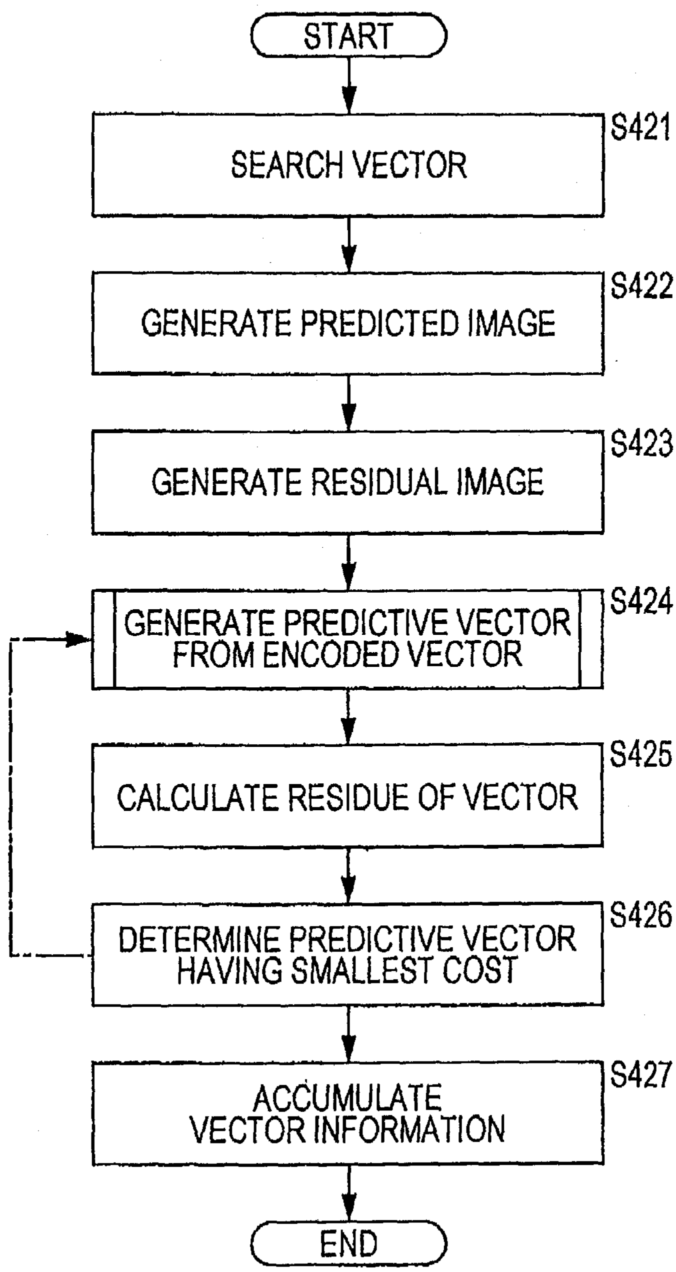

START
S421
SEARCH VECTOR
S422
GENERATE PREDICTED IMAGE
S423
GENERATE RESIDUAL IMAGE
S424
GENERATE PREDICTIVE VECTOR FROM ENCODED VECTOR
S425
CALCULATE RESIDUE OF VECTOR
S426
DETERMINE PREDICTIVE VECTOR HAVING SMALLEST COST
S427
ACCUMULATE VECTOR INFORMATION
END

FIG. 43

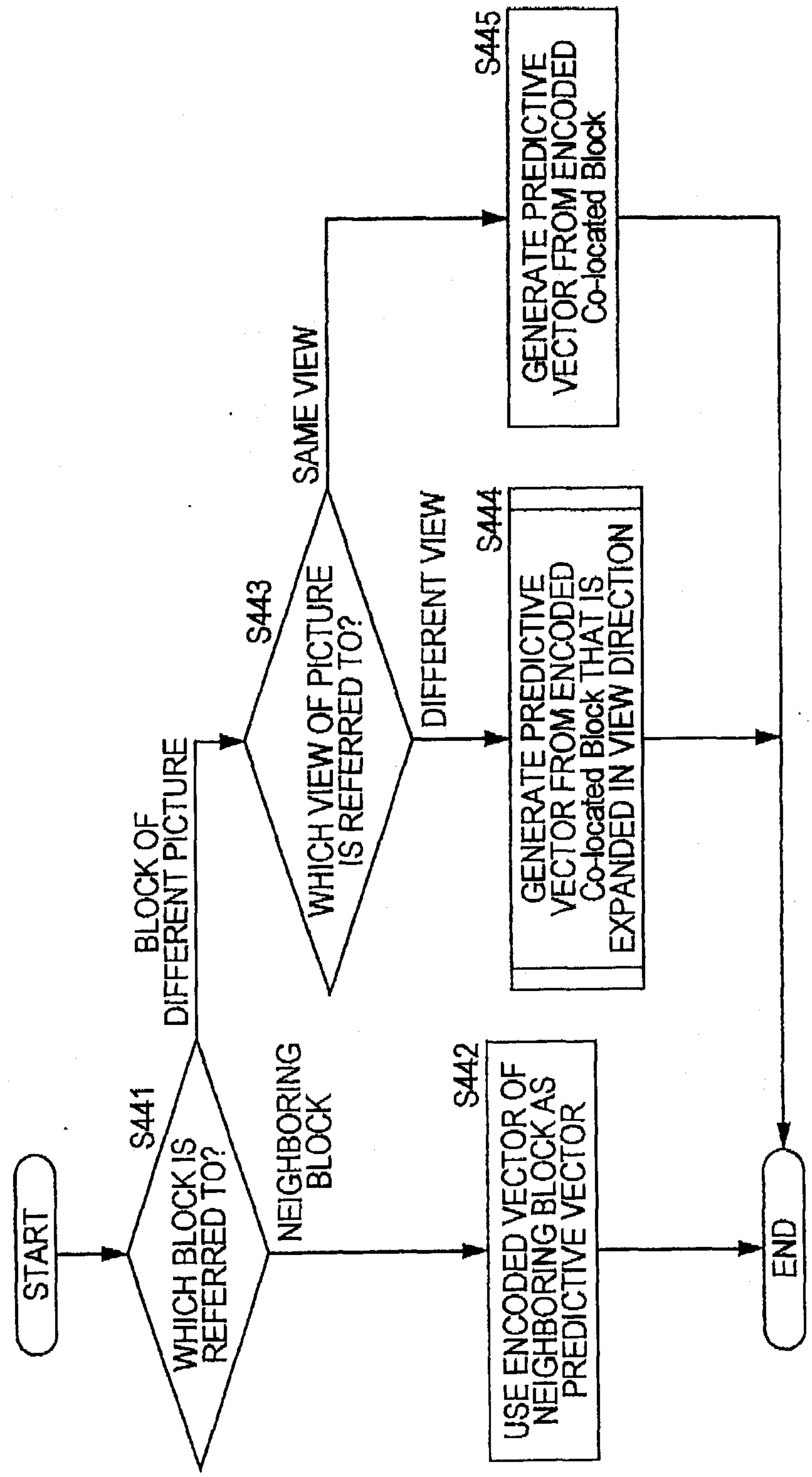

START
S441
WHICH BLOCK IS REFERRED TO?
NEIGHBORING BLOCK
S442
USE ENCODED VECTOR OF NEIGHBORING BLOCK AS PREDICTIVE VECTOR
BLOCK OF DIFFERENT PICTURE
S443
WHICH VIEW OF PICTURE IS REFERRED TO?
DIFFERENT VIEW
S444
GENERATE PREDICTIVE VECTOR FROM ENCODED Co-located Block THAT IS EXPANDED IN VIEW DIRECTION
SAME VIEW
S445
GENERATE PREDICTIVE VECTOR FROM ENCODED Co-located Block
END

FIG. 44

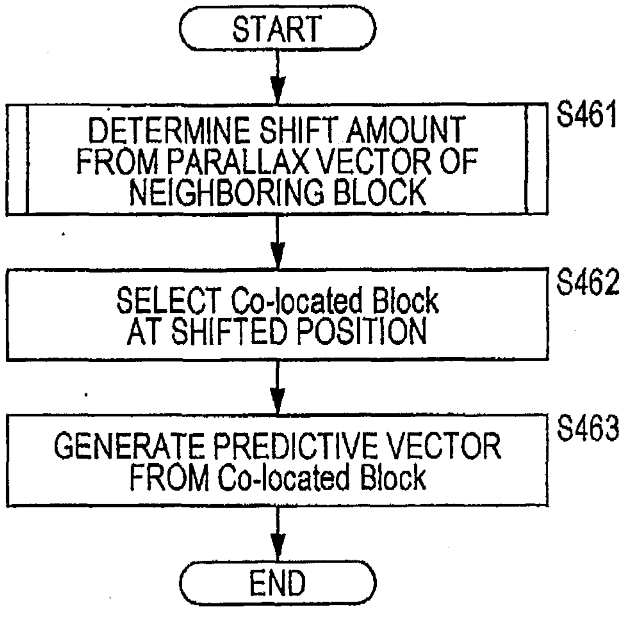

START
DETERMINE SHIFT AMOUNT FROM PARALLAX VECTOR OF NEIGHBORING BLOCK
S461
SELECT Co-located Block AT SHIFTED POSITION
S462
GENERATE PREDICTIVE VECTOR FROM Co-located Block
S463
END

FIG. 45

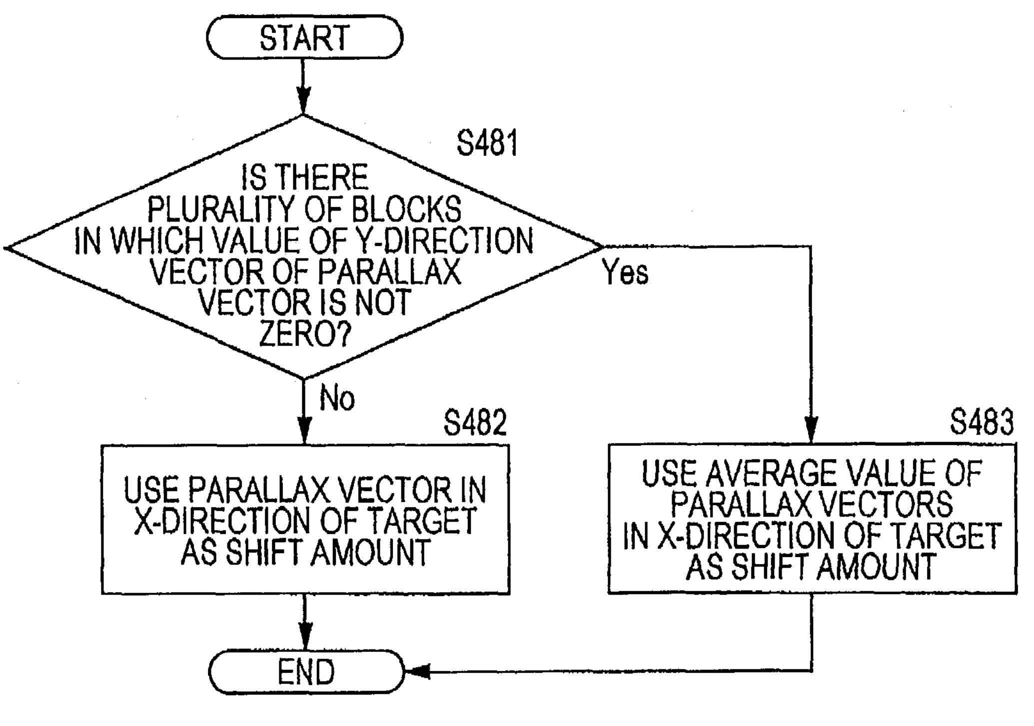

START
IS THERE PLURALITY OF BLOCKS IN WHICH VALUE OF Y-DIRECTION VECTOR OF PARALLAX VECTOR IS NOT ZERO?
S481
Yes
No
S482
USE PARALLAX VECTOR IN X-DIRECTION OF TARGET AS SHIFT AMOUNT
S483
USE AVERAGE VALUE OF PARALLAX VECTORS IN X-DIRECTION OF TARGET AS SHIFT AMOUNT
END

FIG. 46

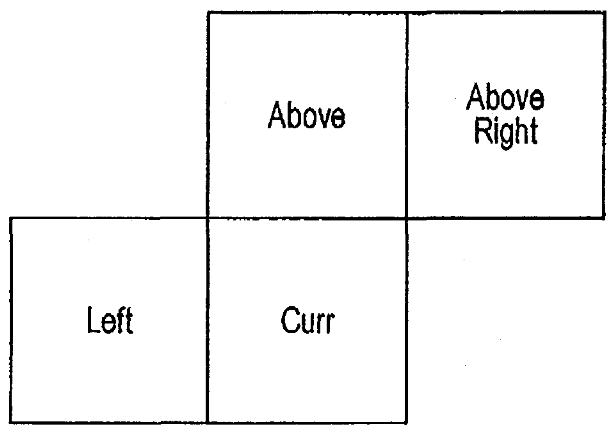


FIG. 47

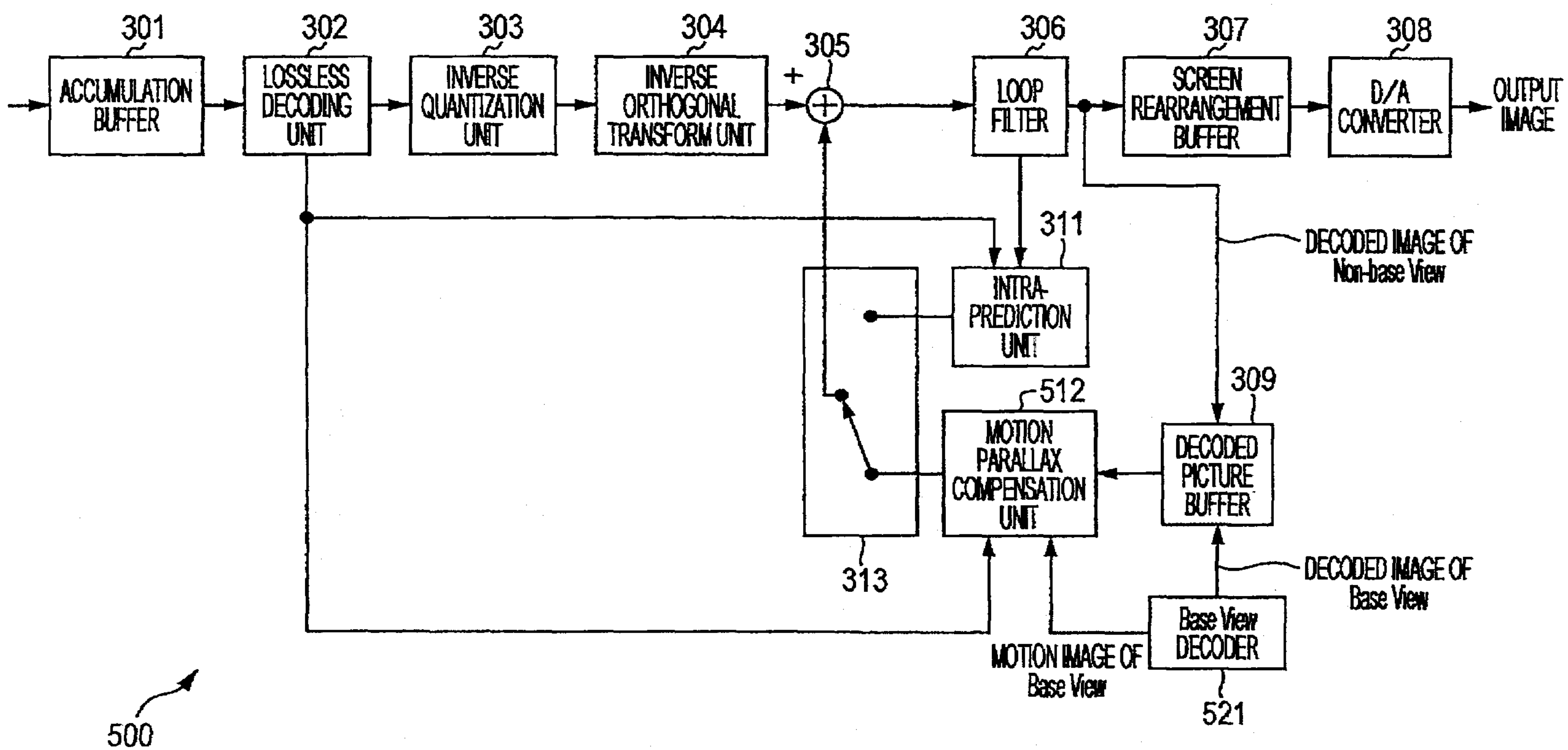

301
ACCUMULATION BUFFER
302
LOSSLESS DECODING UNIT
303
INVERSE QUANTIZATION UNIT
304
INVERSE ORTHOGONAL TRANSFORM UNIT
305
+
306
LOOP FILTER
307
SCREEN REARRANGEMENT BUFFER
308
D/A CONVERTER
OUTPUT IMAGE
311
INTRA-PREDICTION UNIT
512
MOTION PARALLAX COMPENSATION UNIT
309
DECODED PICTURE BUFFER
DECODED IMAGE OF Non-base View
DECODED IMAGE OF Base View
313
Base View DECODER
521
MOTION IMAGE OF Base View
500

FIG. 48

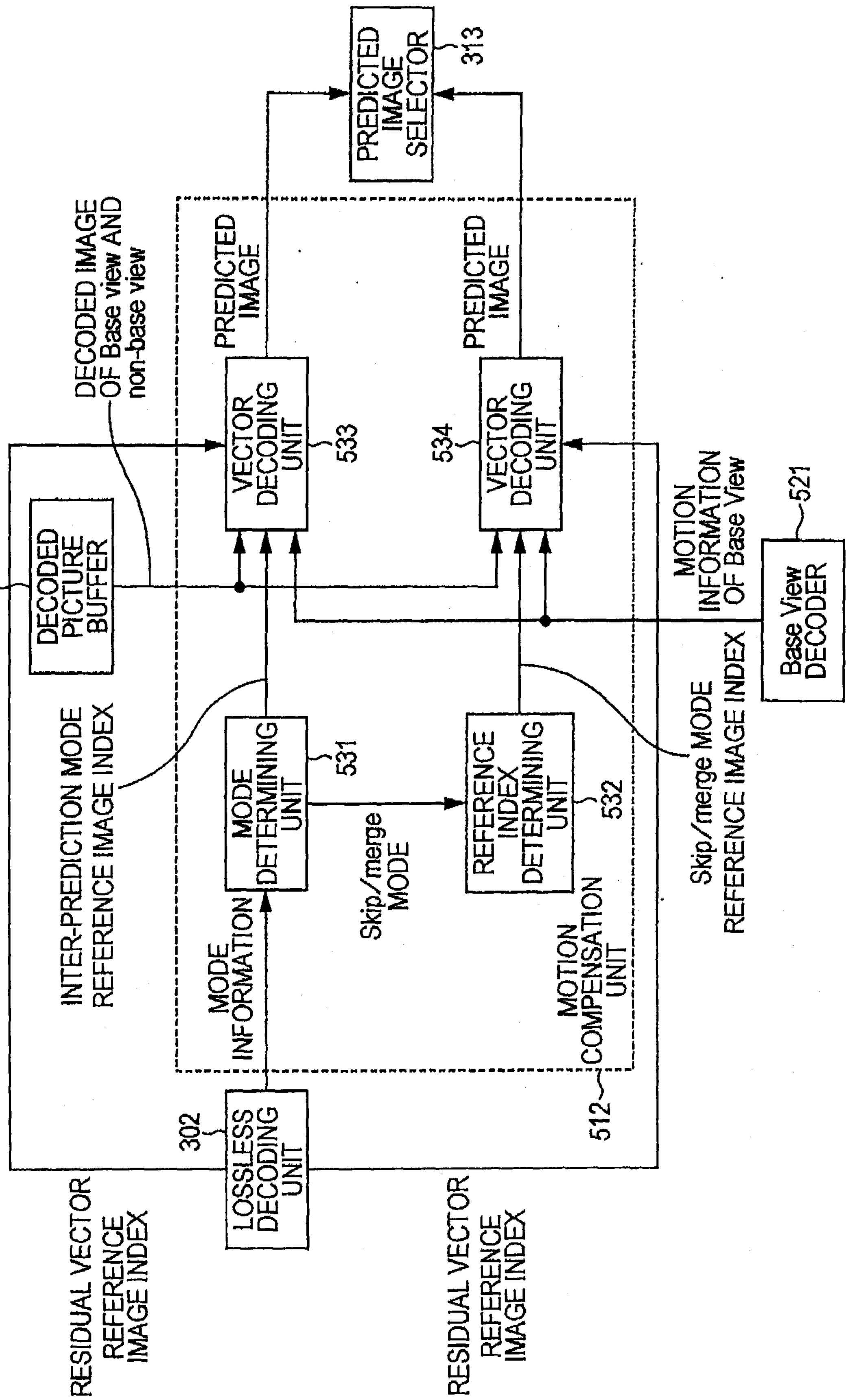

RESIDUAL VECTOR
REFERENCE
IMAGE INDEX
LOSSLESS
DECODING
UNIT
302
RESIDUAL VECTOR
REFERENCE
IMAGE INDEX
MODE
INFORMATION
MODE
DETERMINING
UNIT
531
Skip/merge
MODE
REFERENCE
INDEX
DETERMINING
UNIT
532
MOTION
COMPENSATION
UNIT
512
INTER-PREDICTION MODE
REFERENCE IMAGE INDEX
Skip/merge MODE
REFERENCE IMAGE INDEX
DECODED
PICTURE
BUFFER
309
DECODED IMAGE
OF Base view AND
non-base view
VECTOR
DECODING
UNIT
533
VECTOR
DECODING
UNIT
534
MOTION
INFORMATION
OF Base View
Base View
DECODER
521
PREDICTED
IMAGE
PREDICTED
IMAGE
PREDICTED
IMAGE
SELECTOR
313

FIG. 49

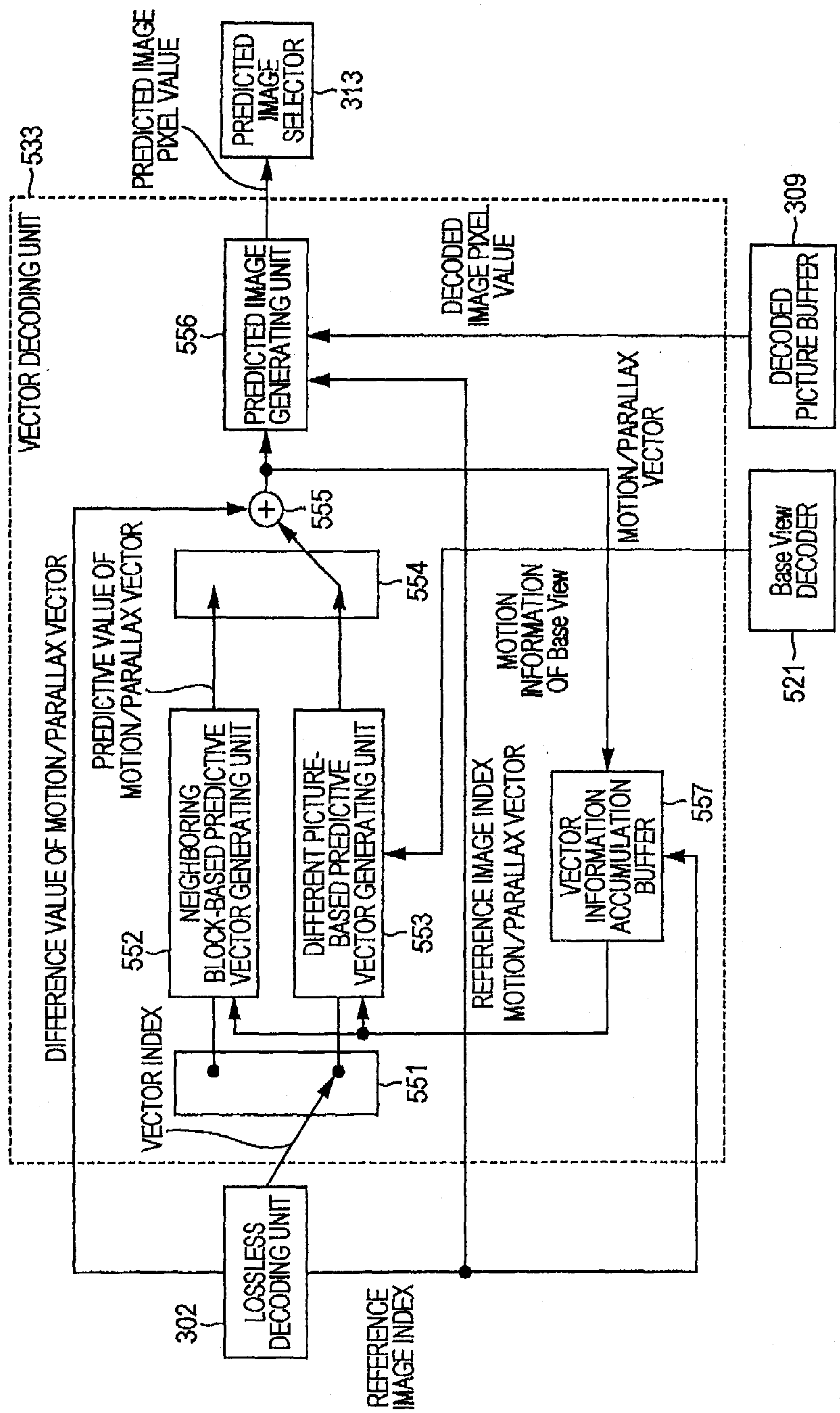

VECTOR DECODING UNIT
533
PREDICTED IMAGE PIXEL VALUE
PREDICTED IMAGE SELECTOR
313
556
PREDICTED IMAGE GENERATING UNIT
DECODED IMAGE PIXEL VALUE
309
DECODED PICTURE BUFFER
MOTION/PARALLAX VECTOR
555
DIFFERENCE VALUE OF MOTION/PARALLAX VECTOR
PREDICTIVE VALUE OF MOTION/PARALLAX VECTOR
554
Base View DECODER
521
MOTION INFORMATION OF Base View
552
NEIGHBORING BLOCK-BASED PREDICTIVE VECTOR GENERATING UNIT
DIFFERENT PICTURE-BASED PREDICTIVE VECTOR GENERATING UNIT
553
REFERENCE IMAGE INDEX
MOTION/PARALLAX VECTOR
VECTOR INFORMATION ACCUMULATION BUFFER
557
VECTOR INDEX
551
302
LOSSLESS DECODING UNIT
REFERENCE IMAGE INDEX

FIG. 50

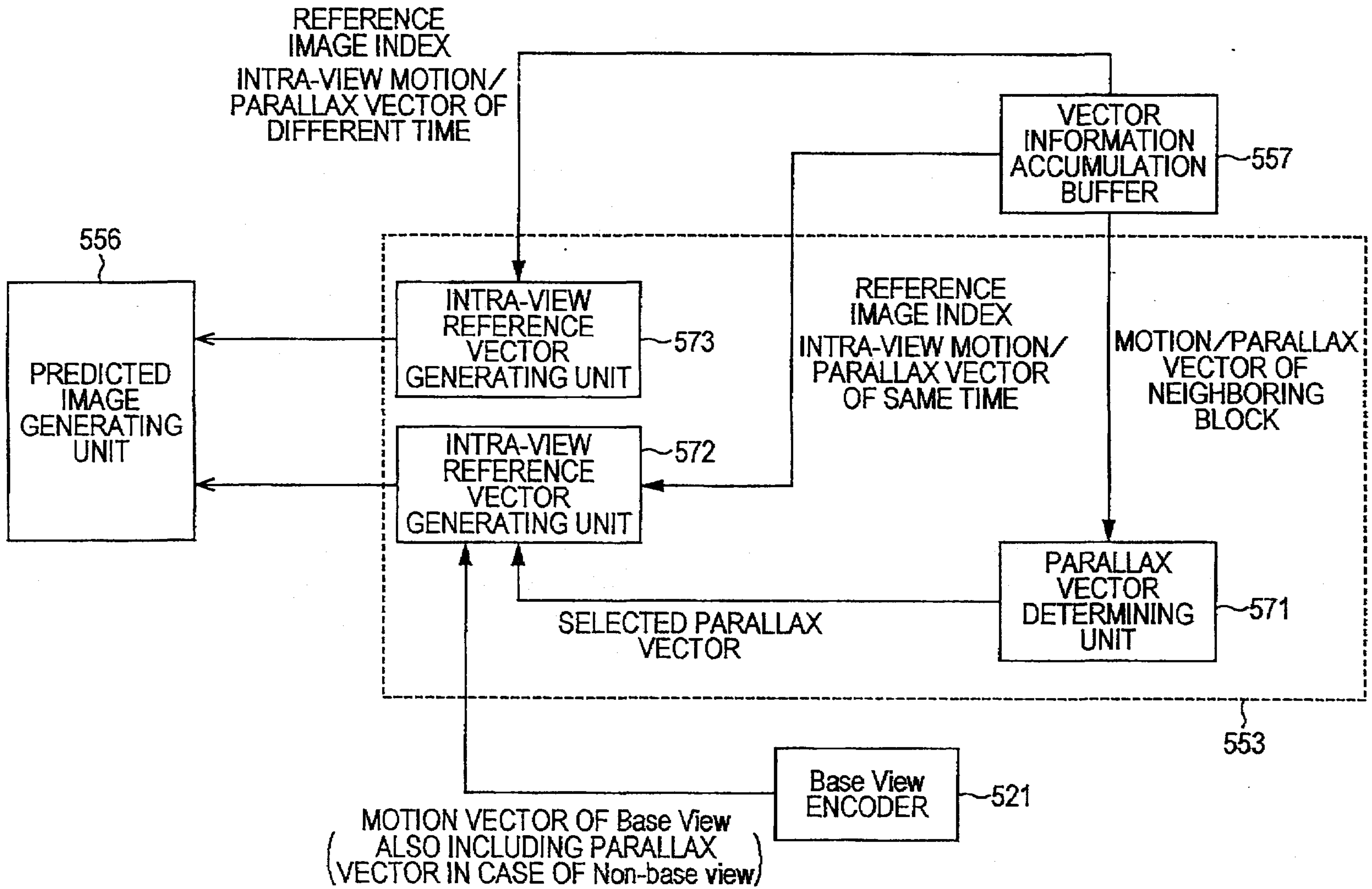

REFERENCE IMAGE INDEX
INTRA-VIEW MOTION/ PARALLAX VECTOR OF DIFFERENT TIME
VECTOR INFORMATION ACCUMULATION BUFFER
557
556
PREDICTED IMAGE GENERATING UNIT
INTRA-VIEW REFERENCE VECTOR GENERATING UNIT
573
INTRA-VIEW REFERENCE VECTOR GENERATING UNIT
572
REFERENCE IMAGE INDEX
INTRA-VIEW MOTION/ PARALLAX VECTOR OF SAME TIME
MOTION/PARALLAX VECTOR OF NEIGHBORING BLOCK
PARALLAX VECTOR DETERMINING UNIT
571
SELECTED PARALLAX VECTOR
553
Base View ENCODER
521
MOTION VECTOR OF Base View
(ALSO INCLUDING PARALLAX VECTOR IN CASE OF Non-base view)

FIG. 51

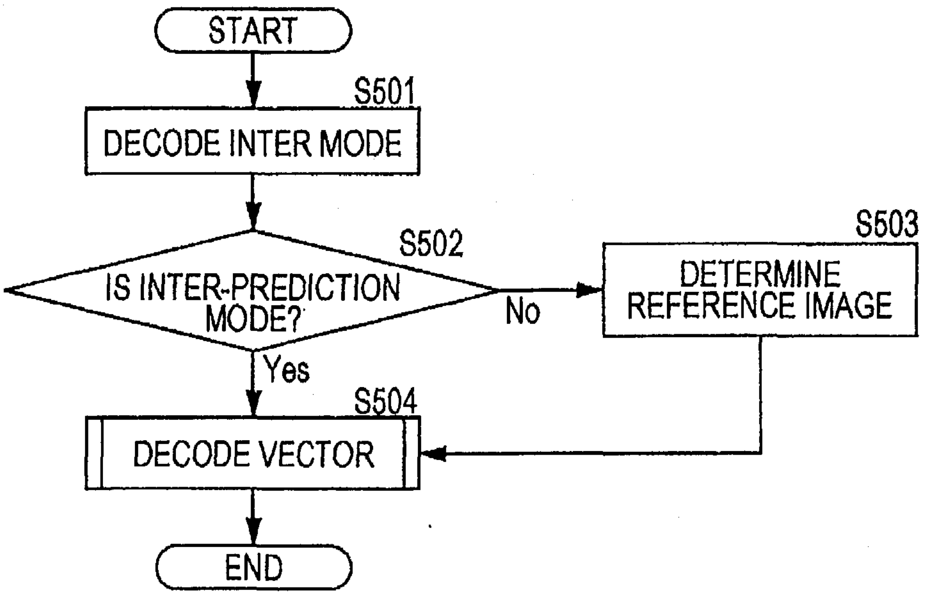

START
S501
DECODE INTER MODE
S502
IS INTER-PREDICTION MODE?
No
S503
DETERMINE REFERENCE IMAGE
Yes
S504
DECODE VECTOR
END

FIG. 52

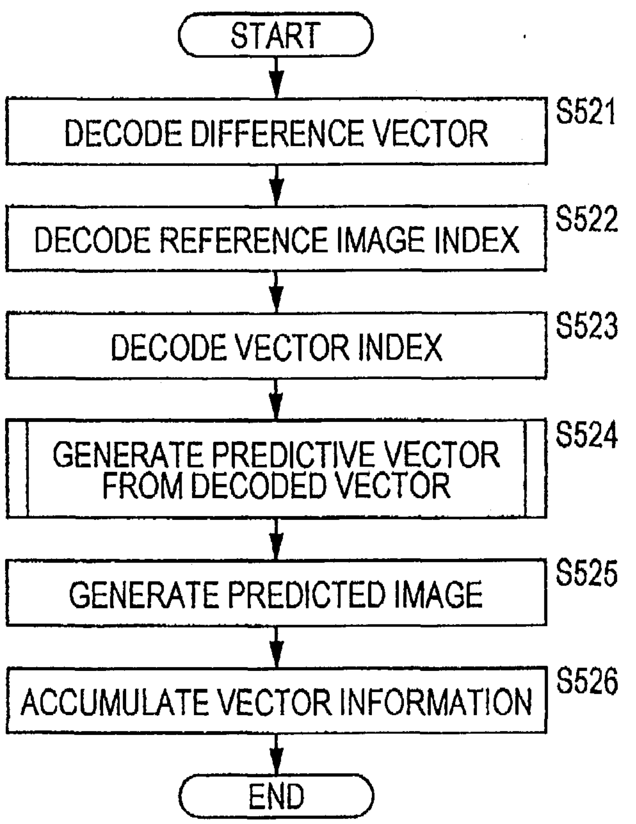

START
S521
DECODE DIFFERENCE VECTOR
S522
DECODE REFERENCE IMAGE INDEX
S523
DECODE VECTOR INDEX
S524
GENERATE PREDICTIVE VECTOR FROM DECODED VECTOR
S525
GENERATE PREDICTED IMAGE
S526
ACCUMULATE VECTOR INFORMATION
END

FIG. 53

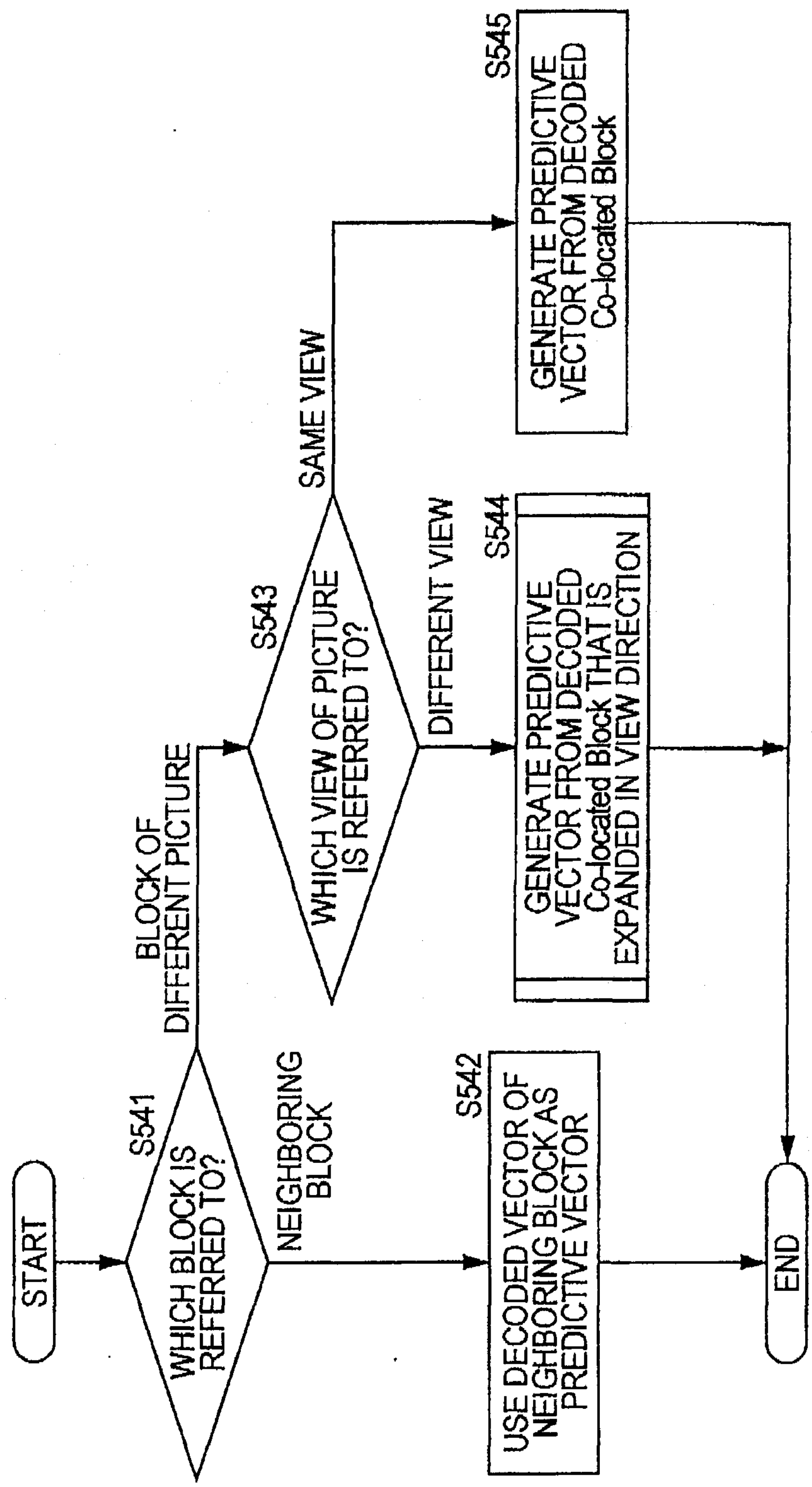

START
S541
WHICH BLOCK IS REFERRED TO?
NEIGHBORING BLOCK
BLOCK OF DIFFERENT PICTURE
S542
USE DECODED VECTOR OF NEIGHBORING BLOCK AS PREDICTIVE VECTOR
S543
WHICH VIEW OF PICTURE IS REFERRED TO?
DIFFERENT VIEW
SAME VIEW
S544
GENERATE PREDICTIVE VECTOR FROM DECODED Co-located Block THAT IS EXPANDED IN VIEW DIRECTION
S545
GENERATE PREDICTIVE VECTOR FROM DECODED Co-located Block
END

FIG. 54

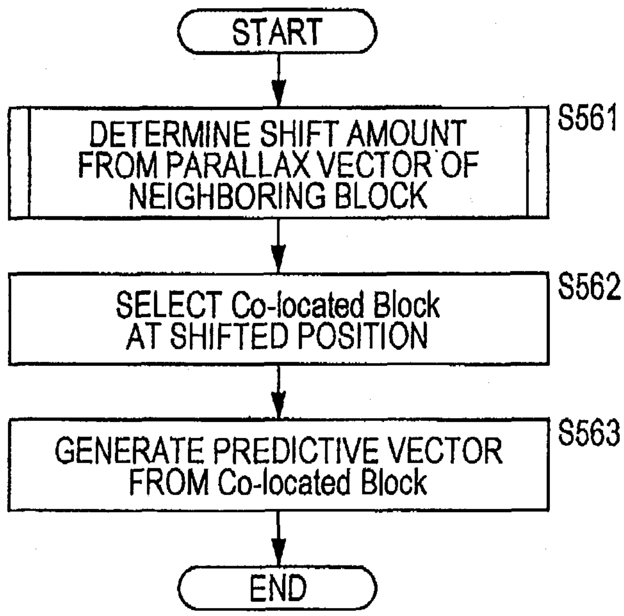

START
DETERMINE SHIFT AMOUNT FROM PARALLAX VECTOR OF NEIGHBORING BLOCK
S561
SELECT Co-located Block AT SHIFTED POSITION
S562
GENERATE PREDICTIVE VECTOR FROM Co-located Block
S563
END

FIG. 55

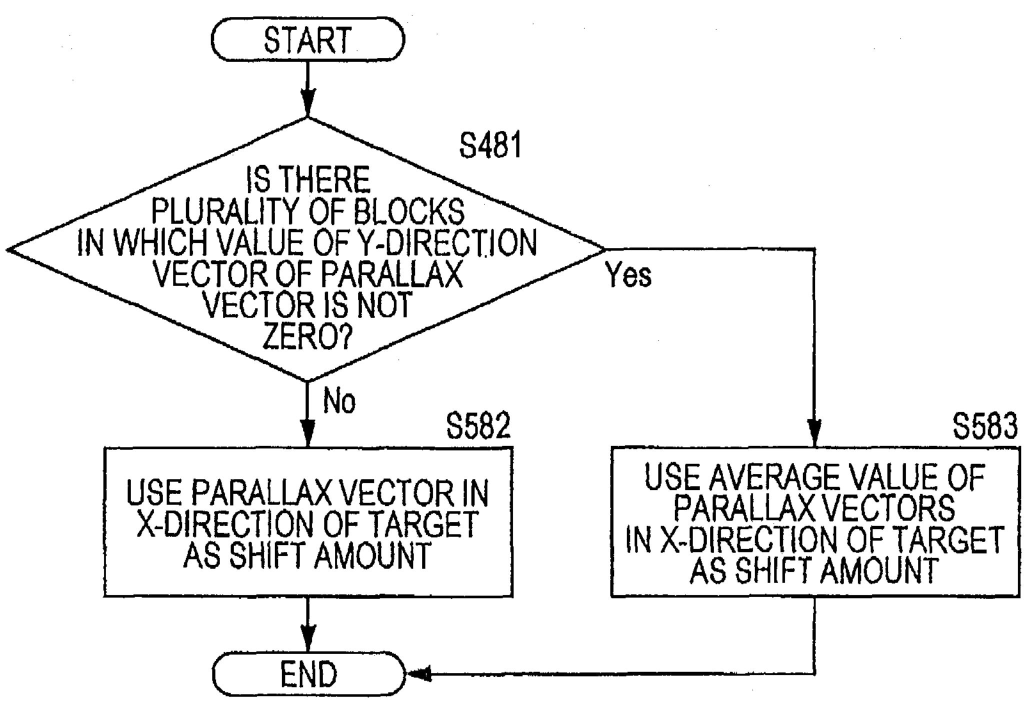

START
S481
IS THERE PLURALITY OF BLOCKS IN WHICH VALUE OF Y-DIRECTION VECTOR OF PARALLAX VECTOR IS NOT ZERO?
Yes
No
S582
USE PARALLAX VECTOR IN X-DIRECTION OF TARGET AS SHIFT AMOUNT
S583
USE AVERAGE VALUE OF PARALLAX VECTORS IN X-DIRECTION OF TARGET AS SHIFT AMOUNT
END

FIG. 56

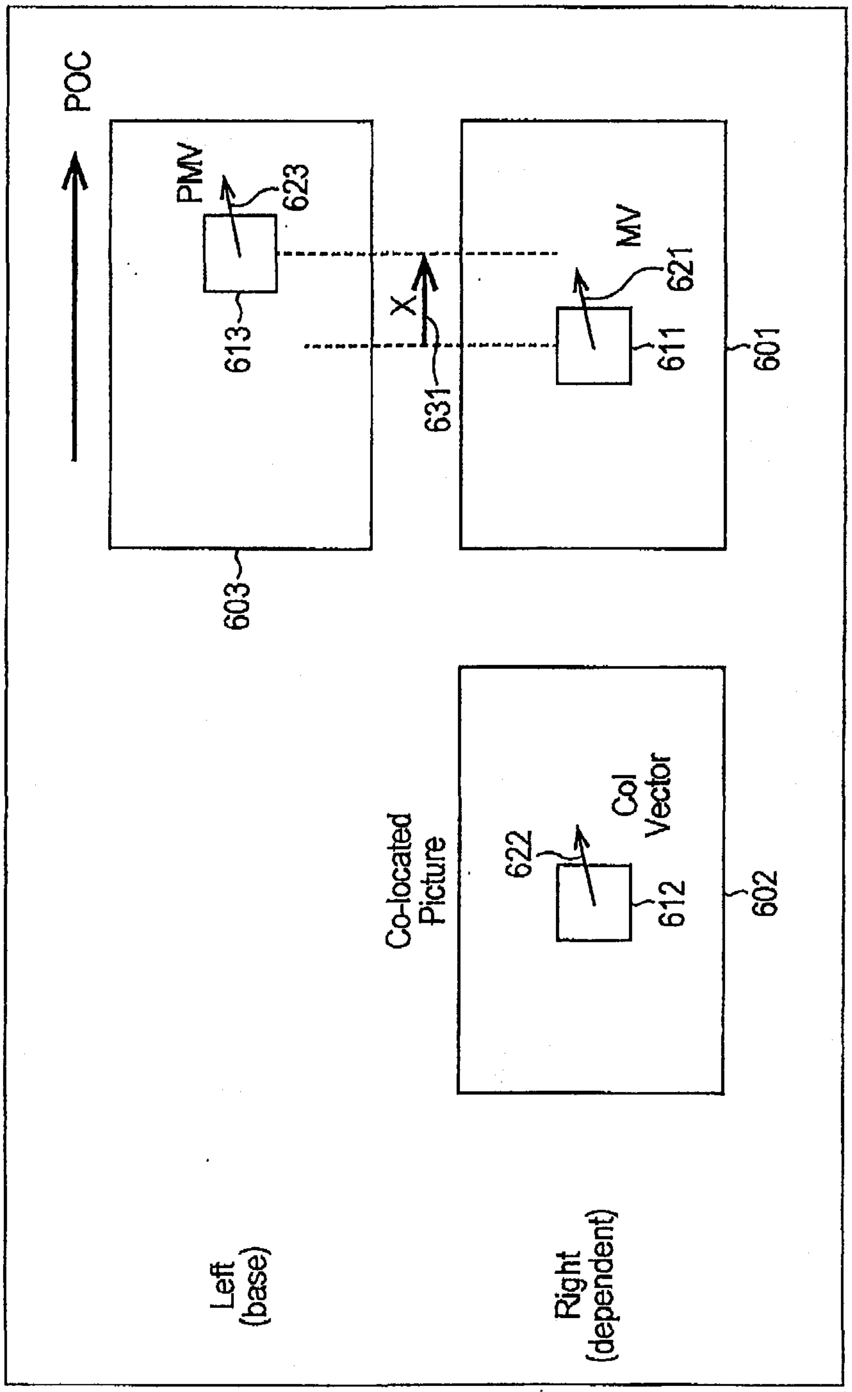

POC
PMV
623
613
603
X
631
MV
621
611
601
Co-located Picture
622
Col Vector
612
602
Left (base)
Right (dependent)

FIG. 57

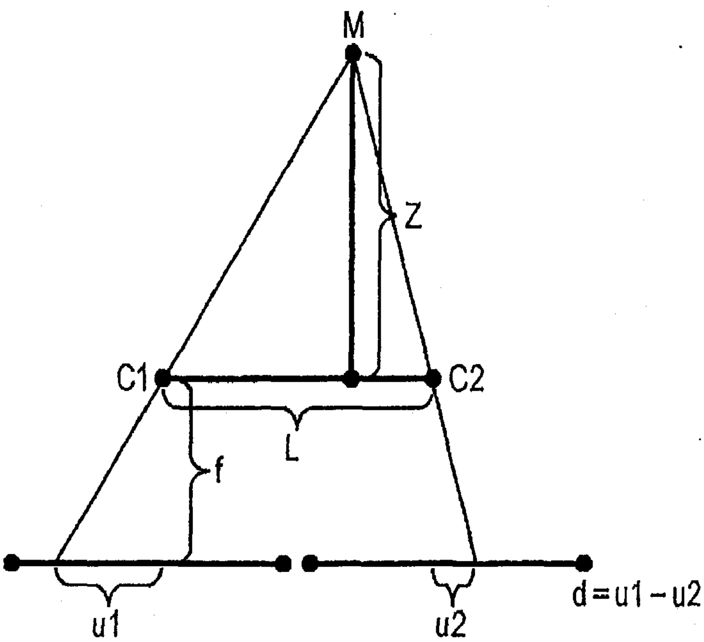


FIG. 58

CODING VECTOR	Co-located VECTOR	PROCESS
Motion vector	Motion vector	USE Co-located VECTOR AS PREDICTIVE VECTOR CANDIDATE.
Motion vector	Inter-view vector	USE MOTION VECTOR OF Base View OF BLOCK SHIFTED BY Co-located VECTOR AS PREDICTIVE VECTOR CANDIDATE.
Motion vector	Intra mode	USE MOTION VECTOR OF Base View OF BLOCK SHIFTED BY GLOBAL PARALLAX VECTOR AS PREDICTIVE VECTOR CANDIDATE.
Inter-view vector	Motion vector	USE GLOBAL PARALLAX VECTOR AS PREDICTIVE VECTOR CANDIDATE.
Inter-view vector	Inter-view vector	USE Co-located VECTOR AS PREDICTIVE VECTOR CANDIDATE.
Inter-view vector	Intra mode	USE GLOBAL PARALLAX VECTOR AS PREDICTIVE VECTOR CANDIDATE.

FIG. 59

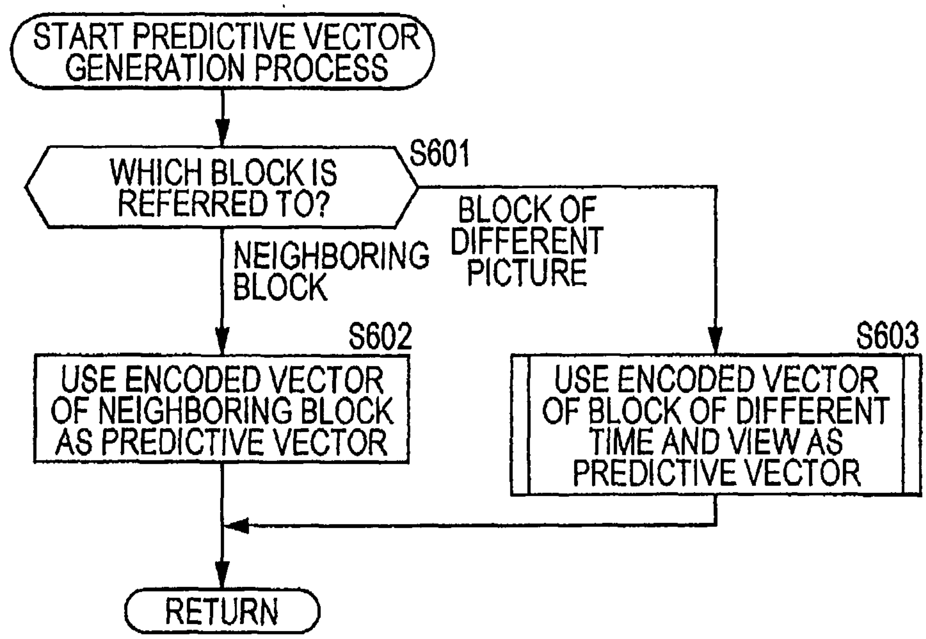

START PREDICTIVE VECTOR GENERATION PROCESS
WHICH BLOCK IS REFERRED TO?
S601
NEIGHBORING BLOCK
BLOCK OF DIFFERENT PICTURE
S602
USE ENCODED VECTOR OF NEIGHBORING BLOCK AS PREDICTIVE VECTOR
S603
USE ENCODED VECTOR OF BLOCK OF DIFFERENT TIME AND VIEW AS PREDICTIVE VECTOR
RETURN

FIG. 60

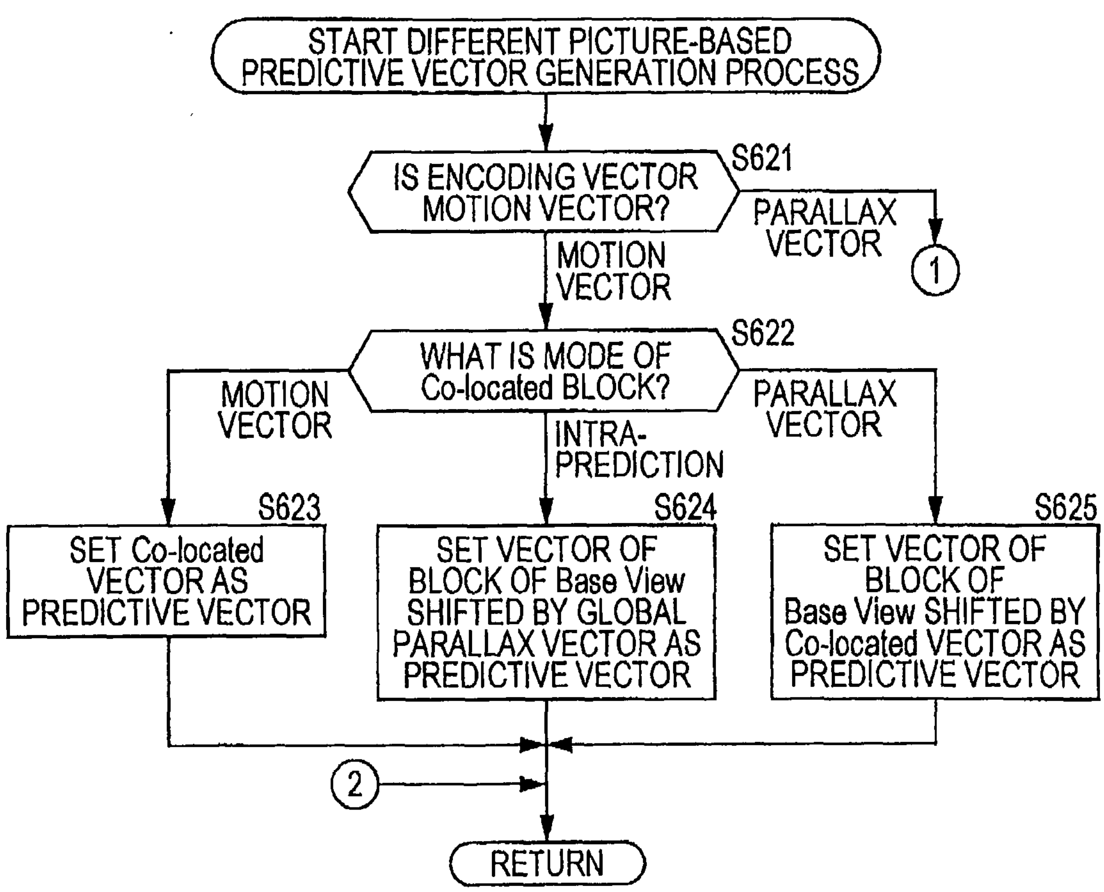

START DIFFERENT PICTURE-BASED PREDICTIVE VECTOR GENERATION PROCESS
IS ENCODING VECTOR MOTION VECTOR?
S621
PARALLAX VECTOR
1
MOTION VECTOR
WHAT IS MODE OF Co-located BLOCK?
S622
MOTION VECTOR
INTRA-PREDICTION
PARALLAX VECTOR
S623
SET Co-located VECTOR AS PREDICTIVE VECTOR
S624
SET VECTOR OF BLOCK OF Base View SHIFTED BY GLOBAL PARALLAX VECTOR AS PREDICTIVE VECTOR
S625
SET VECTOR OF BLOCK OF Base View SHIFTED BY Co-located VECTOR AS PREDICTIVE VECTOR
2
RETURN

FIG. 61

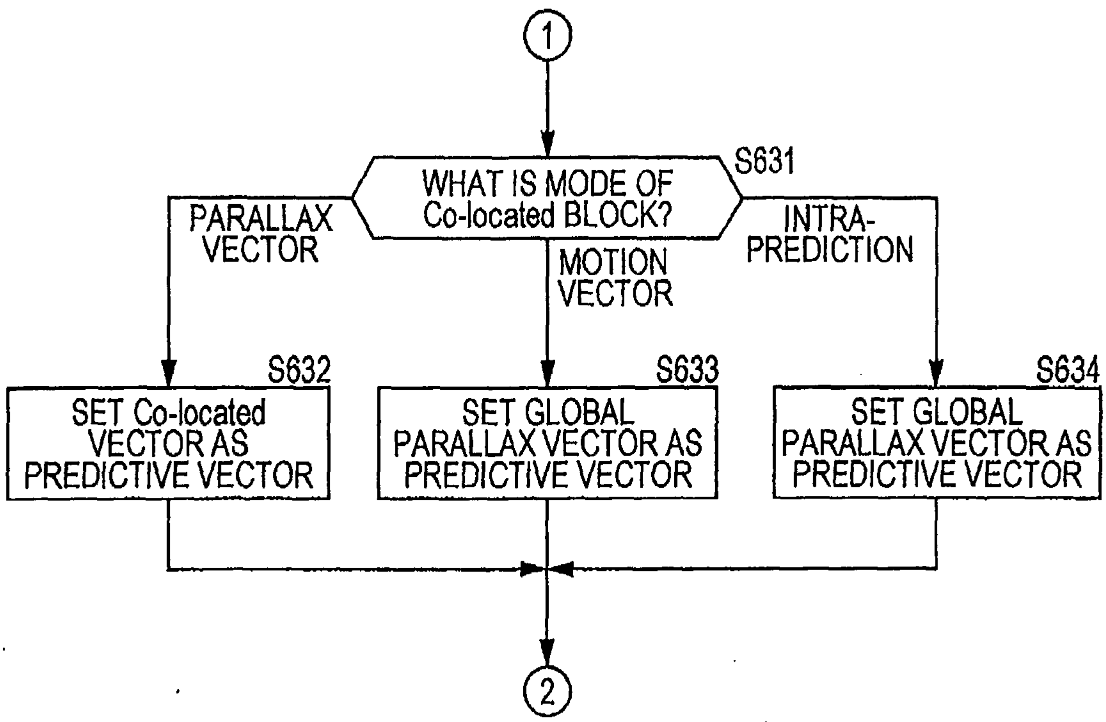

1
WHAT IS MODE OF Co-located BLOCK?
S631
PARALLAX VECTOR
MOTION VECTOR
INTRA-PREDICTION
S632
SET Co-located VECTOR AS PREDICTIVE VECTOR
S633
SET GLOBAL PARALLAX VECTOR AS PREDICTIVE VECTOR
S634
SET GLOBAL PARALLAX VECTOR AS PREDICTIVE VECTOR
2

FIG. 62

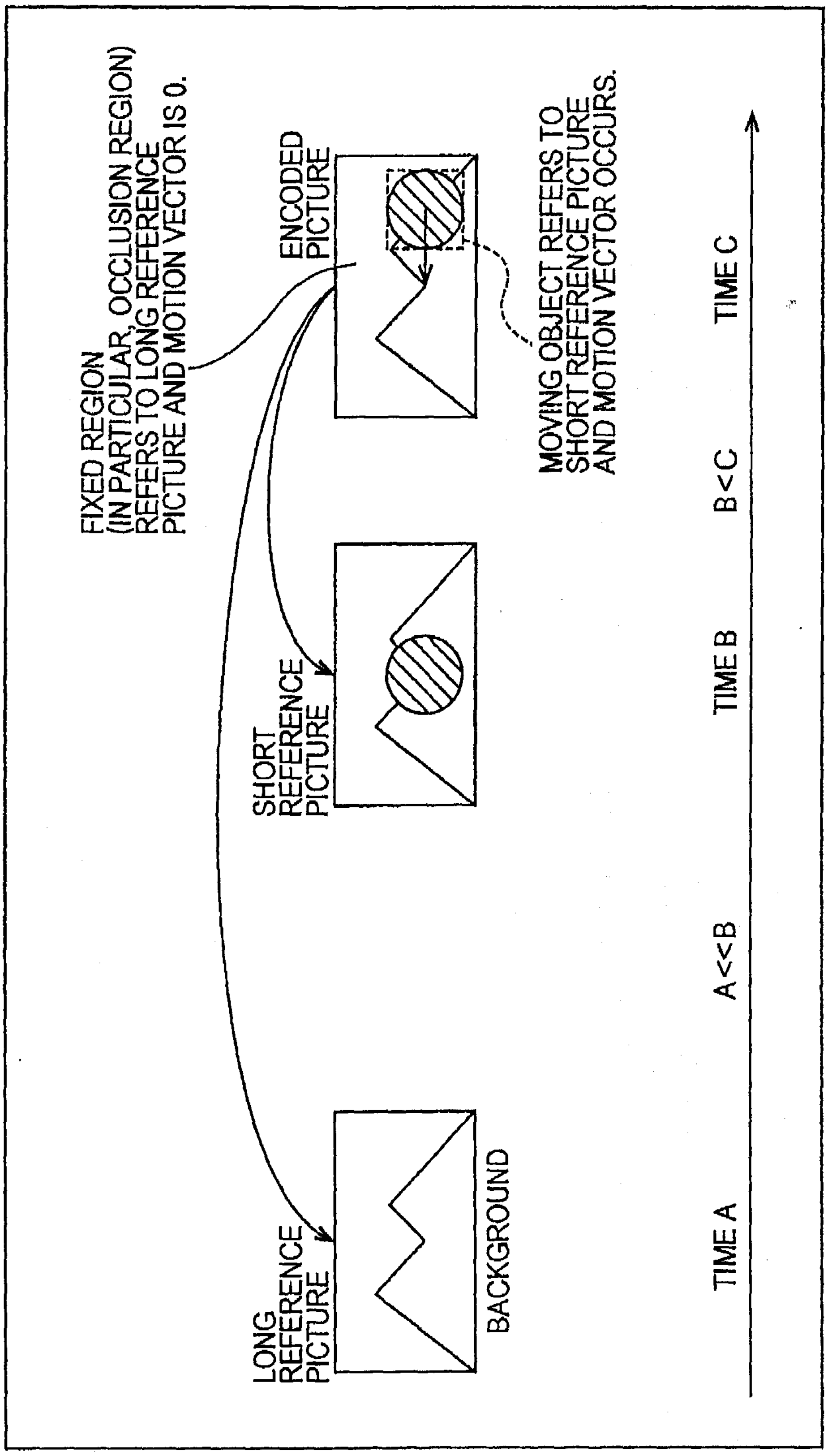

LONG REFERENCE PICTURE
BACKGROUND
SHORT REFERENCE PICTURE
ENCODED PICTURE
FIXED REGION (IN PARTICULAR, OCCLUSION REGION) REFERS TO LONG REFERENCE PICTURE AND MOTION VECTOR IS 0.
MOVING OBJECT REFERS TO SHORT REFERENCE PICTURE AND MOTION VECTOR OCCURS.
TIME A
A<<B
TIME B
B<C
TIME C

FIG. 63

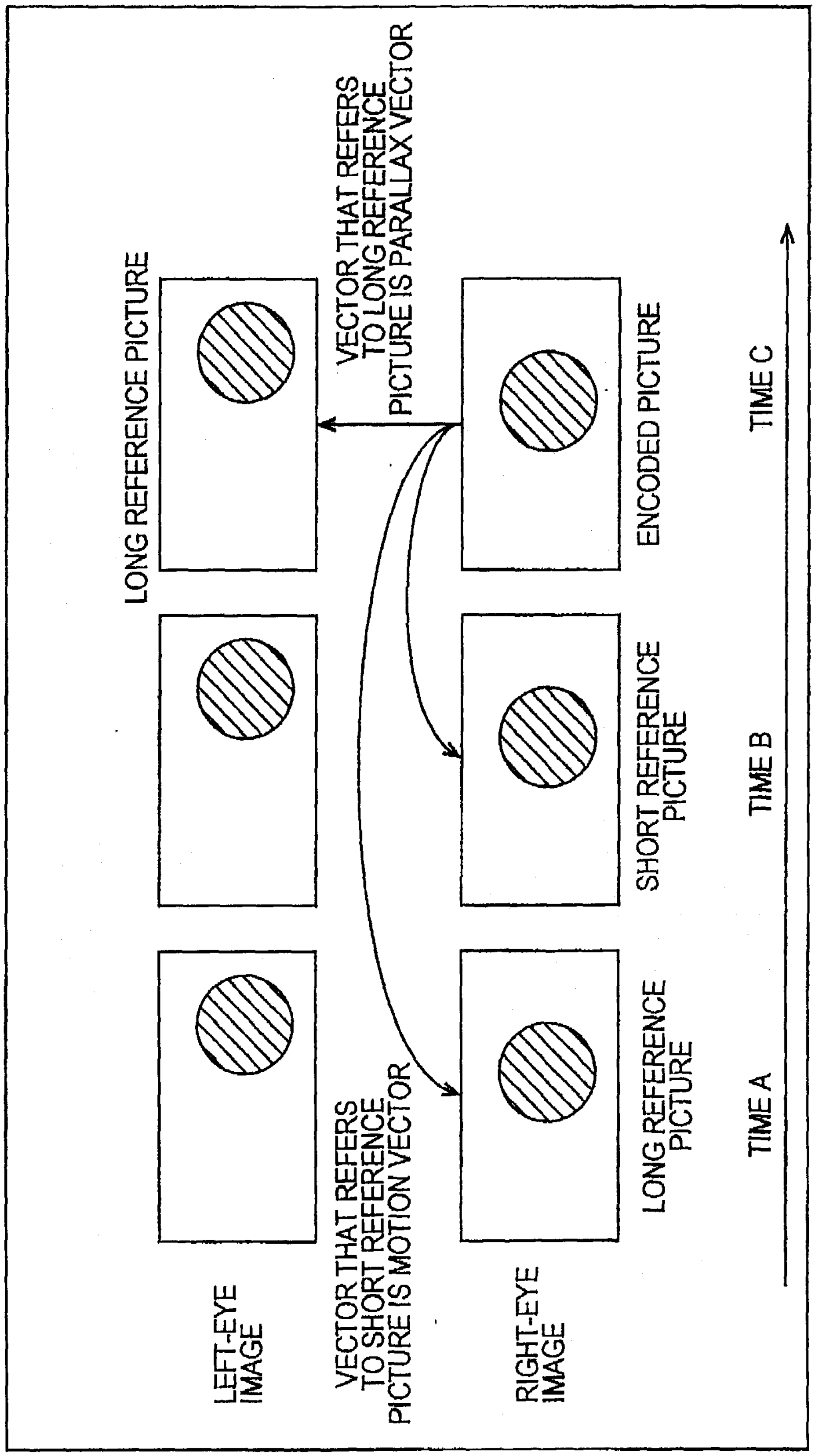

LEFT-EYE IMAGE
RIGHT-EYE IMAGE
LONG REFERENCE PICTURE
VECTOR THAT REFERS TO LONG REFERENCE PICTURE IS PARALLAX VECTOR
ENCODED PICTURE
SHORT REFERENCE PICTURE
LONG REFERENCE PICTURE
VECTOR THAT REFERS TO SHORT REFERENCE PICTURE IS MOTION VECTOR
TIME A
TIME B
TIME C

FIG. 64

FIXED BACKGROUND APPLICATION

TYPE OF REFERENCE IMAGE	VECTOR PROPERTY
SHORT REFERENCE PICTURE	MOTION VECTOR OCCURS (IS LONG) BECAUSE IT IS MAINLY REFERRED TO FOR MOVING OBJECT
LONG REFERENCE PICTURE	MOTION VECTOR IS 0 (IS SHORT) BECAUSE IT IS MAINLY REFERRED TO FOR FIXED REGION (IN PARTICULAR, OCCLUSION REGION)

A

STEREO APPLICATION

TYPE OF REFERENCE IMAGE	VECTOR PROPERTY
SHORT REFERENCE PICTURE	MOTION VECTOR OCCURS BECAUSE IT IS REFERRED TO FOR TEMPORAL PREDICTION
LONG REFERENCE PICTURE	PARALLAX VECTOR OCCURS BECAUSE IT IS REFERRED TO FOR PARALLAX PREDICTION

B

FIG. 65

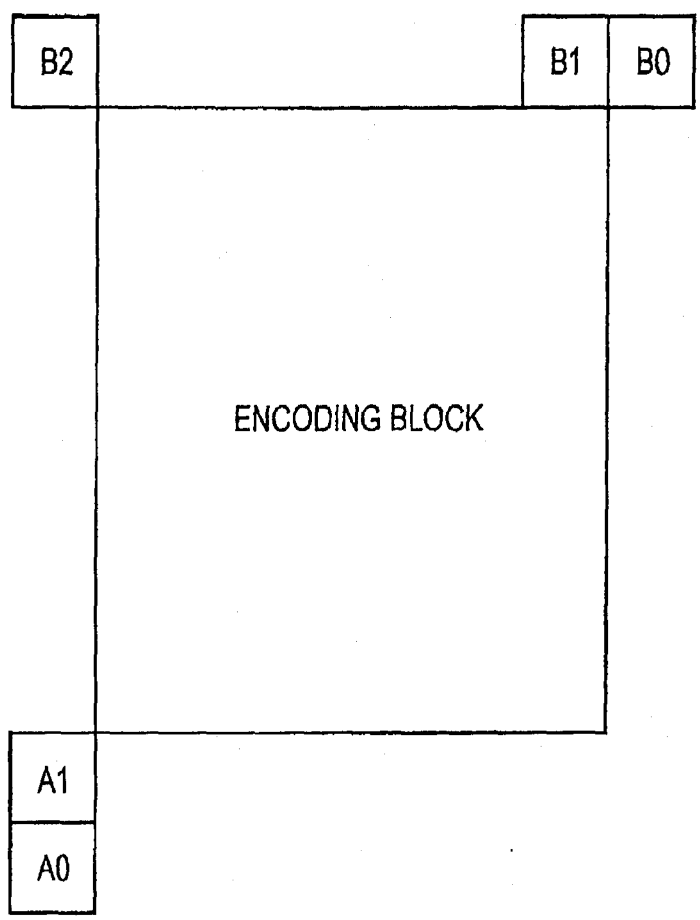


FIG. 66

Index	REFERENCE IMAGE OF ENCODING BLOCK	REFERENCE IMAGE OF TEMPORAL CORRELATION BLOCK	PRESENCE OF CANDIDATE MOTION (PARALLAX) VECTOR OF TEMPORAL CORRELATION BLOCK	SCALING OF MOTION (PARALLAX) VECTOR OF TEMPORAL CORRELATION BLOCK
1	SHORT REFERENCE PICTURE	SHORT REFERENCE PICTURE	INCLUDED IN CANDIDATE	YES
2	SHORT REFERENCE PICTURE	LONG REFERENCE PICTURE	EXCLUDED FROM CANDIDATE	—
3	LONG REFERENCE PICTURE	LONG REFERENCE PICTURE	INCLUDED IN CANDIDATE	NO
4	LONG REFERENCE PICTURE	SHORT REFERENCE PICTURE	EXCLUDED FROM CANDIDATE	—

A

Index	REFERENCE IMAGE OF ENCODING BLOCK	REFERENCE IMAGE OF NEIGHBORING BLOCK	PRESENCE OF CANDIDATE MOTION (PARALLAX) VECTOR OF NEIGHBORING BLOCK	SCALING OF MOTION (PARALLAX) VECTOR OF NEIGHBORING BLOCK
1	SHORT REFERENCE PICTURE	SHORT REFERENCE PICTURE	INCLUDED IN CANDIDATE	YES
2	SHORT REFERENCE PICTURE	LONG REFERENCE PICTURE	EXCLUDED FROM CANDIDATE	—
3	LONG REFERENCE PICTURE	LONG REFERENCE PICTURE	INCLUDED IN CANDIDATE	NO
4	LONG REFERENCE PICTURE	SHORT REFERENCE PICTURE	EXCLUDED FROM CANDIDATE	—

B

FIG. 67

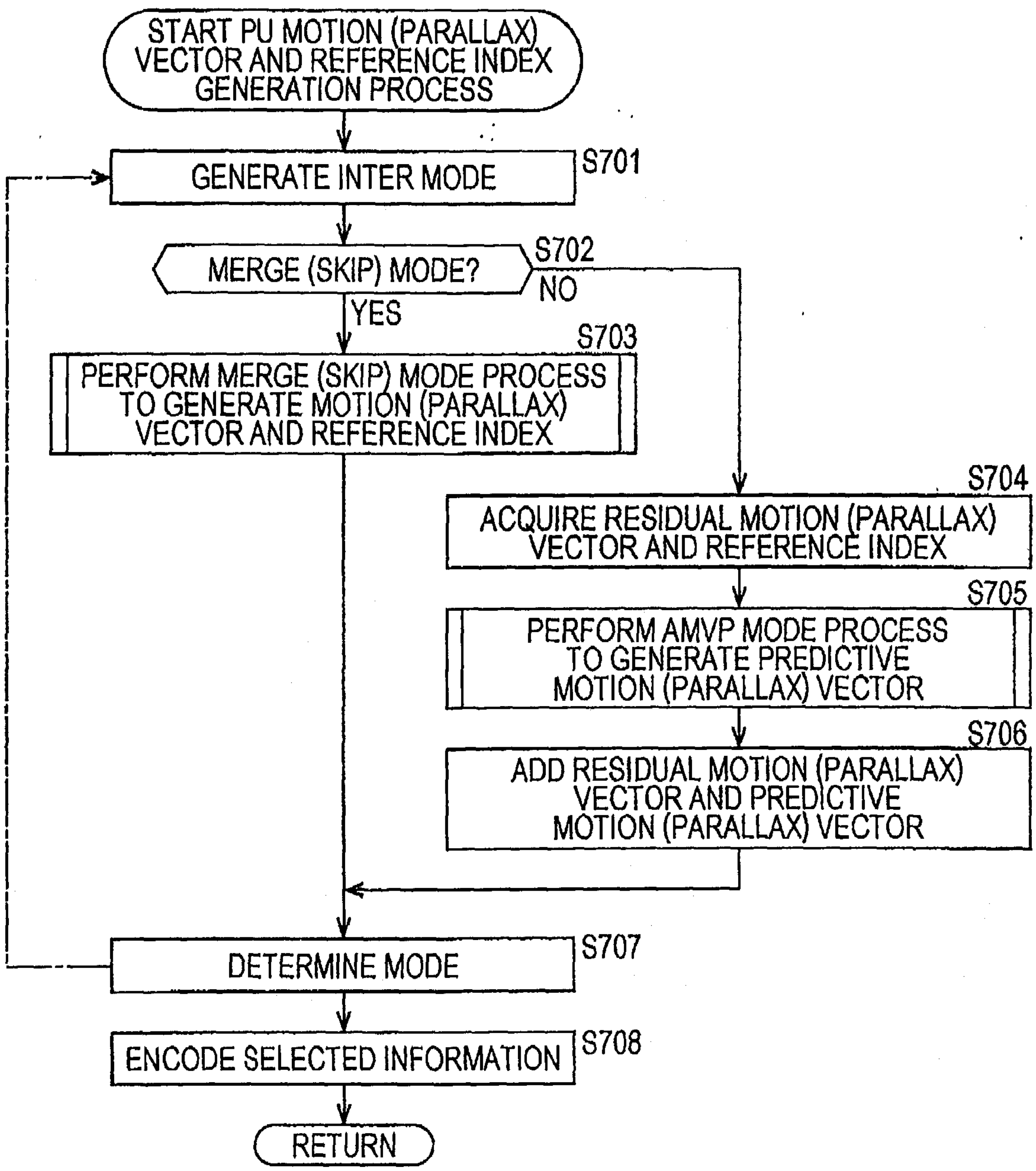

START PU MOTION (PARALLAX) VECTOR AND REFERENCE INDEX GENERATION PROCESS
S701
GENERATE INTER MODE
S702
MERGE (SKIP) MODE?
NO
YES
S703
PERFORM MERGE (SKIP) MODE PROCESS TO GENERATE MOTION (PARALLAX) VECTOR AND REFERENCE INDEX
S704
ACQUIRE RESIDUAL MOTION (PARALLAX) VECTOR AND REFERENCE INDEX
S705
PERFORM AMVP MODE PROCESS TO GENERATE PREDICTIVE MOTION (PARALLAX) VECTOR
S706
ADD RESIDUAL MOTION (PARALLAX) VECTOR AND PREDICTIVE MOTION (PARALLAX) VECTOR
S707
DETERMINE MODE
S708
ENCODE SELECTED INFORMATION
RETURN

FIG. 68

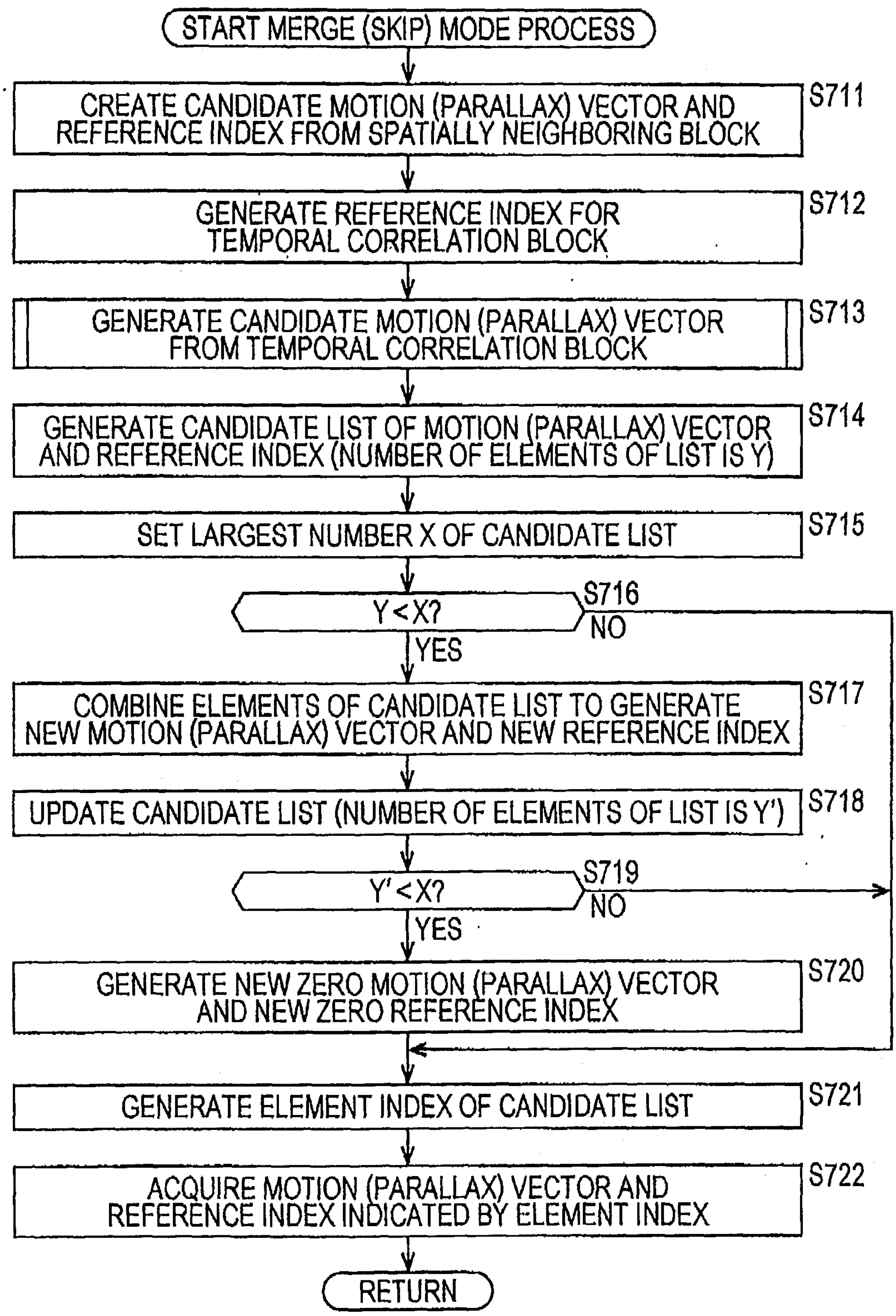

START MERGE (SKIP) MODE PROCESS
CREATE CANDIDATE MOTION (PARALLAX) VECTOR AND REFERENCE INDEX FROM SPATIALLY NEIGHBORING BLOCK
S711
GENERATE REFERENCE INDEX FOR TEMPORAL CORRELATION BLOCK
S712
GENERATE CANDIDATE MOTION (PARALLAX) VECTOR FROM TEMPORAL CORRELATION BLOCK
S713
GENERATE CANDIDATE LIST OF MOTION (PARALLAX) VECTOR AND REFERENCE INDEX (NUMBER OF ELEMENTS OF LIST IS Y)
S714
SET LARGEST NUMBER X OF CANDIDATE LIST
S715
Y<X?
S716
NO
YES
COMBINE ELEMENTS OF CANDIDATE LIST TO GENERATE NEW MOTION (PARALLAX) VECTOR AND NEW REFERENCE INDEX
S717
UPDATE CANDIDATE LIST (NUMBER OF ELEMENTS OF LIST IS Y')
S718
Y'<X?
S719
NO
YES
GENERATE NEW ZERO MOTION (PARALLAX) VECTOR AND NEW ZERO REFERENCE INDEX
S720
GENERATE ELEMENT INDEX OF CANDIDATE LIST
S721
ACQUIRE MOTION (PARALLAX) VECTOR AND REFERENCE INDEX INDICATED BY ELEMENT INDEX
S722
RETURN

FIG. 69

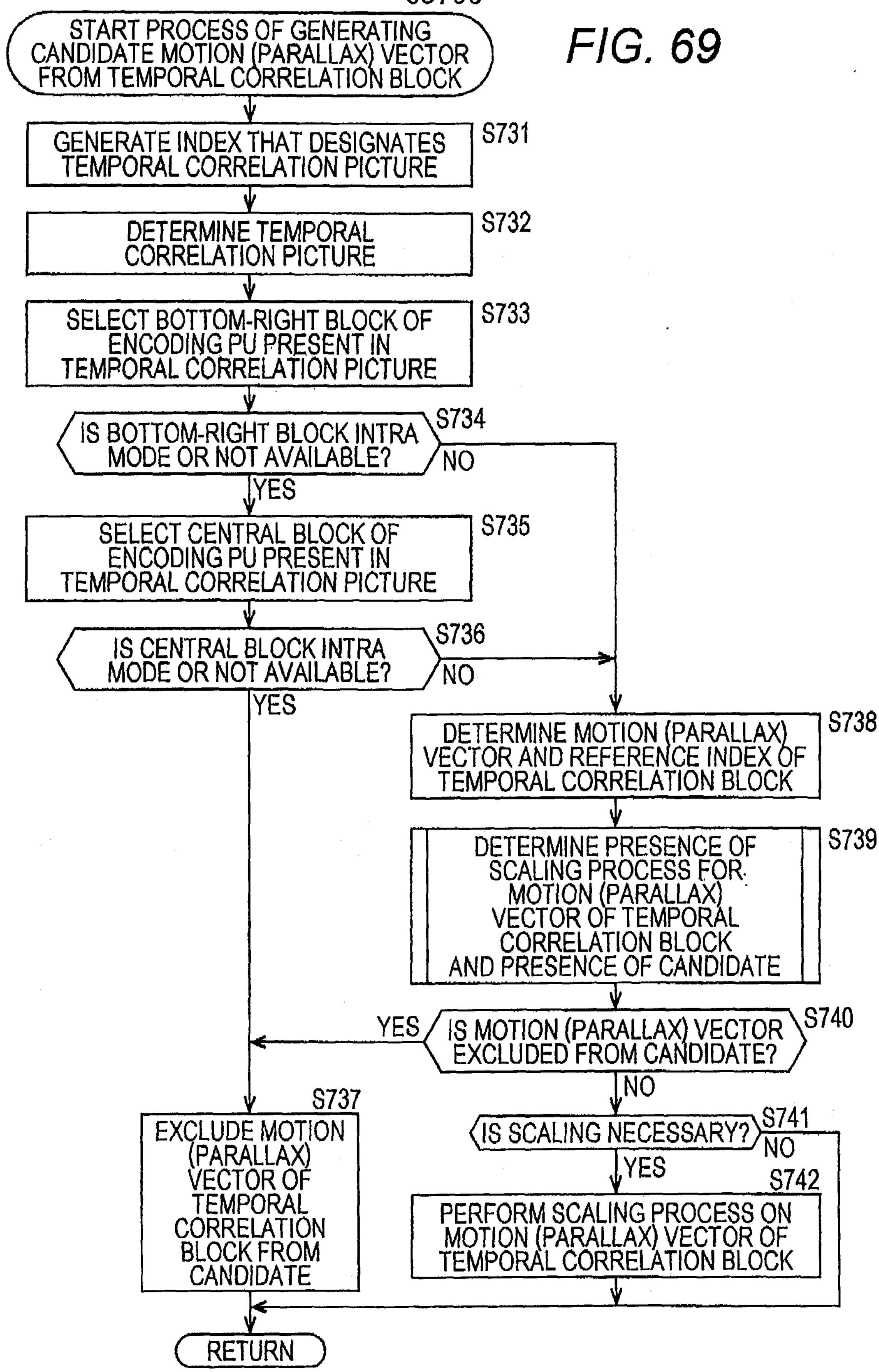

START PROCESS OF GENERATING CANDIDATE MOTION (PARALLAX) VECTOR FROM TEMPORAL CORRELATION BLOCK
GENERATE INDEX THAT DESIGNATES TEMPORAL CORRELATION PICTURE
S731
DETERMINE TEMPORAL CORRELATION PICTURE
S732
SELECT BOTTOM-RIGHT BLOCK OF ENCODING PU PRESENT IN TEMPORAL CORRELATION PICTURE
S733
IS BOTTOM-RIGHT BLOCK INTRA MODE OR NOT AVAILABLE?
S734
NO
YES
SELECT CENTRAL BLOCK OF ENCODING PU PRESENT IN TEMPORAL CORRELATION PICTURE
S735
IS CENTRAL BLOCK INTRA MODE OR NOT AVAILABLE?
S736
NO
YES
DETERMINE MOTION (PARALLAX) VECTOR AND REFERENCE INDEX OF TEMPORAL CORRELATION BLOCK
S738
DETERMINE PRESENCE OF SCALING PROCESS FOR MOTION (PARALLAX) VECTOR OF TEMPORAL CORRELATION BLOCK AND PRESENCE OF CANDIDATE
S739
IS MOTION (PARALLAX) VECTOR EXCLUDED FROM CANDIDATE?
S740
YES
NO
S737
EXCLUDE MOTION (PARALLAX) VECTOR OF TEMPORAL CORRELATION BLOCK FROM CANDIDATE
IS SCALING NECESSARY?
S741
NO
YES
S742
PERFORM SCALING PROCESS ON MOTION (PARALLAX) VECTOR OF TEMPORAL CORRELATION BLOCK
RETURN

FIG. 70

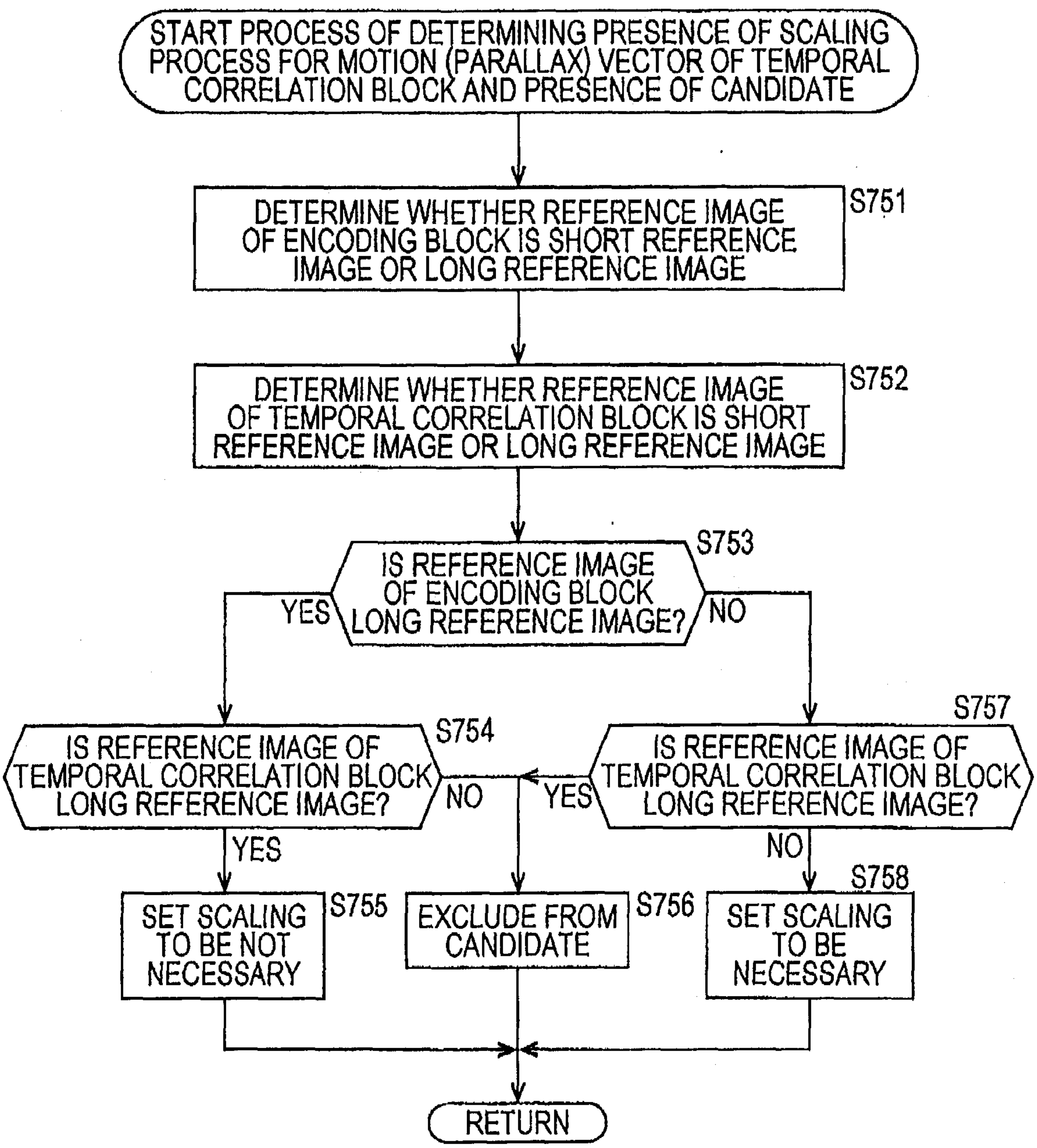

START PROCESS OF DETERMINING PRESENCE OF SCALING PROCESS FOR MOTION (PARALLAX) VECTOR OF TEMPORAL CORRELATION BLOCK AND PRESENCE OF CANDIDATE
DETERMINE WHETHER REFERENCE IMAGE OF ENCODING BLOCK IS SHORT REFERENCE IMAGE OR LONG REFERENCE IMAGE
S751
DETERMINE WHETHER REFERENCE IMAGE OF TEMPORAL CORRELATION BLOCK IS SHORT REFERENCE IMAGE OR LONG REFERENCE IMAGE
S752
IS REFERENCE IMAGE OF ENCODING BLOCK LONG REFERENCE IMAGE?
S753
YES
NO
IS REFERENCE IMAGE OF TEMPORAL CORRELATION BLOCK LONG REFERENCE IMAGE?
S754
NO
YES
IS REFERENCE IMAGE OF TEMPORAL CORRELATION BLOCK LONG REFERENCE IMAGE?
S757
YES
NO
SET SCALING TO BE NOT NECESSARY
S755
EXCLUDE FROM CANDIDATE
S756
SET SCALING TO BE NECESSARY
S758
RETURN

FIG. 71

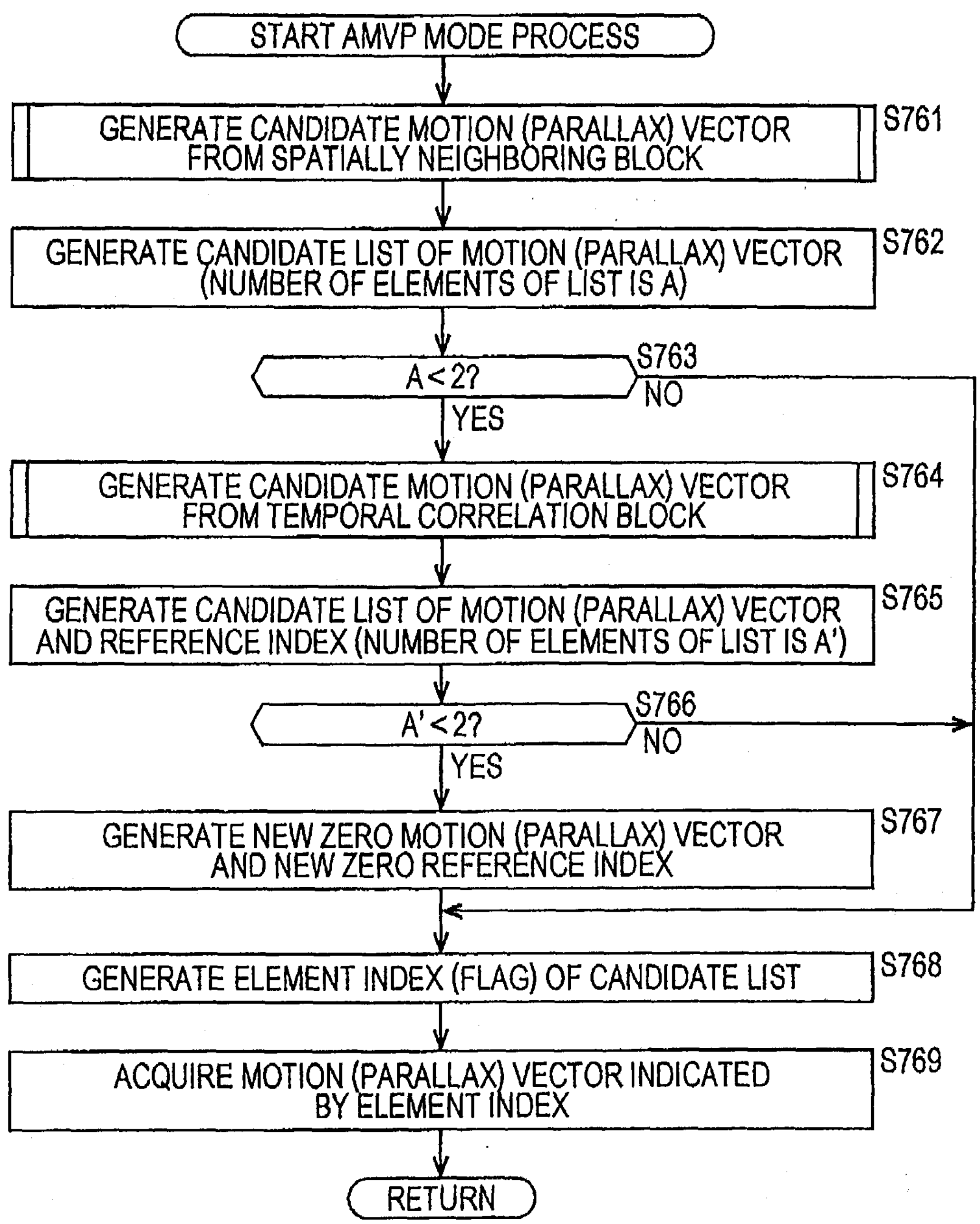

START AMVP MODE PROCESS
GENERATE CANDIDATE MOTION (PARALLAX) VECTOR FROM SPATIALLY NEIGHBORING BLOCK
S761
GENERATE CANDIDATE LIST OF MOTION (PARALLAX) VECTOR (NUMBER OF ELEMENTS OF LIST IS A)
S762
A<2?
S763
NO
YES
GENERATE CANDIDATE MOTION (PARALLAX) VECTOR FROM TEMPORAL CORRELATION BLOCK
S764
GENERATE CANDIDATE LIST OF MOTION (PARALLAX) VECTOR AND REFERENCE INDEX (NUMBER OF ELEMENTS OF LIST IS A')
S765
A'<2?
S766
NO
YES
GENERATE NEW ZERO MOTION (PARALLAX) VECTOR AND NEW ZERO REFERENCE INDEX
S767
GENERATE ELEMENT INDEX (FLAG) OF CANDIDATE LIST
S768
ACQUIRE MOTION (PARALLAX) VECTOR INDICATED BY ELEMENT INDEX
S769
RETURN

FIG. 72

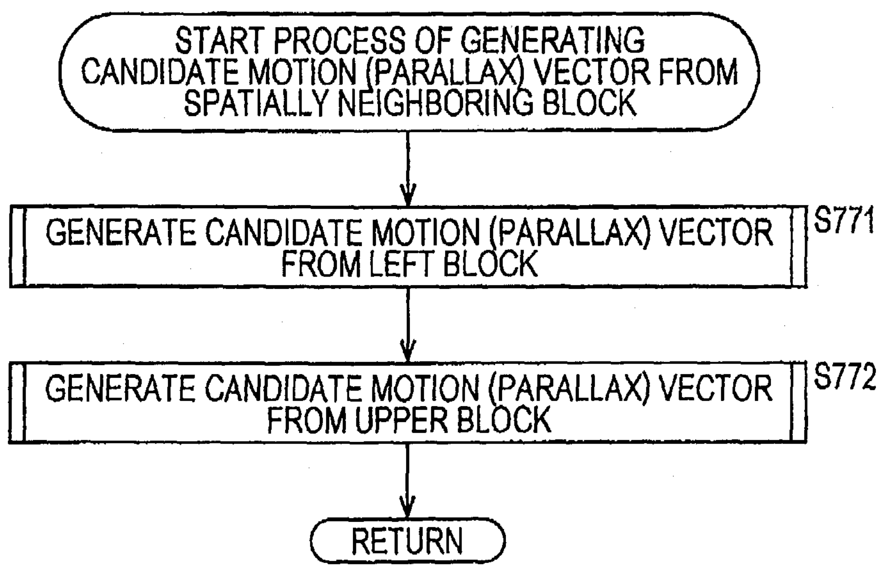

START PROCESS OF GENERATING CANDIDATE MOTION (PARALLAX) VECTOR FROM SPATIALLY NEIGHBORING BLOCK
GENERATE CANDIDATE MOTION (PARALLAX) VECTOR FROM LEFT BLOCK
S771
GENERATE CANDIDATE MOTION (PARALLAX) VECTOR FROM UPPER BLOCK
S772
RETURN

FIG. 73

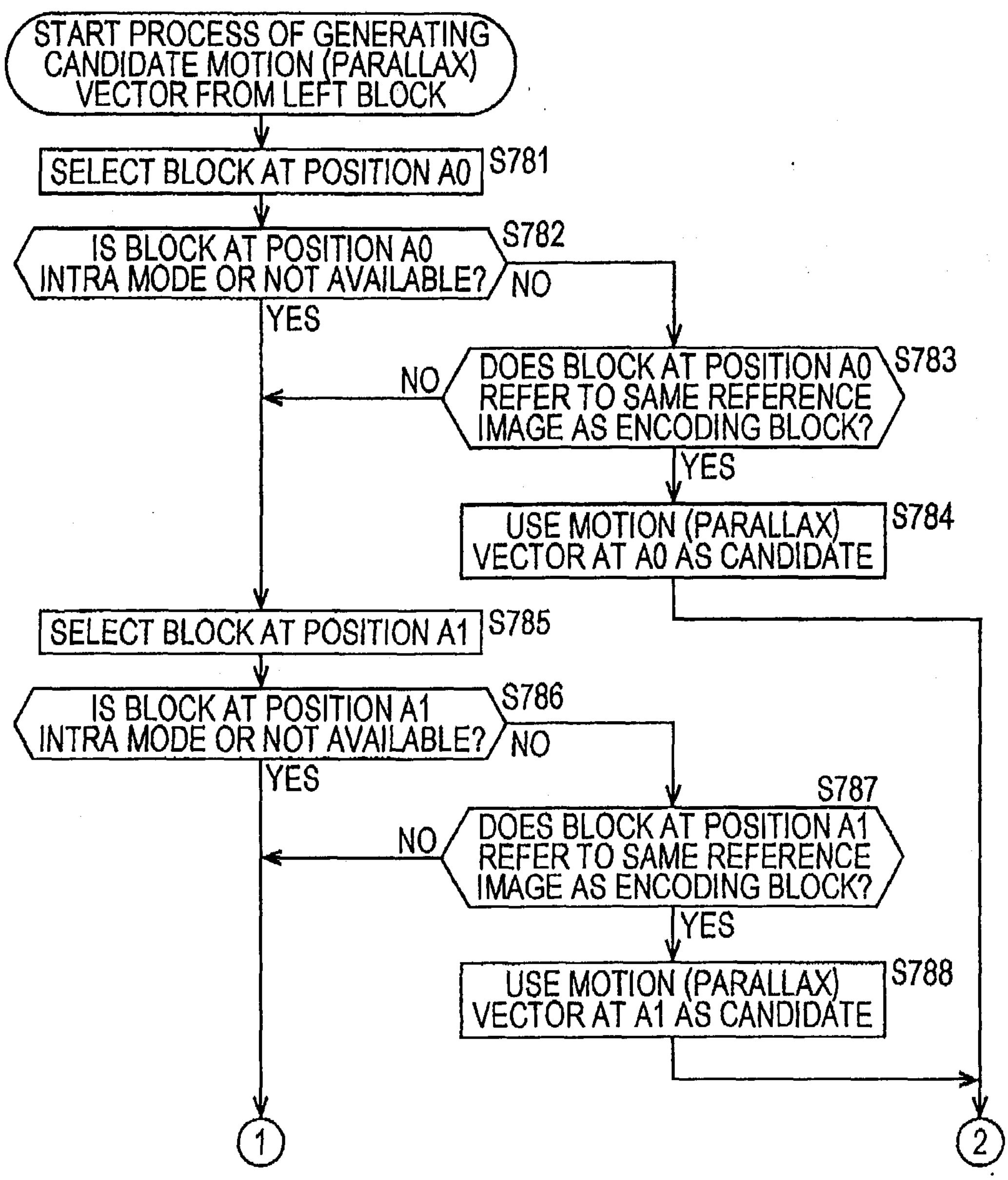

START PROCESS OF GENERATING CANDIDATE MOTION (PARALLAX) VECTOR FROM LEFT BLOCK
SELECT BLOCK AT POSITION A0
S781
IS BLOCK AT POSITION A0 INTRA MODE OR NOT AVAILABLE?
S782
NO
YES
DOES BLOCK AT POSITION A0 REFER TO SAME REFERENCE IMAGE AS ENCODING BLOCK?
S783
NO
YES
USE MOTION (PARALLAX) VECTOR AT A0 AS CANDIDATE
S784
SELECT BLOCK AT POSITION A1
S785
IS BLOCK AT POSITION A1 INTRA MODE OR NOT AVAILABLE?
S786
NO
YES
DOES BLOCK AT POSITION A1 REFER TO SAME REFERENCE IMAGE AS ENCODING BLOCK?
S787
NO
YES
USE MOTION (PARALLAX) VECTOR AT A1 AS CANDIDATE
S788
1
2

FIG. 74

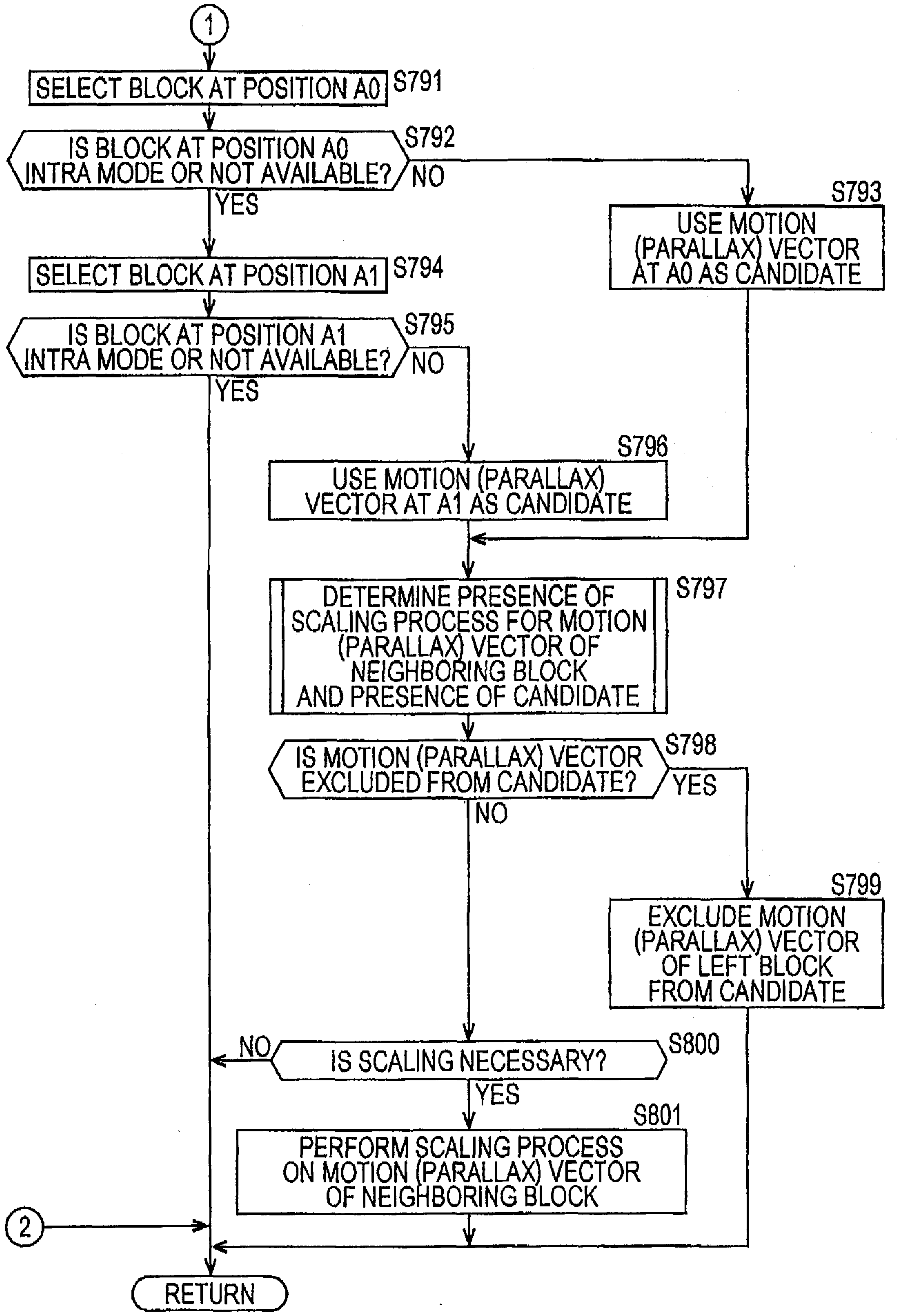

1
SELECT BLOCK AT POSITION A0
S791
IS BLOCK AT POSITION A0 INTRA MODE OR NOT AVAILABLE?
S792
NO
YES
S793
USE MOTION (PARALLAX) VECTOR AT A0 AS CANDIDATE
SELECT BLOCK AT POSITION A1
S794
IS BLOCK AT POSITION A1 INTRA MODE OR NOT AVAILABLE?
S795
NO
YES
S796
USE MOTION (PARALLAX) VECTOR AT A1 AS CANDIDATE
DETERMINE PRESENCE OF SCALING PROCESS FOR MOTION (PARALLAX) VECTOR OF NEIGHBORING BLOCK AND PRESENCE OF CANDIDATE
S797
IS MOTION (PARALLAX) VECTOR EXCLUDED FROM CANDIDATE?
S798
YES
NO
S799
EXCLUDE MOTION (PARALLAX) VECTOR OF LEFT BLOCK FROM CANDIDATE
NO
IS SCALING NECESSARY?
S800
YES
S801
PERFORM SCALING PROCESS ON MOTION (PARALLAX) VECTOR OF NEIGHBORING BLOCK
2
RETURN

FIG. 75

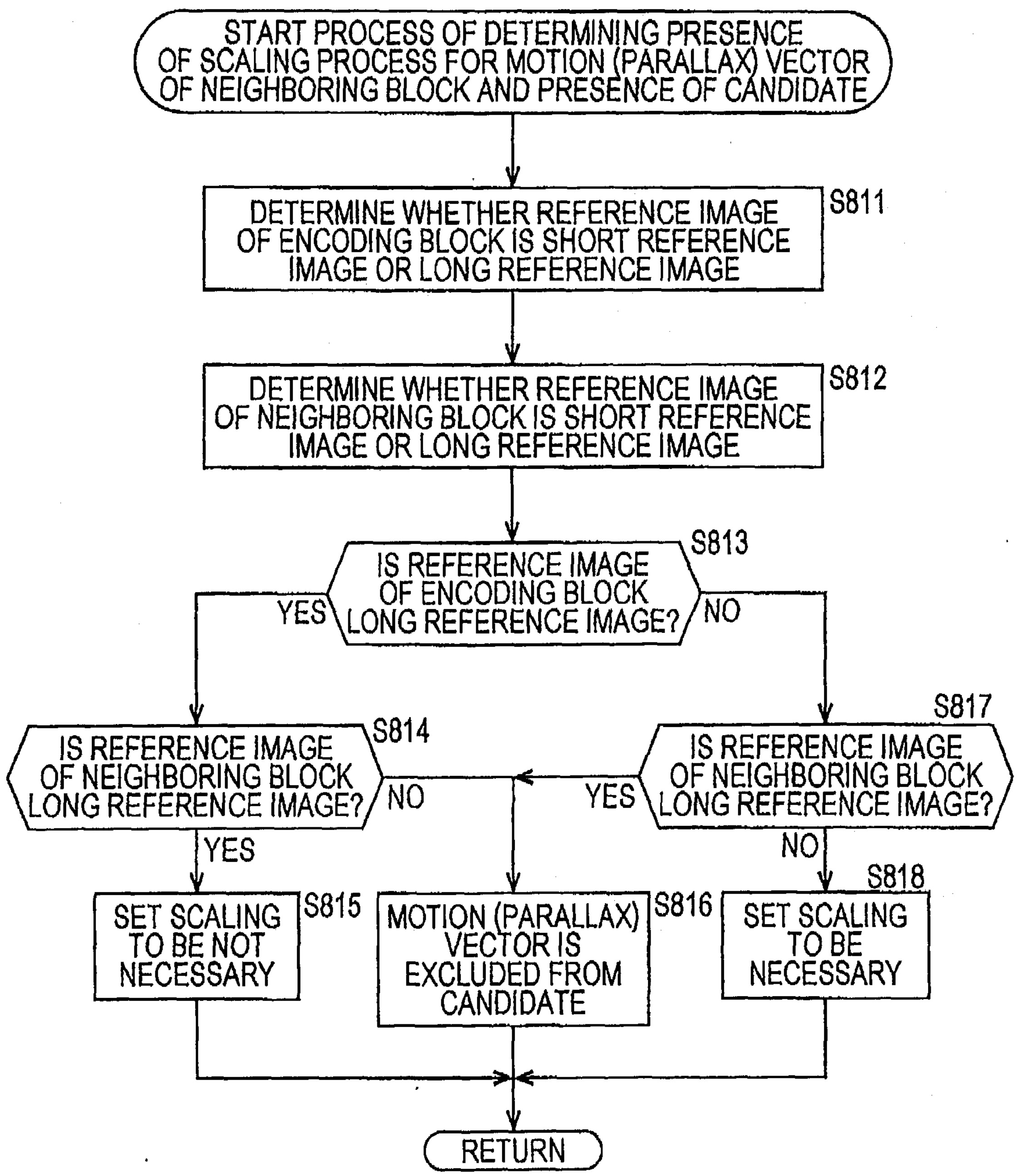

START PROCESS OF DETERMINING PRESENCE OF SCALING PROCESS FOR MOTION (PARALLAX) VECTOR OF NEIGHBORING BLOCK AND PRESENCE OF CANDIDATE
DETERMINE WHETHER REFERENCE IMAGE OF ENCODING BLOCK IS SHORT REFERENCE IMAGE OR LONG REFERENCE IMAGE
S811
DETERMINE WHETHER REFERENCE IMAGE OF NEIGHBORING BLOCK IS SHORT REFERENCE IMAGE OR LONG REFERENCE IMAGE
S812
IS REFERENCE IMAGE OF ENCODING BLOCK LONG REFERENCE IMAGE?
S813
YES
NO
IS REFERENCE IMAGE OF NEIGHBORING BLOCK LONG REFERENCE IMAGE?
S814
NO
YES
IS REFERENCE IMAGE OF NEIGHBORING BLOCK LONG REFERENCE IMAGE?
S817
YES
NO
SET SCALING TO BE NOT NECESSARY
S815
MOTION (PARALLAX) VECTOR IS EXCLUDED FROM CANDIDATE
S816
SET SCALING TO BE NECESSARY
S818
RETURN

FIG. 76

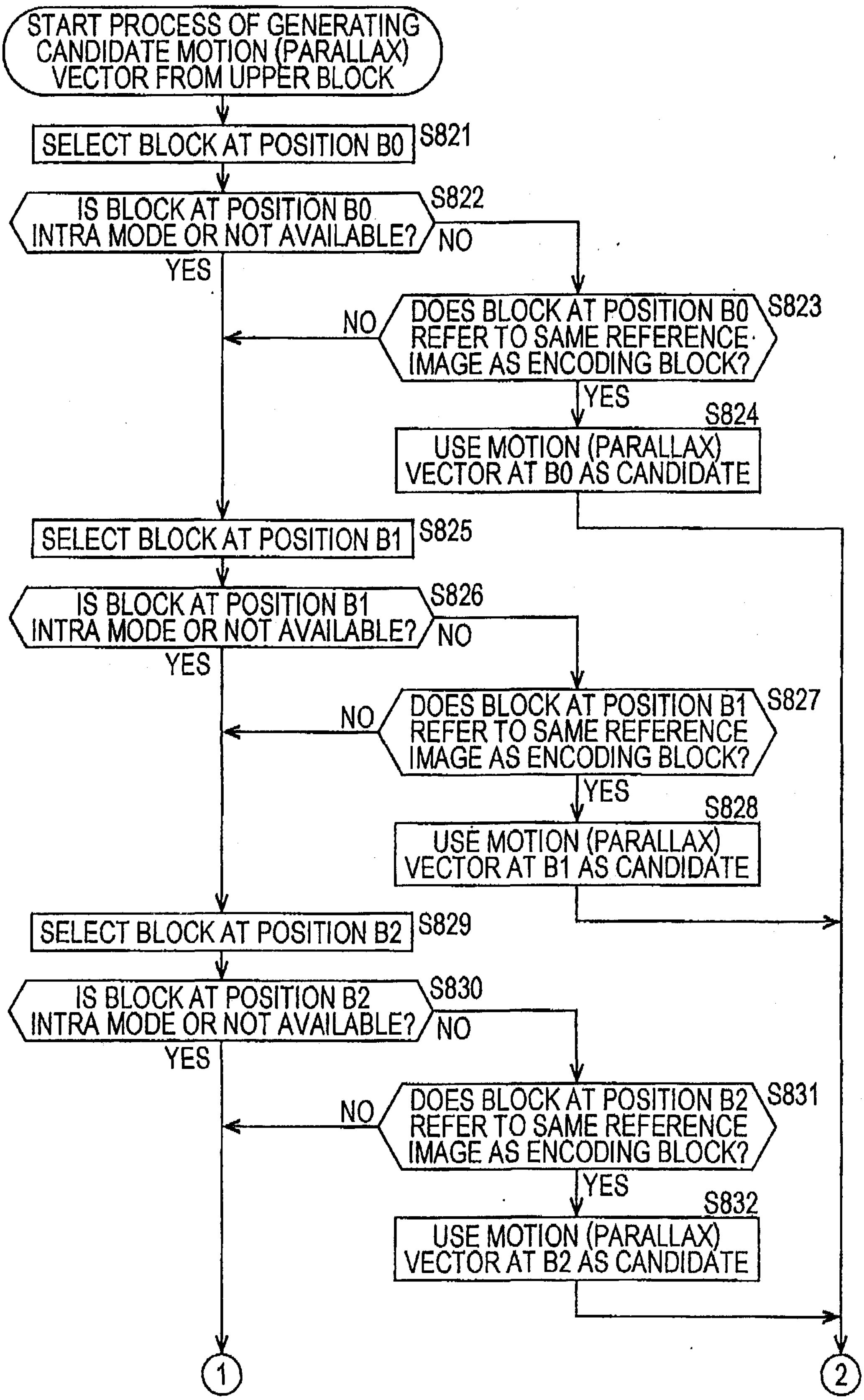

START PROCESS OF GENERATING CANDIDATE MOTION (PARALLAX) VECTOR FROM UPPER BLOCK
SELECT BLOCK AT POSITION B0
S821
IS BLOCK AT POSITION B0 INTRA MODE OR NOT AVAILABLE?
S822
YES
NO
DOES BLOCK AT POSITION B0 REFER TO SAME REFERENCE IMAGE AS ENCODING BLOCK?
S823
NO
YES
USE MOTION (PARALLAX) VECTOR AT B0 AS CANDIDATE
S824
SELECT BLOCK AT POSITION B1
S825
IS BLOCK AT POSITION B1 INTRA MODE OR NOT AVAILABLE?
S826
YES
NO
DOES BLOCK AT POSITION B1 REFER TO SAME REFERENCE IMAGE AS ENCODING BLOCK?
S827
NO
YES
USE MOTION (PARALLAX) VECTOR AT B1 AS CANDIDATE
S828
SELECT BLOCK AT POSITION B2
S829
IS BLOCK AT POSITION B2 INTRA MODE OR NOT AVAILABLE?
S830
YES
NO
DOES BLOCK AT POSITION B2 REFER TO SAME REFERENCE IMAGE AS ENCODING BLOCK?
S831
NO
YES
USE MOTION (PARALLAX) VECTOR AT B2 AS CANDIDATE
S832
1
2

FIG. 77

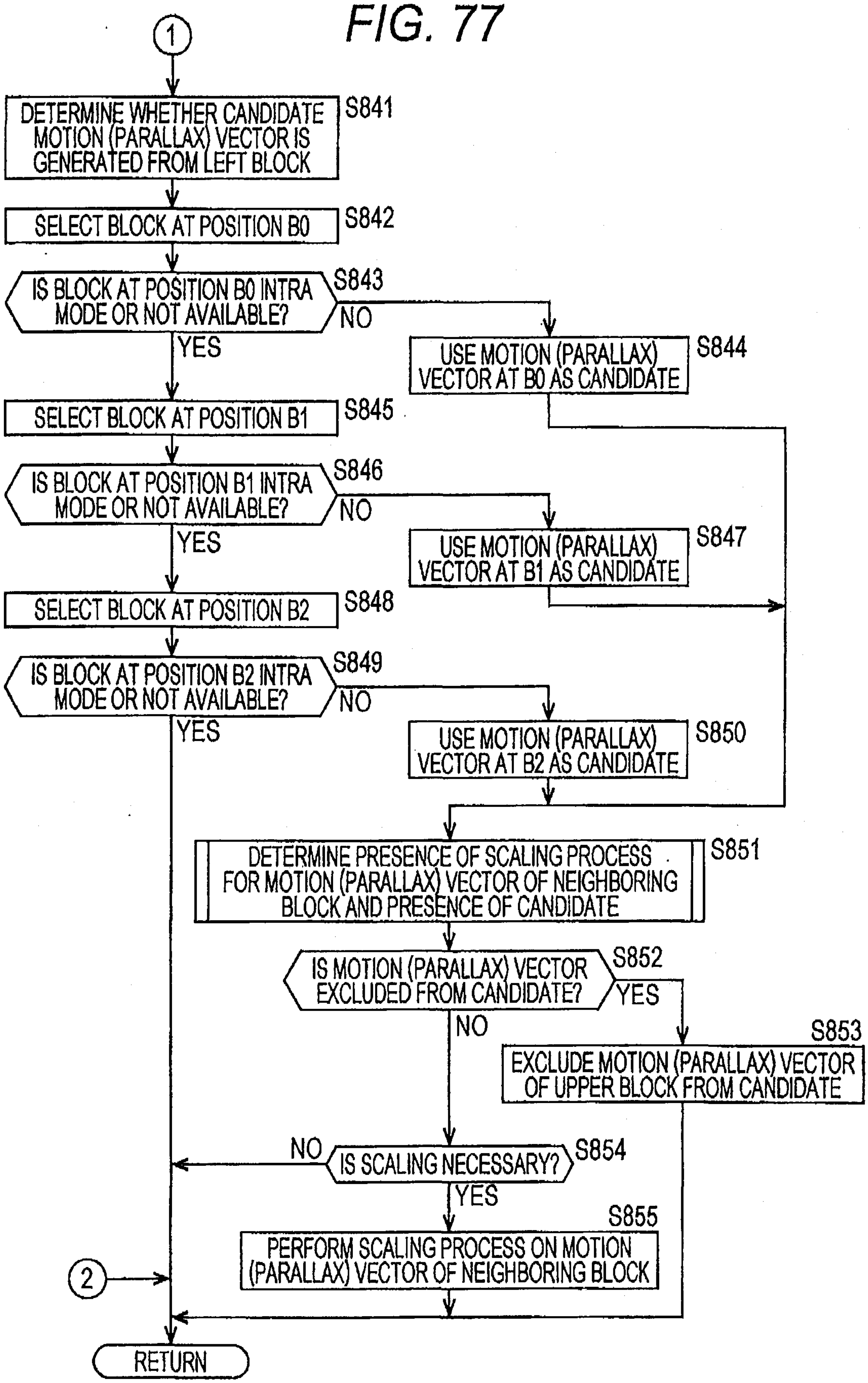

1
DETERMINE WHETHER CANDIDATE MOTION (PARALLAX) VECTOR IS GENERATED FROM LEFT BLOCK
S841
SELECT BLOCK AT POSITION B0
S842
IS BLOCK AT POSITION B0 INTRA MODE OR NOT AVAILABLE?
S843
NO
YES
USE MOTION (PARALLAX) VECTOR AT B0 AS CANDIDATE
S844
SELECT BLOCK AT POSITION B1
S845
IS BLOCK AT POSITION B1 INTRA MODE OR NOT AVAILABLE?
S846
NO
YES
USE MOTION (PARALLAX) VECTOR AT B1 AS CANDIDATE
S847
SELECT BLOCK AT POSITION B2
S848
IS BLOCK AT POSITION B2 INTRA MODE OR NOT AVAILABLE?
S849
NO
YES
USE MOTION (PARALLAX) VECTOR AT B2 AS CANDIDATE
S850
DETERMINE PRESENCE OF SCALING PROCESS FOR MOTION (PARALLAX) VECTOR OF NEIGHBORING BLOCK AND PRESENCE OF CANDIDATE
S851
IS MOTION (PARALLAX) VECTOR EXCLUDED FROM CANDIDATE?
S852
YES
NO
S853
EXCLUDE MOTION (PARALLAX) VECTOR OF UPPER BLOCK FROM CANDIDATE
NO
IS SCALING NECESSARY?
S854
YES
S855
PERFORM SCALING PROCESS ON MOTION (PARALLAX) VECTOR OF NEIGHBORING BLOCK
2
RETURN

FIG. 78

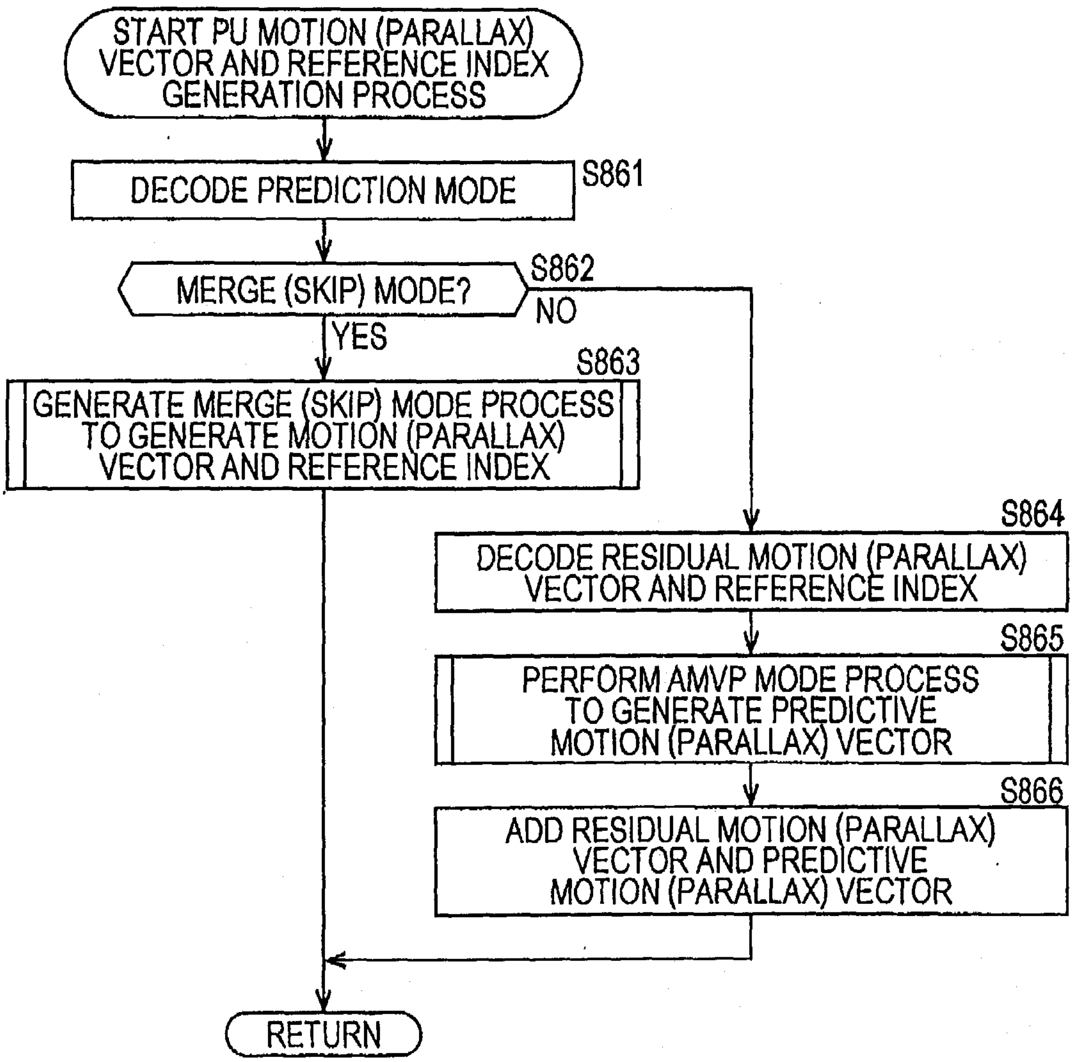
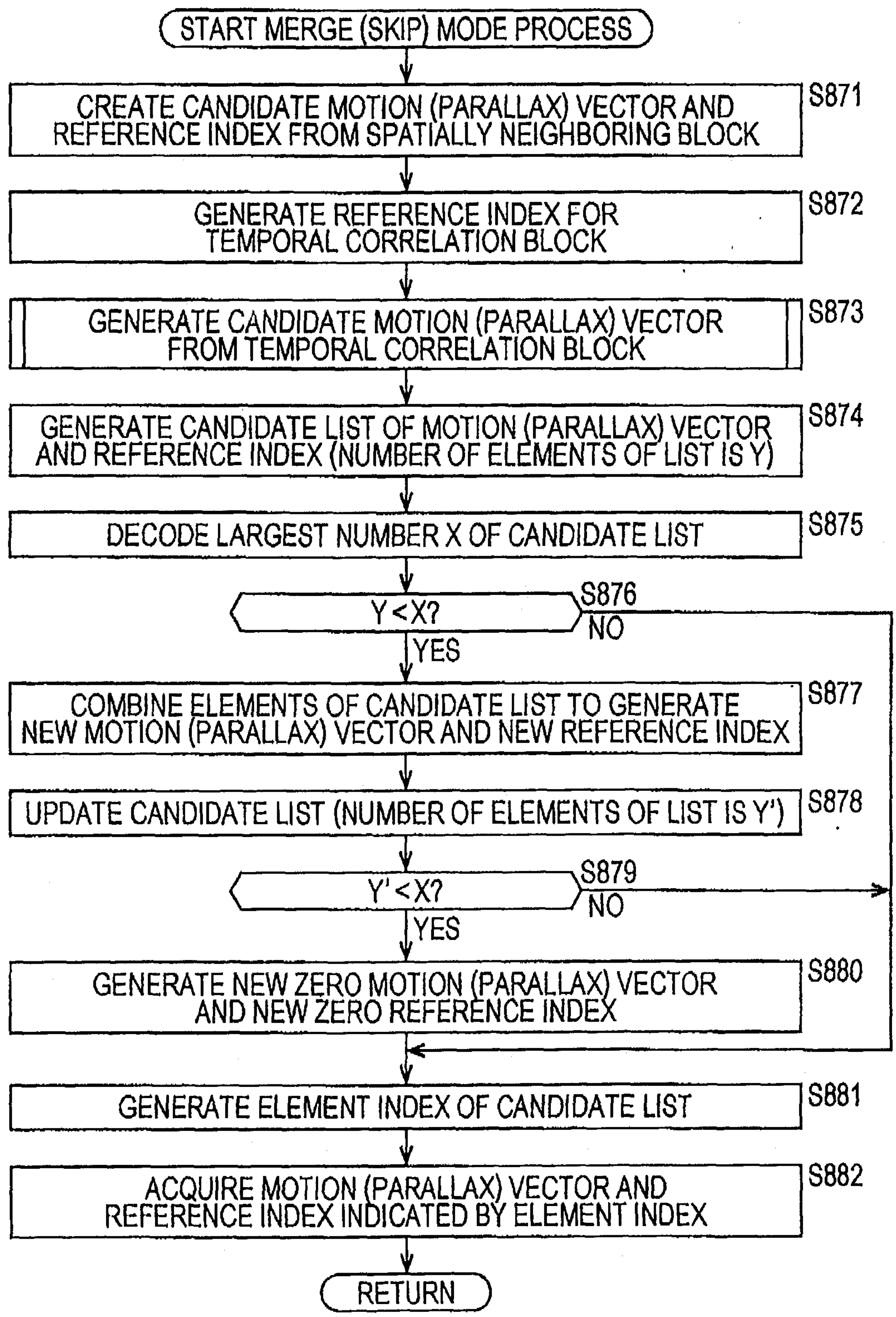

START PU MOTION (PARALLAX) VECTOR AND REFERENCE INDEX GENERATION PROCESS
DECODE PREDICTION MODE
S861
MERGE (SKIP) MODE?
S862
NO
YES
S863
GENERATE MERGE (SKIP) MODE PROCESS TO GENERATE MOTION (PARALLAX) VECTOR AND REFERENCE INDEX
S864
DECODE RESIDUAL MOTION (PARALLAX) VECTOR AND REFERENCE INDEX
S865
PERFORM AMVP MODE PROCESS TO GENERATE PREDICTIVE MOTION (PARALLAX) VECTOR
S866
ADD RESIDUAL MOTION (PARALLAX) VECTOR AND PREDICTIVE MOTION (PARALLAX) VECTOR
RETURN

FIG. 79


START MERGE (SKIP) MODE PROCESS
CREATE CANDIDATE MOTION (PARALLAX) VECTOR AND REFERENCE INDEX FROM SPATIALLY NEIGHBORING BLOCK
S871
GENERATE REFERENCE INDEX FOR TEMPORAL CORRELATION BLOCK
S872
GENERATE CANDIDATE MOTION (PARALLAX) VECTOR FROM TEMPORAL CORRELATION BLOCK
S873
GENERATE CANDIDATE LIST OF MOTION (PARALLAX) VECTOR AND REFERENCE INDEX (NUMBER OF ELEMENTS OF LIST IS Y)
S874
DECODE LARGEST NUMBER X OF CANDIDATE LIST
S875
Y<X?
S876
NO
YES
COMBINE ELEMENTS OF CANDIDATE LIST TO GENERATE NEW MOTION (PARALLAX) VECTOR AND NEW REFERENCE INDEX
S877
UPDATE CANDIDATE LIST (NUMBER OF ELEMENTS OF LIST IS Y')
S878
Y'<X?
S879
NO
YES
GENERATE NEW ZERO MOTION (PARALLAX) VECTOR AND NEW ZERO REFERENCE INDEX
S880
GENERATE ELEMENT INDEX OF CANDIDATE LIST
S881
ACQUIRE MOTION (PARALLAX) VECTOR AND REFERENCE INDEX INDICATED BY ELEMENT INDEX
S882
RETURN

SP333690

FIG. 80

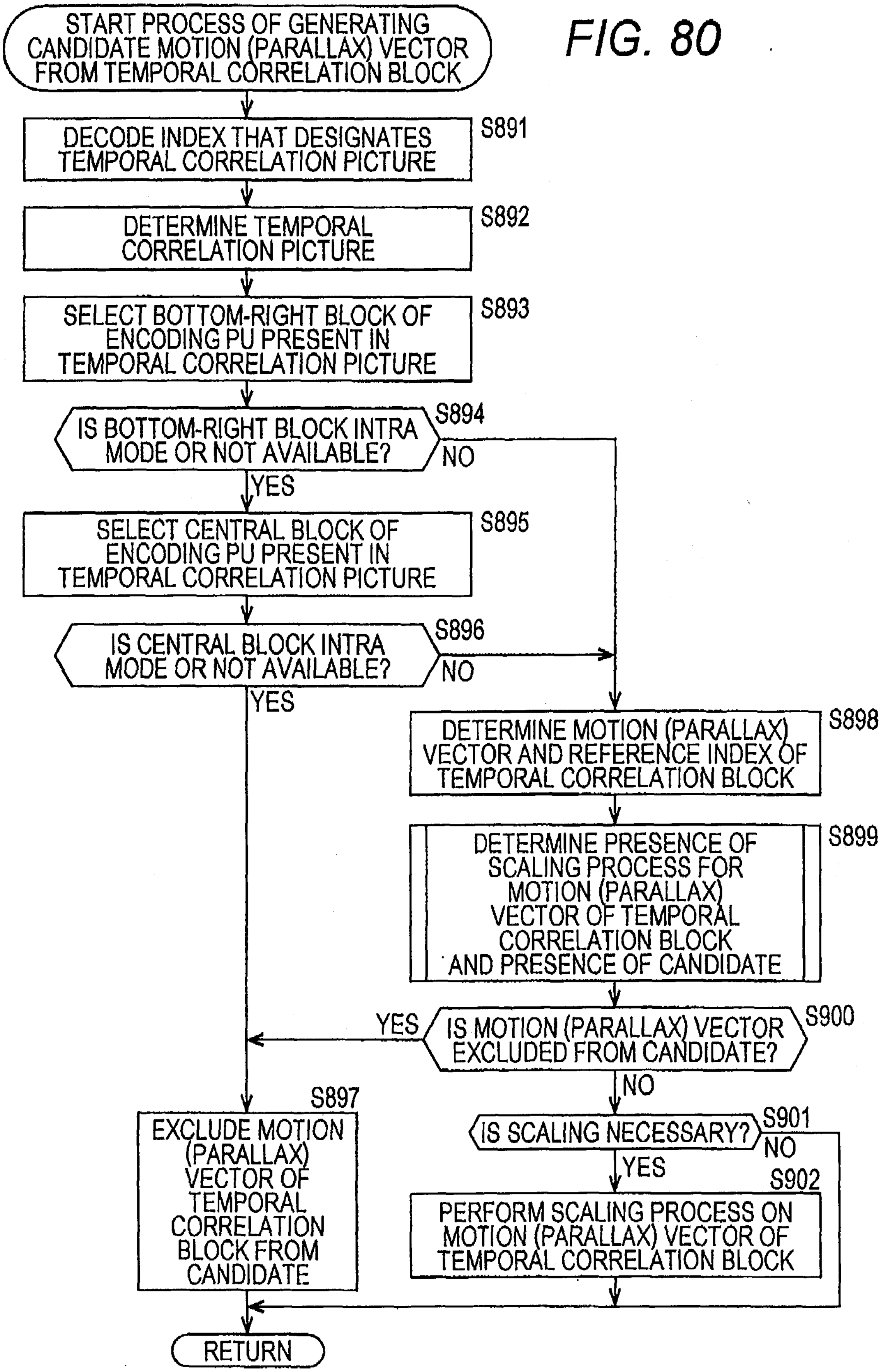


FIG. 81

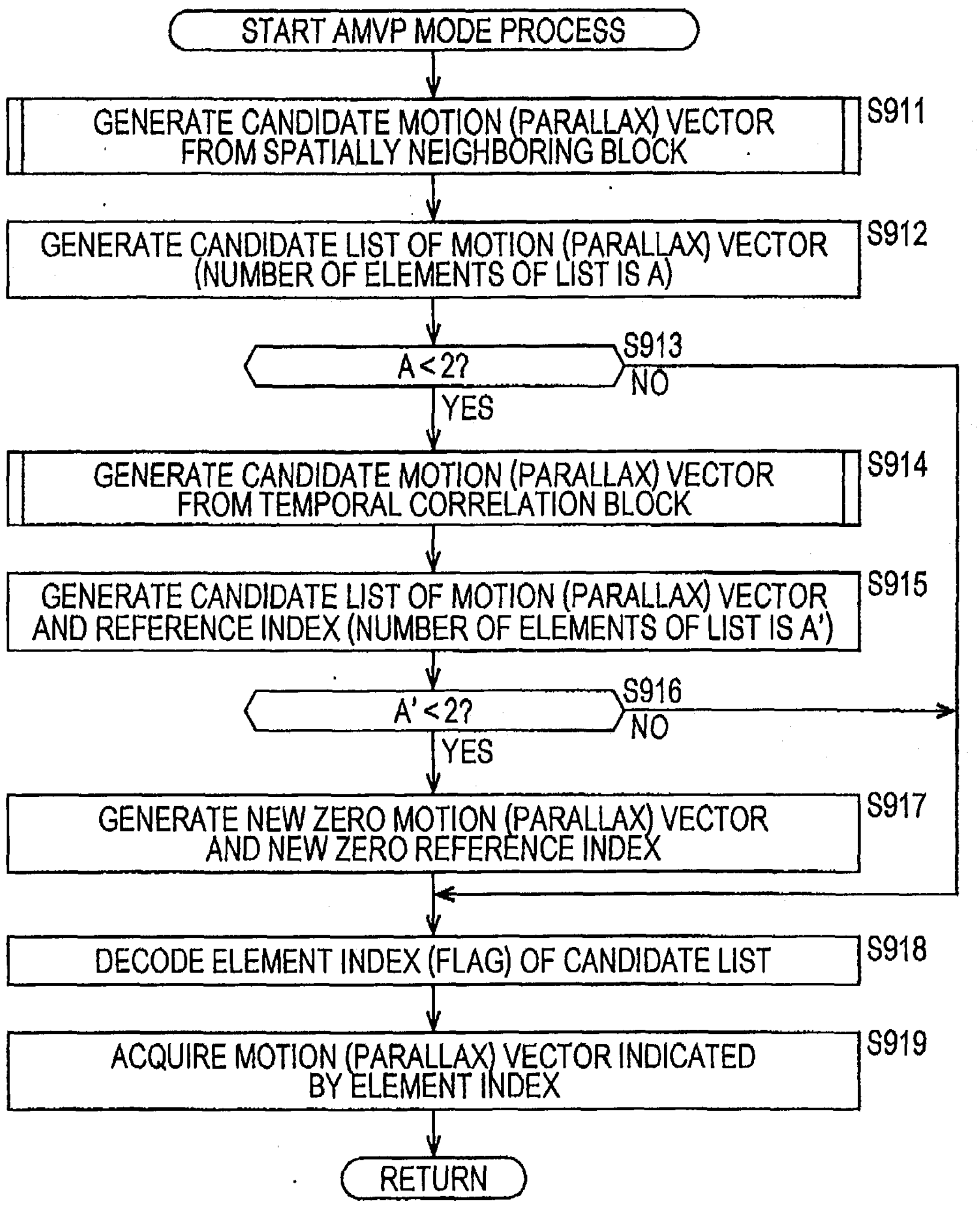

START AMVP MODE PROCESS
GENERATE CANDIDATE MOTION (PARALLAX) VECTOR FROM SPATIALLY NEIGHBORING BLOCK
S911
GENERATE CANDIDATE LIST OF MOTION (PARALLAX) VECTOR (NUMBER OF ELEMENTS OF LIST IS A)
S912
A<2?
S913
NO
YES
GENERATE CANDIDATE MOTION (PARALLAX) VECTOR FROM TEMPORAL CORRELATION BLOCK
S914
GENERATE CANDIDATE LIST OF MOTION (PARALLAX) VECTOR AND REFERENCE INDEX (NUMBER OF ELEMENTS OF LIST IS A')
S915
A'<2?
S916
NO
YES
GENERATE NEW ZERO MOTION (PARALLAX) VECTOR AND NEW ZERO REFERENCE INDEX
S917
DECODE ELEMENT INDEX (FLAG) OF CANDIDATE LIST
S918
ACQUIRE MOTION (PARALLAX) VECTOR INDICATED BY ELEMENT INDEX
S919
RETURN

FIG. 82

Index	REFERENCE IMAGE OF ENCODING BLOCK	REFERENCE IMAGE OF NEIGHBORING BLOCK	PRESENCE OF CANDIDATE MOTION (PARALLAX) VECTOR OF NEIGHBORING BLOCK
1	SHORT REFERENCE PICTURE	SHORT REFERENCE PICTURE	INCLUDED IN CANDIDATE
2	SHORT REFERENCE PICTURE	LONG REFERENCE PICTURE	EXCLUDED FROM CANDIDATE
3	LONG REFERENCE PICTURE	LONG REFERENCE PICTURE	INCLUDED IN CANDIDATE
4	LONG REFERENCE PICTURE	SHORT REFERENCE PICTURE	EXCLUDED FROM CANDIDATE

A

Index	REFERENCE IMAGE OF ENCODING BLOCK	REFERENCE IMAGE OF NEIGHBORING BLOCK	SCALING OF MOTION (PARALLAX) VECTOR OF NEIGHBORING BLOCK
1	SHORT REFERENCE PICTURE	SHORT REFERENCE PICTURE	YES
2	SHORT REFERENCE PICTURE	LONG REFERENCE PICTURE	NO
3	LONG REFERENCE PICTURE	LONG REFERENCE PICTURE	NO
4	LONG REFERENCE PICTURE	SHORT REFERENCE PICTURE	NO

B

FIG. 83

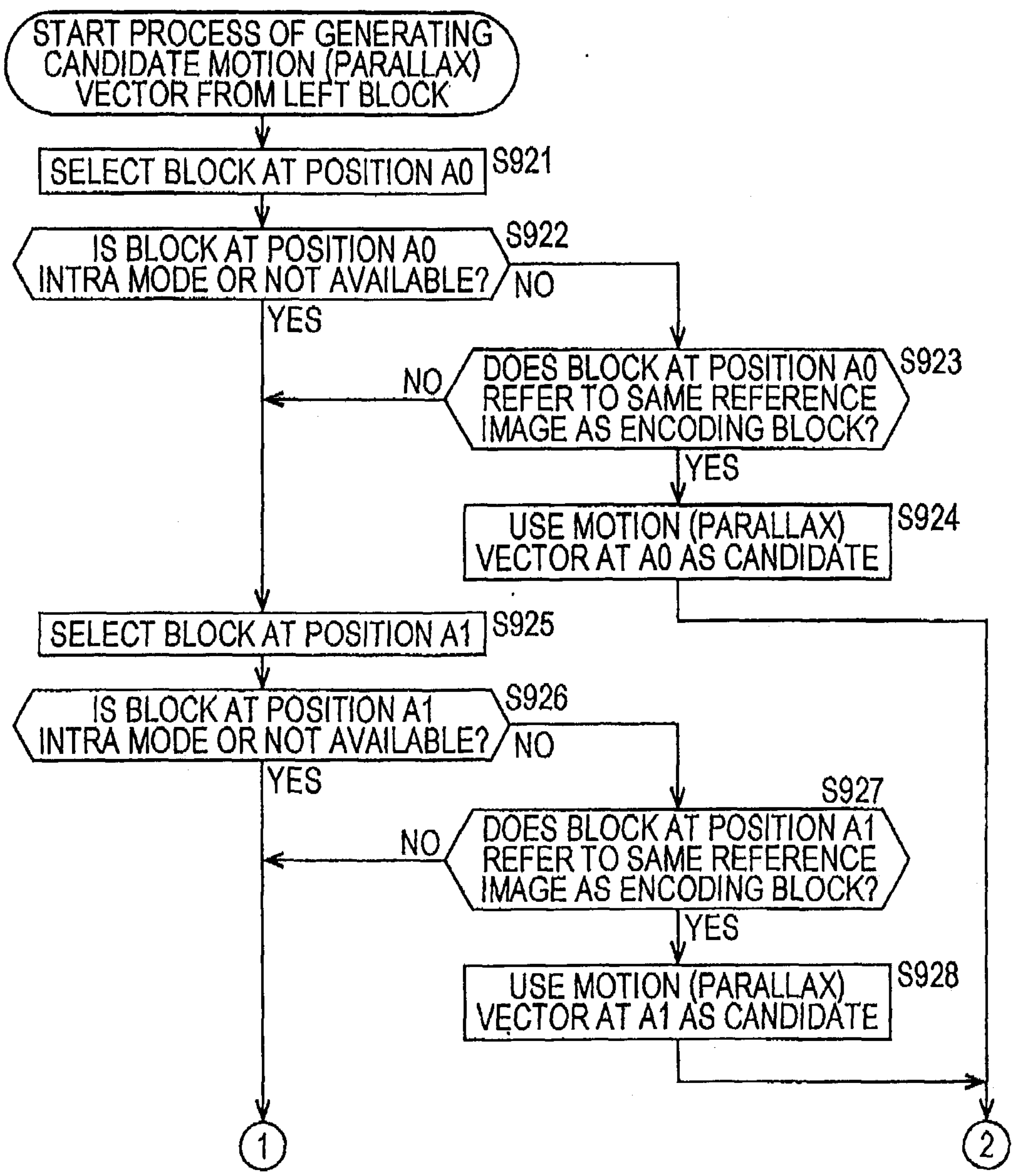

START PROCESS OF GENERATING CANDIDATE MOTION (PARALLAX) VECTOR FROM LEFT BLOCK
SELECT BLOCK AT POSITION A0
S921
IS BLOCK AT POSITION A0 INTRA MODE OR NOT AVAILABLE?
S922
NO
YES
DOES BLOCK AT POSITION A0 REFER TO SAME REFERENCE IMAGE AS ENCODING BLOCK?
S923
NO
YES
USE MOTION (PARALLAX) VECTOR AT A0 AS CANDIDATE
S924
SELECT BLOCK AT POSITION A1
S925
IS BLOCK AT POSITION A1 INTRA MODE OR NOT AVAILABLE?
S926
NO
YES
DOES BLOCK AT POSITION A1 REFER TO SAME REFERENCE IMAGE AS ENCODING BLOCK?
S927
NO
YES
USE MOTION (PARALLAX) VECTOR AT A1 AS CANDIDATE
S928
1
2

FIG. 84

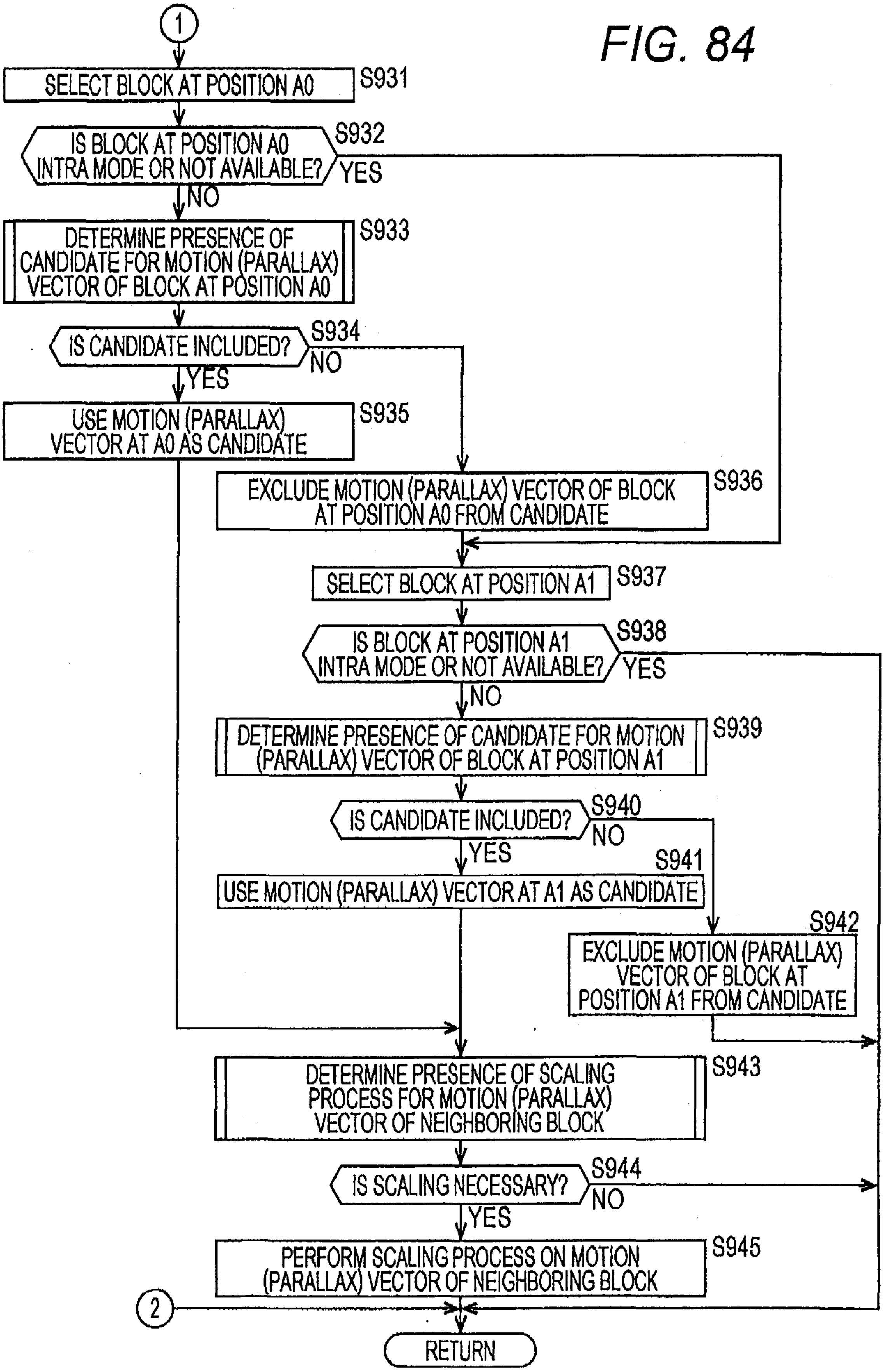

1
SELECT BLOCK AT POSITION A0
S931
IS BLOCK AT POSITION A0 INTRA MODE OR NOT AVAILABLE?
S932
YES
NO
DETERMINE PRESENCE OF CANDIDATE FOR MOTION (PARALLAX) VECTOR OF BLOCK AT POSITION A0
S933
IS CANDIDATE INCLUDED?
S934
NO
YES
USE MOTION (PARALLAX) VECTOR AT A0 AS CANDIDATE
S935
EXCLUDE MOTION (PARALLAX) VECTOR OF BLOCK AT POSITION A0 FROM CANDIDATE
S936
SELECT BLOCK AT POSITION A1
S937
IS BLOCK AT POSITION A1 INTRA MODE OR NOT AVAILABLE?
S938
YES
NO
DETERMINE PRESENCE OF CANDIDATE FOR MOTION (PARALLAX) VECTOR OF BLOCK AT POSITION A1
S939
IS CANDIDATE INCLUDED?
S940
NO
YES
S941
USE MOTION (PARALLAX) VECTOR AT A1 AS CANDIDATE
S942
EXCLUDE MOTION (PARALLAX) VECTOR OF BLOCK AT POSITION A1 FROM CANDIDATE
DETERMINE PRESENCE OF SCALING PROCESS FOR MOTION (PARALLAX) VECTOR OF NEIGHBORING BLOCK
S943
IS SCALING NECESSARY?
S944
NO
YES
PERFORM SCALING PROCESS ON MOTION (PARALLAX) VECTOR OF NEIGHBORING BLOCK
S945
2
RETURN

FIG. 85

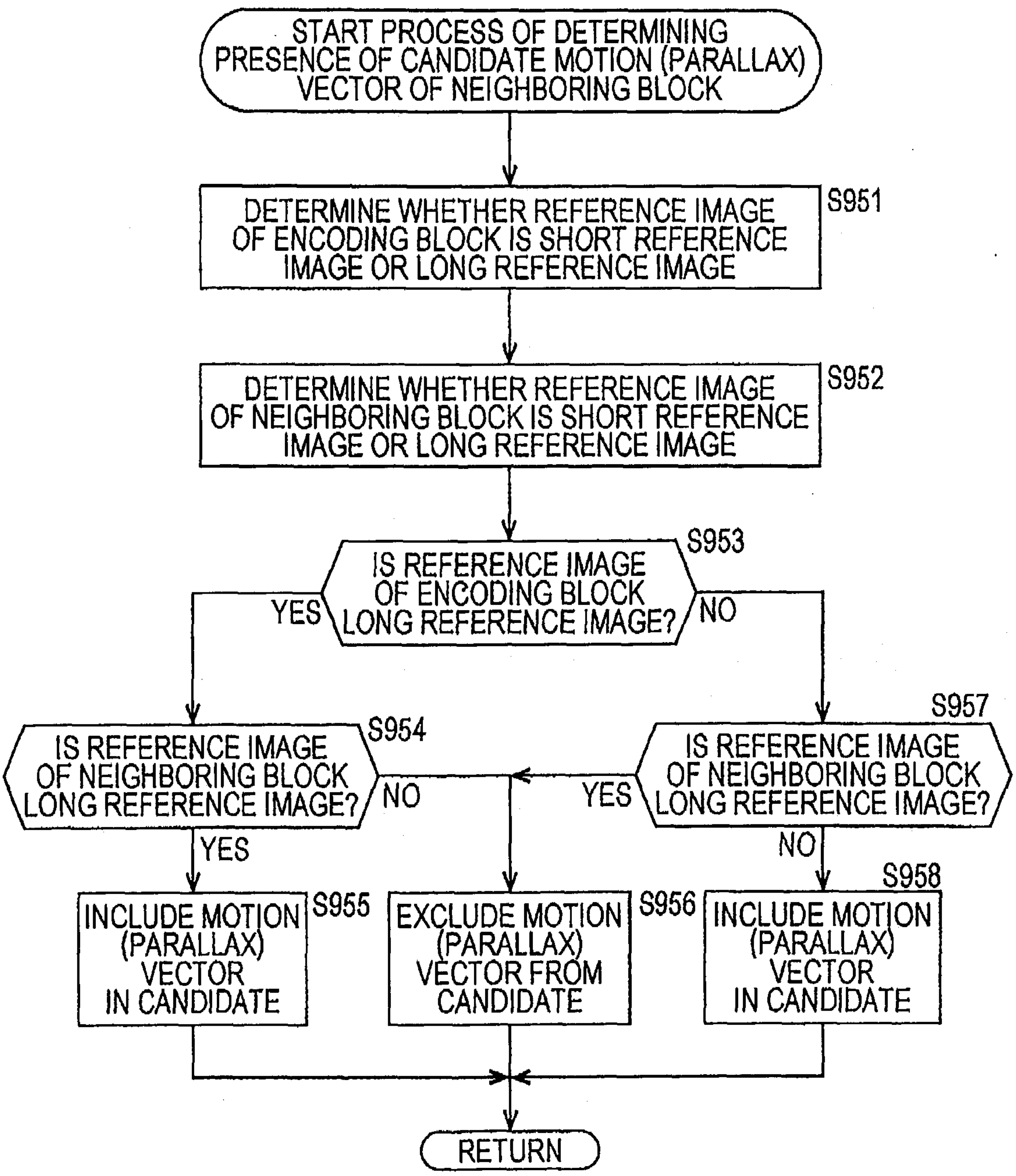

START PROCESS OF DETERMINING PRESENCE OF CANDIDATE MOTION (PARALLAX) VECTOR OF NEIGHBORING BLOCK
DETERMINE WHETHER REFERENCE IMAGE OF ENCODING BLOCK IS SHORT REFERENCE IMAGE OR LONG REFERENCE IMAGE
S951
DETERMINE WHETHER REFERENCE IMAGE OF NEIGHBORING BLOCK IS SHORT REFERENCE IMAGE OR LONG REFERENCE IMAGE
S952
IS REFERENCE IMAGE OF ENCODING BLOCK LONG REFERENCE IMAGE?
S953
YES
NO
IS REFERENCE IMAGE OF NEIGHBORING BLOCK LONG REFERENCE IMAGE?
S954
NO
YES
IS REFERENCE IMAGE OF NEIGHBORING BLOCK LONG REFERENCE IMAGE?
S957
YES
NO
INCLUDE MOTION (PARALLAX) VECTOR IN CANDIDATE
S955
EXCLUDE MOTION (PARALLAX) VECTOR FROM CANDIDATE
S956
INCLUDE MOTION (PARALLAX) VECTOR IN CANDIDATE
S958
RETURN

FIG. 86

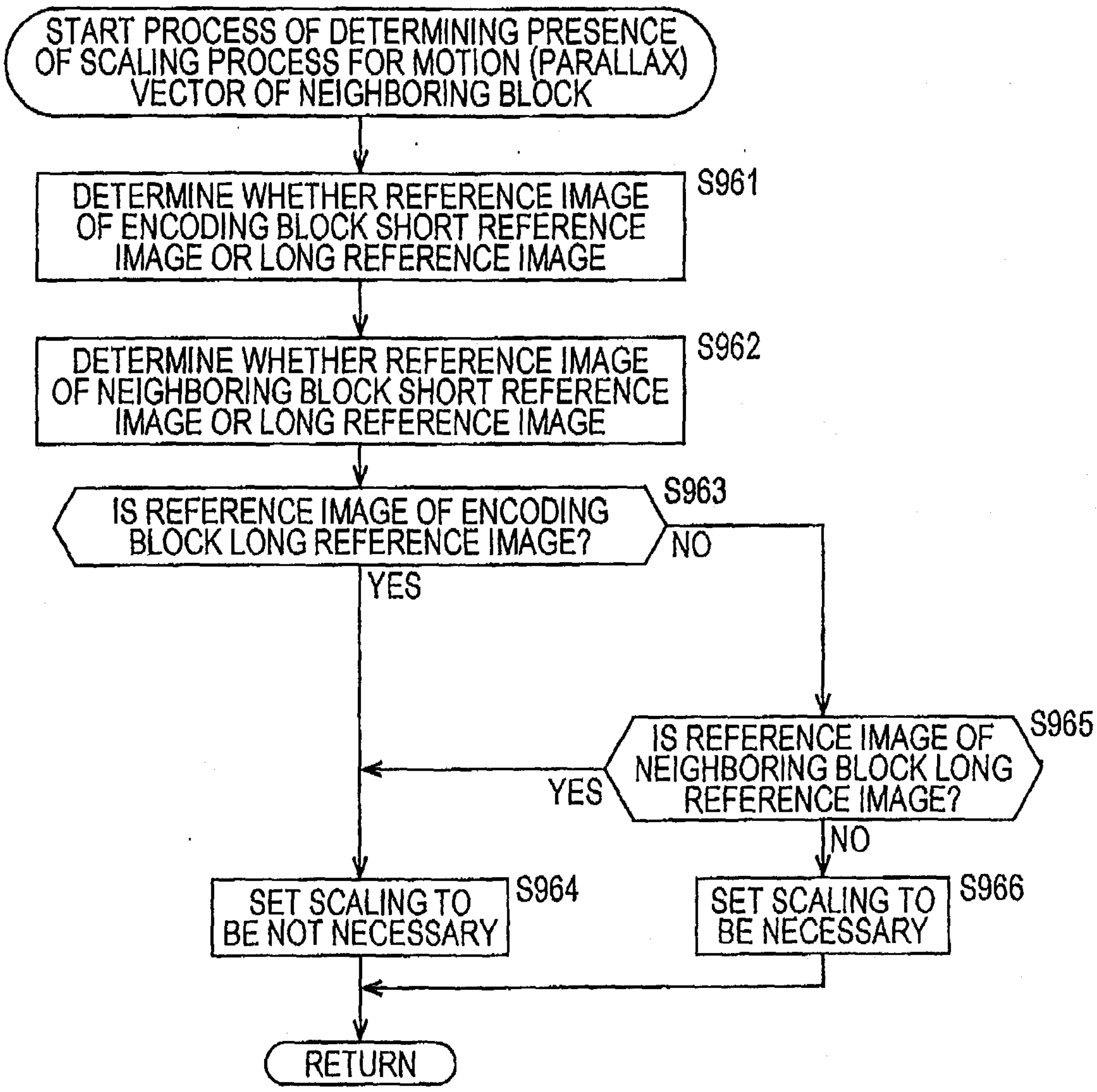

START PROCESS OF DETERMINING PRESENCE OF SCALING PROCESS FOR MOTION (PARALLAX) VECTOR OF NEIGHBORING BLOCK
DETERMINE WHETHER REFERENCE IMAGE OF ENCODING BLOCK SHORT REFERENCE IMAGE OR LONG REFERENCE IMAGE
S961
DETERMINE WHETHER REFERENCE IMAGE OF NEIGHBORING BLOCK SHORT REFERENCE IMAGE OR LONG REFERENCE IMAGE
S962
IS REFERENCE IMAGE OF ENCODING BLOCK LONG REFERENCE IMAGE?
S963
NO
YES
IS REFERENCE IMAGE OF NEIGHBORING BLOCK LONG REFERENCE IMAGE?
S965
YES
NO
SET SCALING TO BE NOT NECESSARY
S964
SET SCALING TO BE NECESSARY
S966
RETURN

FIG. 87

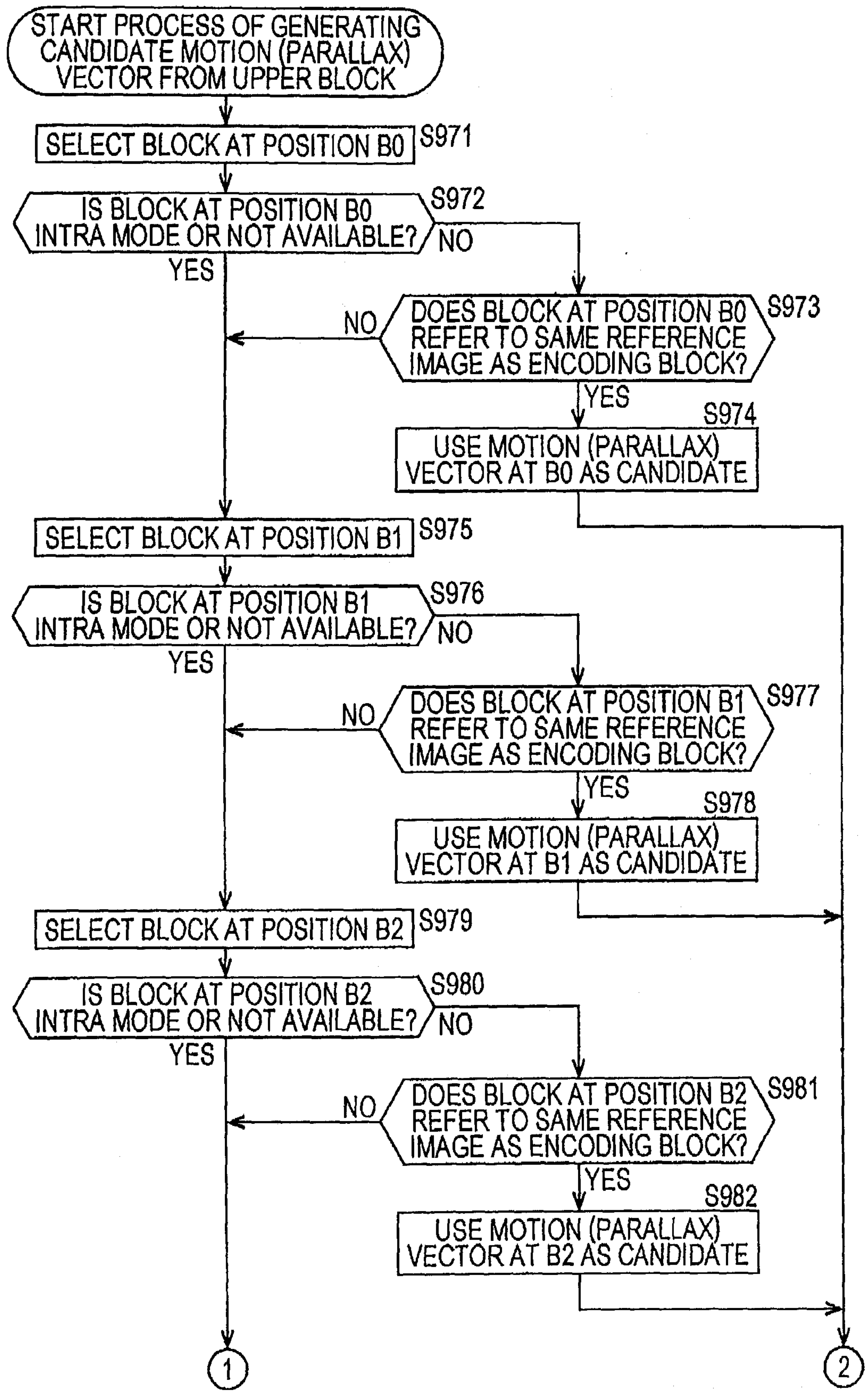

START PROCESS OF GENERATING CANDIDATE MOTION (PARALLAX) VECTOR FROM UPPER BLOCK
SELECT BLOCK AT POSITION B0
S971
IS BLOCK AT POSITION B0 INTRA MODE OR NOT AVAILABLE?
S972
NO
YES
DOES BLOCK AT POSITION B0 REFER TO SAME REFERENCE IMAGE AS ENCODING BLOCK?
S973
NO
YES
S974
USE MOTION (PARALLAX) VECTOR AT B0 AS CANDIDATE
SELECT BLOCK AT POSITION B1
S975
IS BLOCK AT POSITION B1 INTRA MODE OR NOT AVAILABLE?
S976
NO
YES
DOES BLOCK AT POSITION B1 REFER TO SAME REFERENCE IMAGE AS ENCODING BLOCK?
S977
NO
YES
S978
USE MOTION (PARALLAX) VECTOR AT B1 AS CANDIDATE
SELECT BLOCK AT POSITION B2
S979
IS BLOCK AT POSITION B2 INTRA MODE OR NOT AVAILABLE?
S980
NO
YES
DOES BLOCK AT POSITION B2 REFER TO SAME REFERENCE IMAGE AS ENCODING BLOCK?
S981
NO
YES
S982
USE MOTION (PARALLAX) VECTOR AT B2 AS CANDIDATE
1
2

FIG. 88

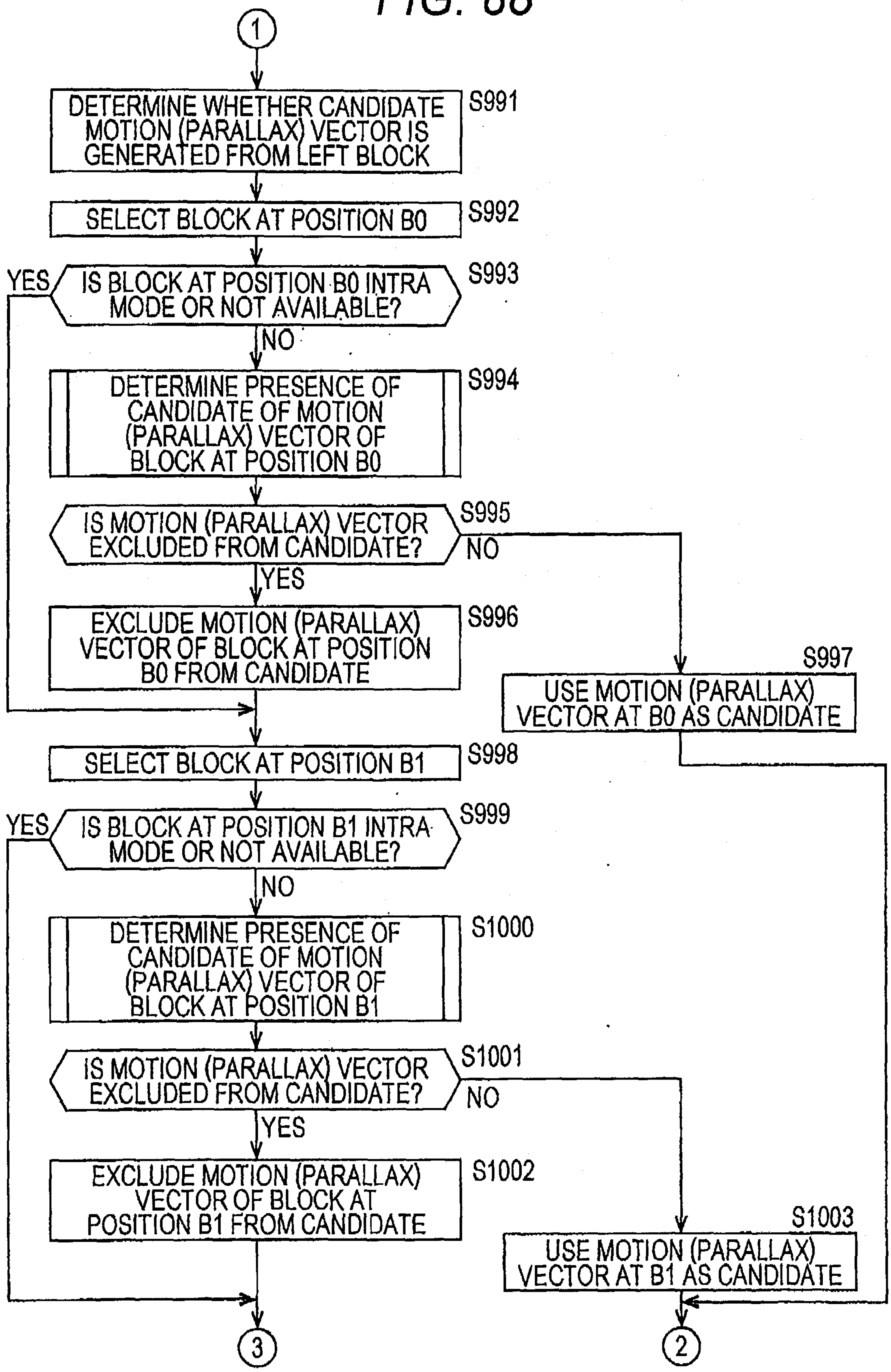

1
DETERMINE WHETHER CANDIDATE MOTION (PARALLAX) VECTOR IS GENERATED FROM LEFT BLOCK
S991
SELECT BLOCK AT POSITION B0
S992
IS BLOCK AT POSITION B0 INTRA MODE OR NOT AVAILABLE?
S993
YES
NO
DETERMINE PRESENCE OF CANDIDATE OF MOTION (PARALLAX) VECTOR OF BLOCK AT POSITION B0
S994
IS MOTION (PARALLAX) VECTOR EXCLUDED FROM CANDIDATE?
S995
NO
YES
EXCLUDE MOTION (PARALLAX) VECTOR OF BLOCK AT POSITION B0 FROM CANDIDATE
S996
S997
USE MOTION (PARALLAX) VECTOR AT B0 AS CANDIDATE
SELECT BLOCK AT POSITION B1
S998
IS BLOCK AT POSITION B1 INTRA MODE OR NOT AVAILABLE?
S999
YES
NO
DETERMINE PRESENCE OF CANDIDATE OF MOTION (PARALLAX) VECTOR OF BLOCK AT POSITION B1
S1000
IS MOTION (PARALLAX) VECTOR EXCLUDED FROM CANDIDATE?
S1001
NO
YES
EXCLUDE MOTION (PARALLAX) VECTOR OF BLOCK AT POSITION B1 FROM CANDIDATE
S1002
S1003
USE MOTION (PARALLAX) VECTOR AT B1 AS CANDIDATE
3
2

FIG. 89

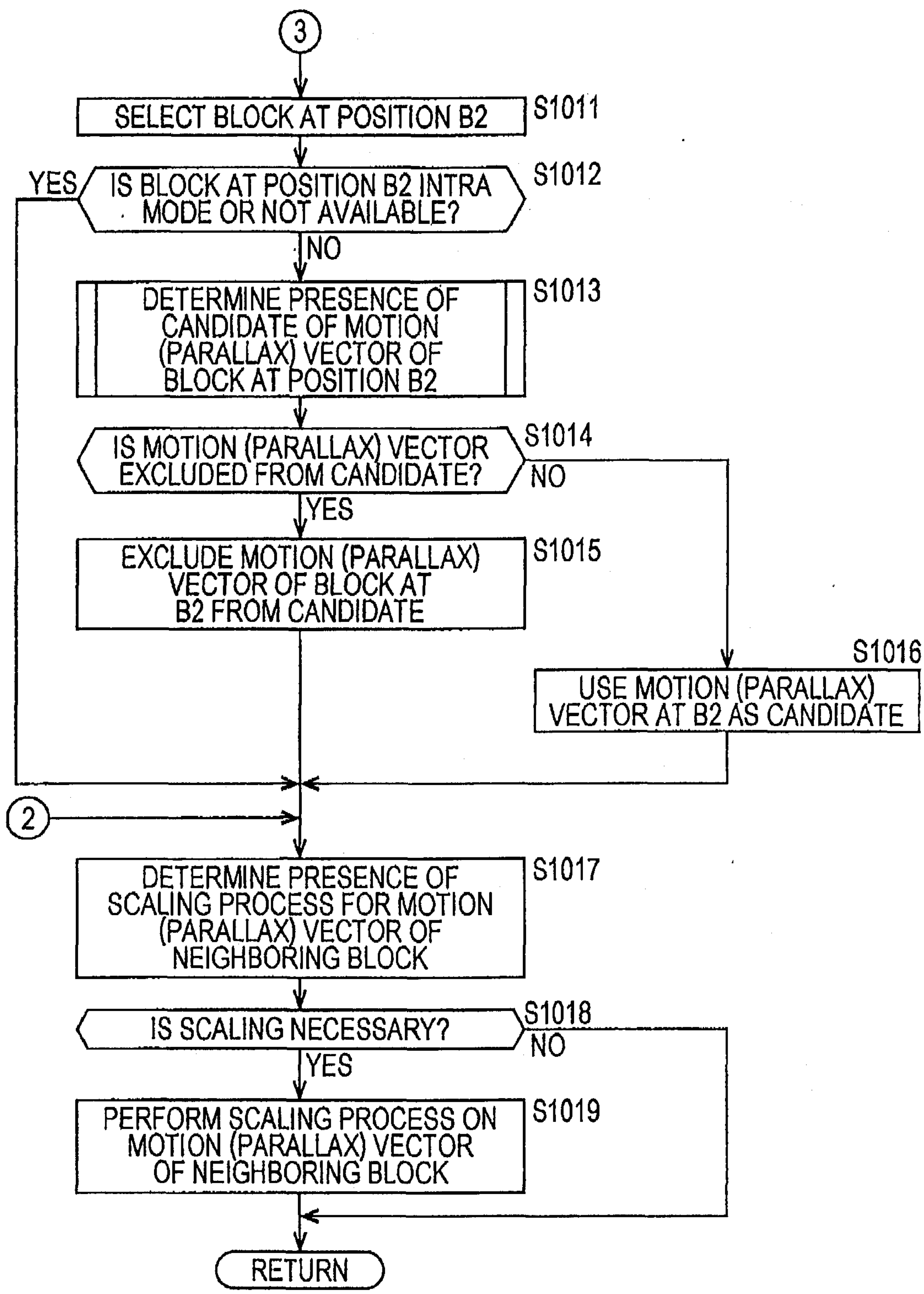

3
SELECT BLOCK AT POSITION B2
S1011
IS BLOCK AT POSITION B2 INTRA MODE OR NOT AVAILABLE?
S1012
YES
NO
DETERMINE PRESENCE OF CANDIDATE OF MOTION (PARALLAX) VECTOR OF BLOCK AT POSITION B2
S1013
IS MOTION (PARALLAX) VECTOR EXCLUDED FROM CANDIDATE?
S1014
NO
YES
EXCLUDE MOTION (PARALLAX) VECTOR OF BLOCK AT B2 FROM CANDIDATE
S1015
S1016
USE MOTION (PARALLAX) VECTOR AT B2 AS CANDIDATE
2
DETERMINE PRESENCE OF SCALING PROCESS FOR MOTION (PARALLAX) VECTOR OF NEIGHBORING BLOCK
S1017
IS SCALING NECESSARY?
S1018
NO
YES
PERFORM SCALING PROCESS ON MOTION (PARALLAX) VECTOR OF NEIGHBORING BLOCK
S1019
RETURN

FIG. 90

Index	REFERENCE IMAGE OF ENCODING BLOCK	REFERENCE IMAGE OF TEMPORAL CORRELATION BLOCK	PRESENCE OF CANDIDATE MOTION (PARALLAX) VECTOR OF TEMPORAL CORRELATION BLOCK	SCALING OF MOTION (PARALLAX) VECTOR OF TEMPORAL CORRELATION BLOCK
1	SHORT REFERENCE PICTURE	SHORT REFERENCE PICTURE	INCLUDED IN CANDIDATE	YES
2	SHORT REFERENCE PICTURE	LONG REFERENCE PICTURE	EXCLUDED FROM CANDIDATE	—
3	LONG REFERENCE PICTURE	LONG REFERENCE PICTURE	INCLUDED IN CANDIDATE	NO
4	LONG REFERENCE PICTURE	SHORT REFERENCE PICTURE	EXCLUDED FROM CANDIDATE	—

A

Index	REFERENCE IMAGE OF ENCODING BLOCK	REFERENCE IMAGE OF NEIGHBORING BLOCK	PRESENCE OF CANDIDATE MOTION (PARALLAX) VECTOR OF NEIGHBORING BLOCK	SCALING OF MOTION (PARALLAX) VECTOR OF NEIGHBORING BLOCK
1	SHORT REFERENCE PICTURE	SHORT REFERENCE PICTURE	INCLUDED IN CANDIDATE	YES
2	SHORT REFERENCE PICTURE	LONG REFERENCE PICTURE	EXCLUDED FROM CANDIDATE	—
3	LONG REFERENCE PICTURE	LONG REFERENCE PICTURE	INCLUDED IN CANDIDATE (ONLY WHEN REFERENCE IMAGES ARE IDENTICAL)	NO
4	LONG REFERENCE PICTURE	SHORT REFERENCE PICTURE	EXCLUDED FROM CANDIDATE	—

B

FIG. 91

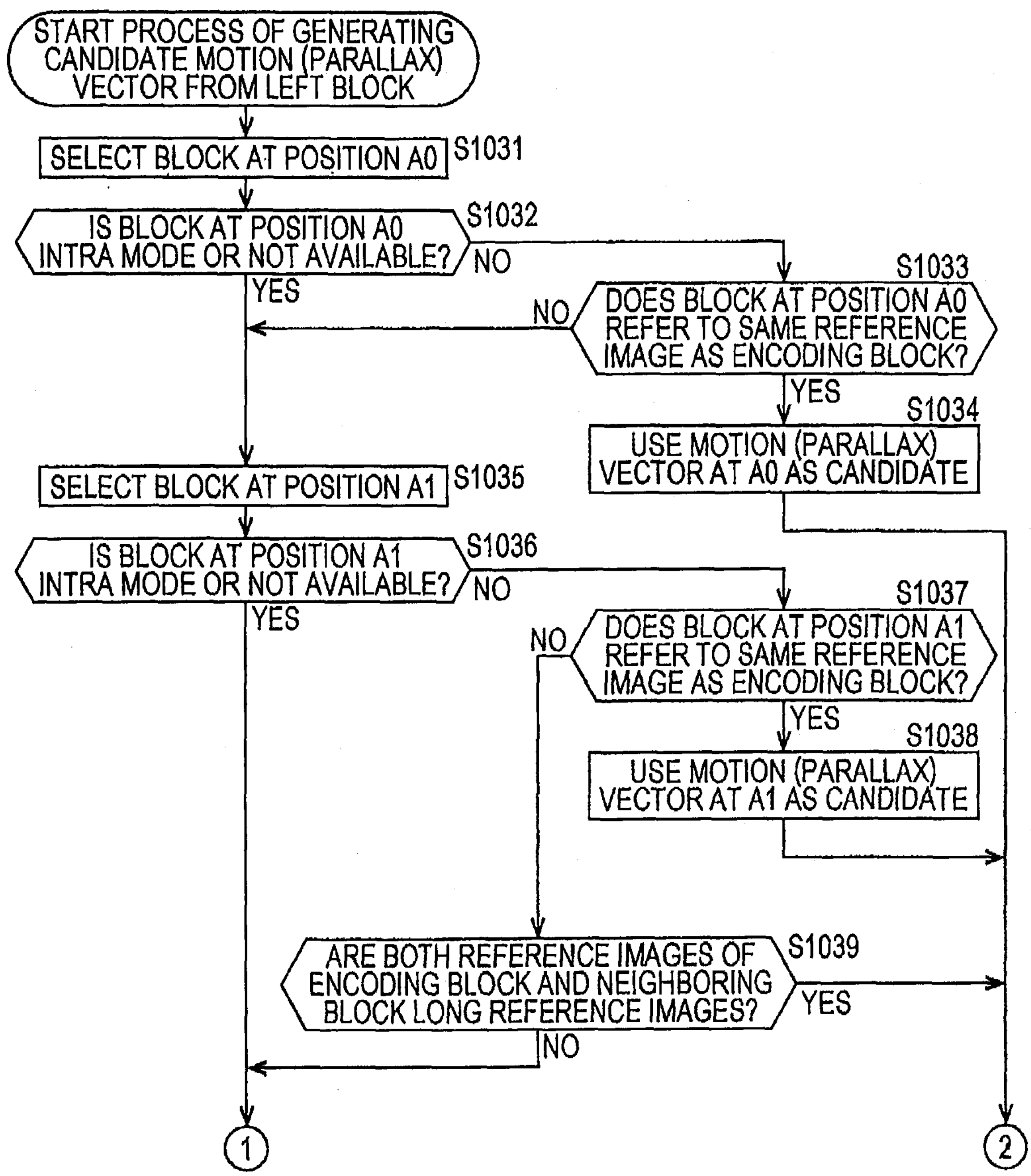

START PROCESS OF GENERATING CANDIDATE MOTION (PARALLAX) VECTOR FROM LEFT BLOCK
SELECT BLOCK AT POSITION A0
S1031
IS BLOCK AT POSITION A0 INTRA MODE OR NOT AVAILABLE?
S1032
NO
YES
DOES BLOCK AT POSITION A0 REFER TO SAME REFERENCE IMAGE AS ENCODING BLOCK?
S1033
NO
YES
USE MOTION (PARALLAX) VECTOR AT A0 AS CANDIDATE
S1034
SELECT BLOCK AT POSITION A1
S1035
IS BLOCK AT POSITION A1 INTRA MODE OR NOT AVAILABLE?
S1036
NO
YES
DOES BLOCK AT POSITION A1 REFER TO SAME REFERENCE IMAGE AS ENCODING BLOCK?
S1037
NO
YES
USE MOTION (PARALLAX) VECTOR AT A1 AS CANDIDATE
S1038
ARE BOTH REFERENCE IMAGES OF ENCODING BLOCK AND NEIGHBORING BLOCK LONG REFERENCE IMAGES?
S1039
YES
NO
1
2

FIG. 92

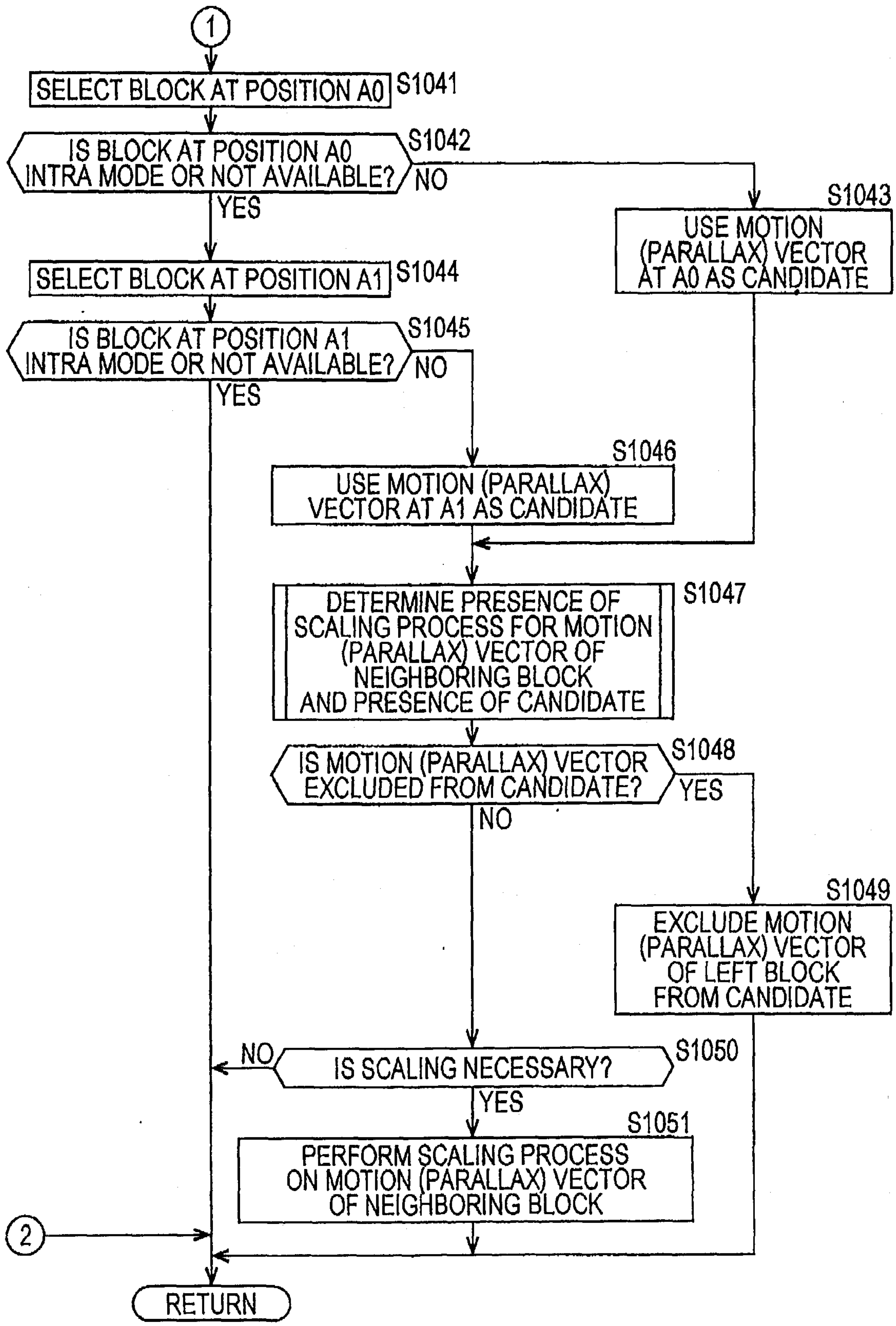

1
SELECT BLOCK AT POSITION A0
S1041
IS BLOCK AT POSITION A0 INTRA MODE OR NOT AVAILABLE?
S1042
NO
YES
S1043
USE MOTION (PARALLAX) VECTOR AT A0 AS CANDIDATE
SELECT BLOCK AT POSITION A1
S1044
IS BLOCK AT POSITION A1 INTRA MODE OR NOT AVAILABLE?
S1045
NO
YES
S1046
USE MOTION (PARALLAX) VECTOR AT A1 AS CANDIDATE
DETERMINE PRESENCE OF SCALING PROCESS FOR MOTION (PARALLAX) VECTOR OF NEIGHBORING BLOCK AND PRESENCE OF CANDIDATE
S1047
IS MOTION (PARALLAX) VECTOR EXCLUDED FROM CANDIDATE?
S1048
YES
NO
S1049
EXCLUDE MOTION (PARALLAX) VECTOR OF LEFT BLOCK FROM CANDIDATE
NO
IS SCALING NECESSARY?
S1050
YES
S1051
PERFORM SCALING PROCESS ON MOTION (PARALLAX) VECTOR OF NEIGHBORING BLOCK
2
RETURN

FIG. 93

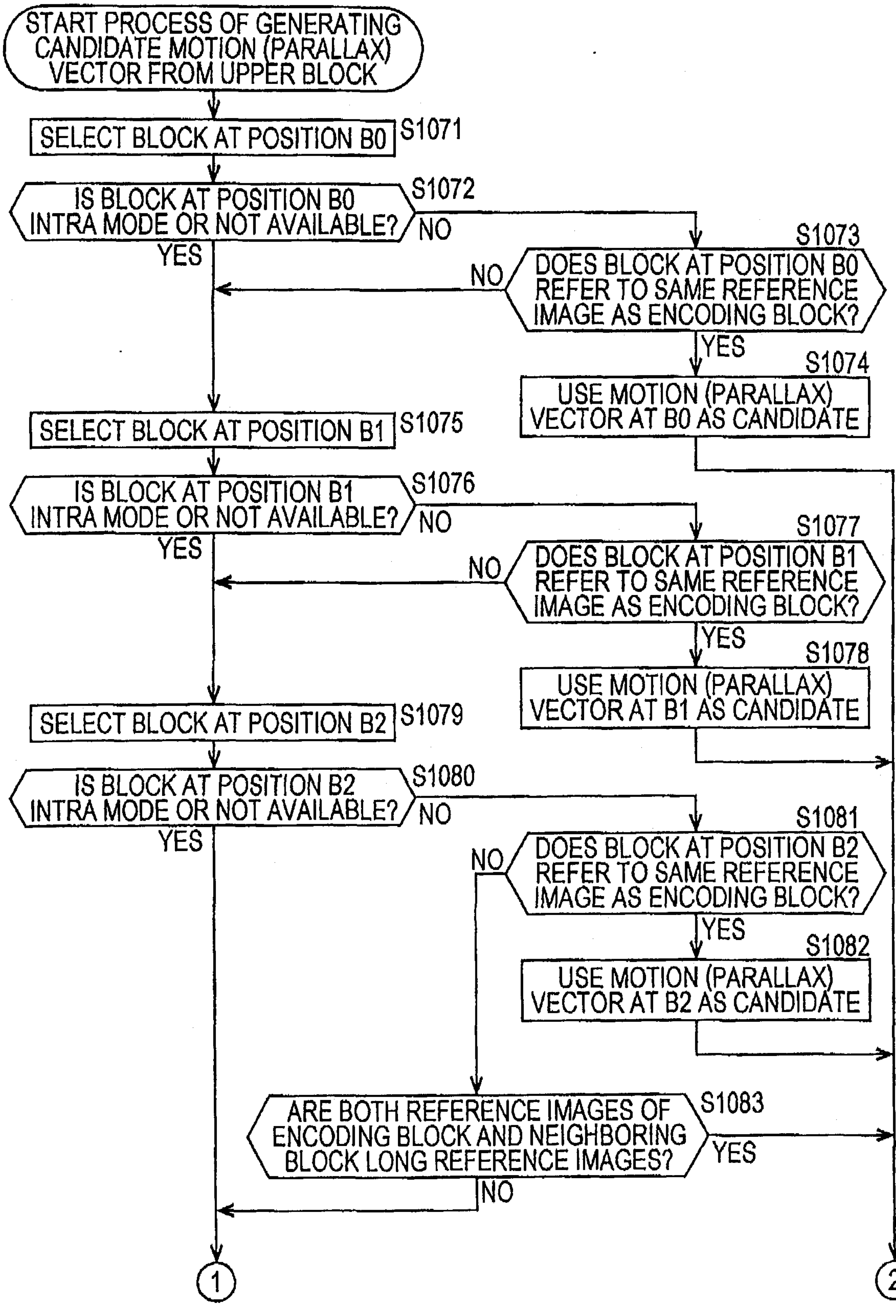

START PROCESS OF GENERATING CANDIDATE MOTION (PARALLAX) VECTOR FROM UPPER BLOCK
SELECT BLOCK AT POSITION B0
S1071
IS BLOCK AT POSITION B0 INTRA MODE OR NOT AVAILABLE?
S1072
YES
NO
S1073
DOES BLOCK AT POSITION B0 REFER TO SAME REFERENCE IMAGE AS ENCODING BLOCK?
NO
YES
S1074
USE MOTION (PARALLAX) VECTOR AT B0 AS CANDIDATE
SELECT BLOCK AT POSITION B1
S1075
IS BLOCK AT POSITION B1 INTRA MODE OR NOT AVAILABLE?
S1076
YES
NO
S1077
DOES BLOCK AT POSITION B1 REFER TO SAME REFERENCE IMAGE AS ENCODING BLOCK?
NO
YES
S1078
USE MOTION (PARALLAX) VECTOR AT B1 AS CANDIDATE
SELECT BLOCK AT POSITION B2
S1079
IS BLOCK AT POSITION B2 INTRA MODE OR NOT AVAILABLE?
S1080
YES
NO
S1081
DOES BLOCK AT POSITION B2 REFER TO SAME REFERENCE IMAGE AS ENCODING BLOCK?
NO
YES
S1082
USE MOTION (PARALLAX) VECTOR AT B2 AS CANDIDATE
ARE BOTH REFERENCE IMAGES OF ENCODING BLOCK AND NEIGHBORING BLOCK LONG REFERENCE IMAGES?
S1083
YES
NO
1
2

FIG. 94

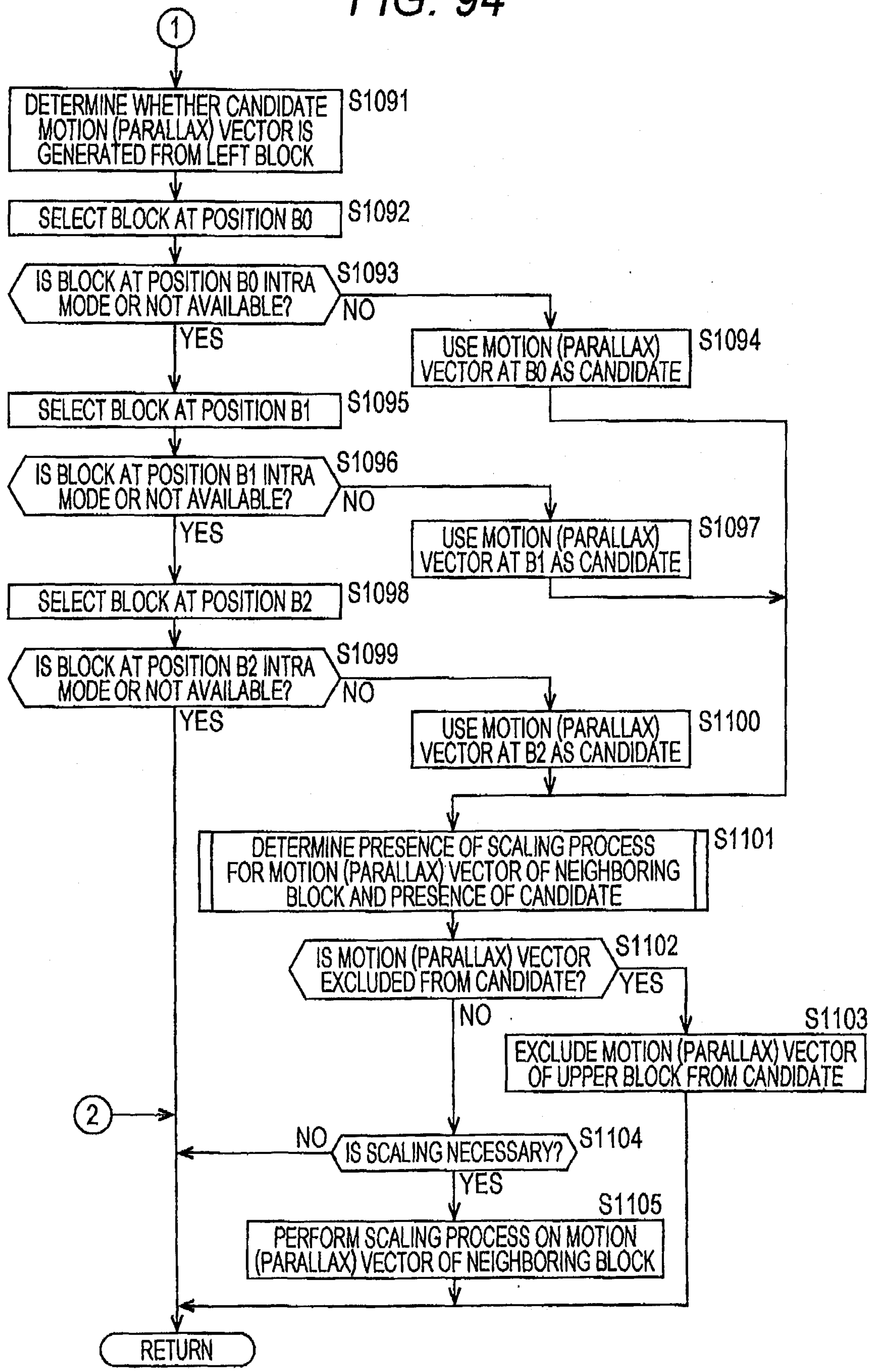

1
DETERMINE WHETHER CANDIDATE MOTION (PARALLAX) VECTOR IS GENERATED FROM LEFT BLOCK
S1091
SELECT BLOCK AT POSITION B0
S1092
IS BLOCK AT POSITION B0 INTRA MODE OR NOT AVAILABLE?
S1093
NO
YES
USE MOTION (PARALLAX) VECTOR AT B0 AS CANDIDATE
S1094
SELECT BLOCK AT POSITION B1
S1095
IS BLOCK AT POSITION B1 INTRA MODE OR NOT AVAILABLE?
S1096
NO
YES
USE MOTION (PARALLAX) VECTOR AT B1 AS CANDIDATE
S1097
SELECT BLOCK AT POSITION B2
S1098
IS BLOCK AT POSITION B2 INTRA MODE OR NOT AVAILABLE?
S1099
NO
YES
USE MOTION (PARALLAX) VECTOR AT B2 AS CANDIDATE
S1100
DETERMINE PRESENCE OF SCALING PROCESS FOR MOTION (PARALLAX) VECTOR OF NEIGHBORING BLOCK AND PRESENCE OF CANDIDATE
S1101
IS MOTION (PARALLAX) VECTOR EXCLUDED FROM CANDIDATE?
S1102
YES
NO
S1103
EXCLUDE MOTION (PARALLAX) VECTOR OF UPPER BLOCK FROM CANDIDATE
2
NO
IS SCALING NECESSARY?
S1104
YES
S1105
PERFORM SCALING PROCESS ON MOTION (PARALLAX) VECTOR OF NEIGHBORING BLOCK
RETURN

FIG. 95

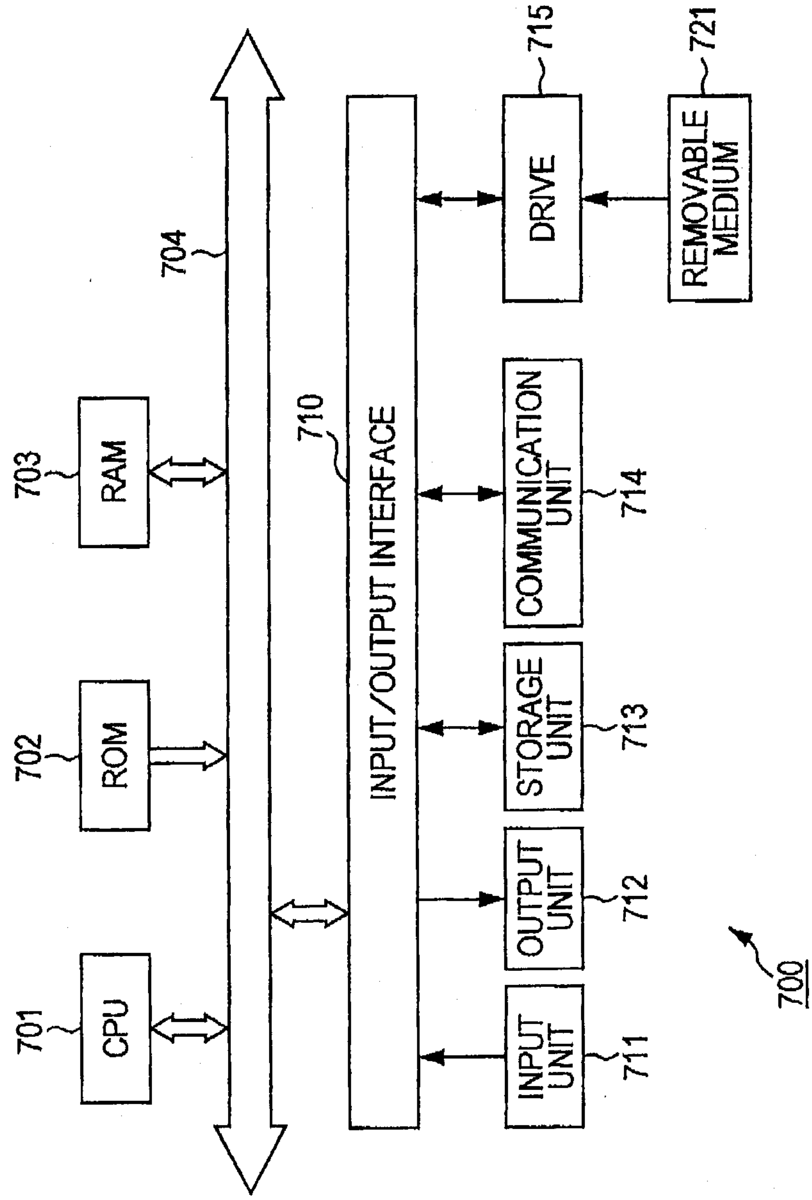

701
CPU
702
ROM
703
RAM
704
710
INPUT/OUTPUT INTERFACE
INPUT UNIT
711
OUTPUT UNIT
712
STORAGE UNIT
713
COMMUNICATION UNIT
714
DRIVE
715
REMOVABLE MEDIUM
721
700

FIG. 96

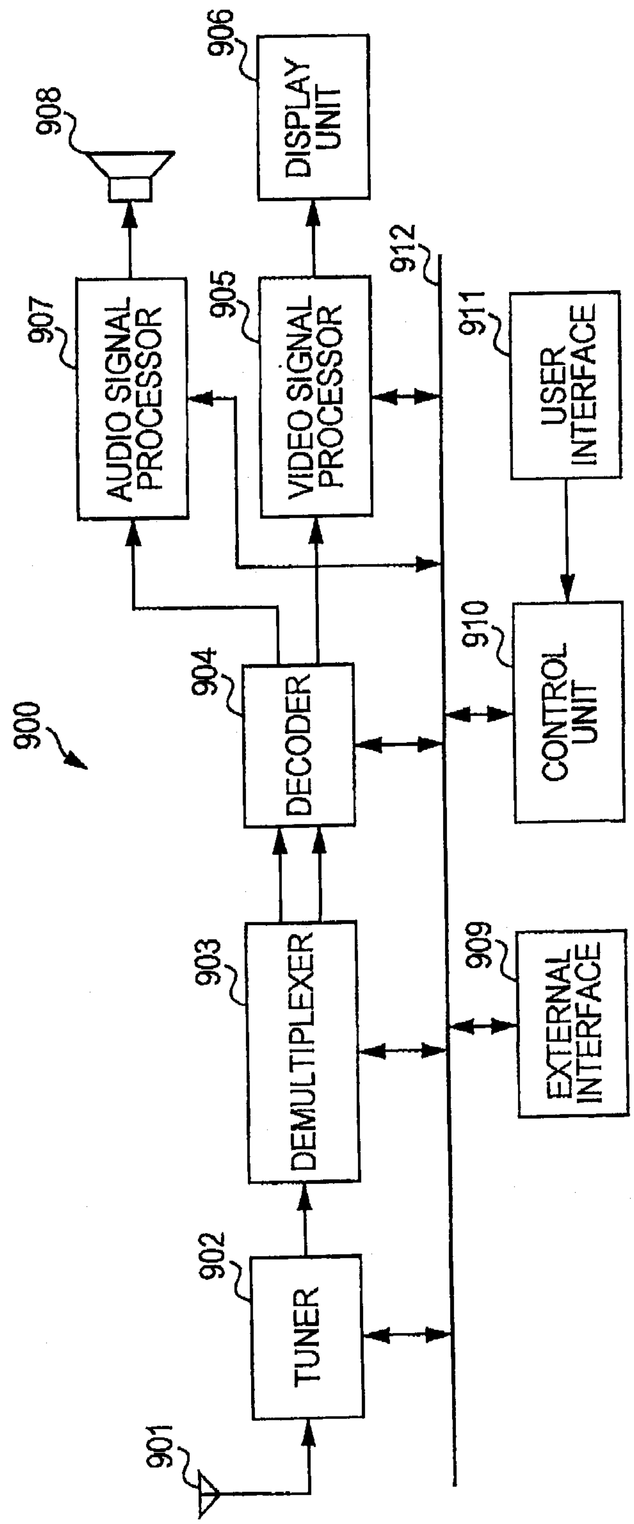

900
901
TUNER
902
DEMULTIPLEXER
903
DECODER
904
VIDEO SIGNAL PROCESSOR
905
DISPLAY UNIT
906
AUDIO SIGNAL PROCESSOR
907
908
EXTERNAL INTERFACE
909
CONTROL UNIT
910
USER INTERFACE
911
912

FIG. 97

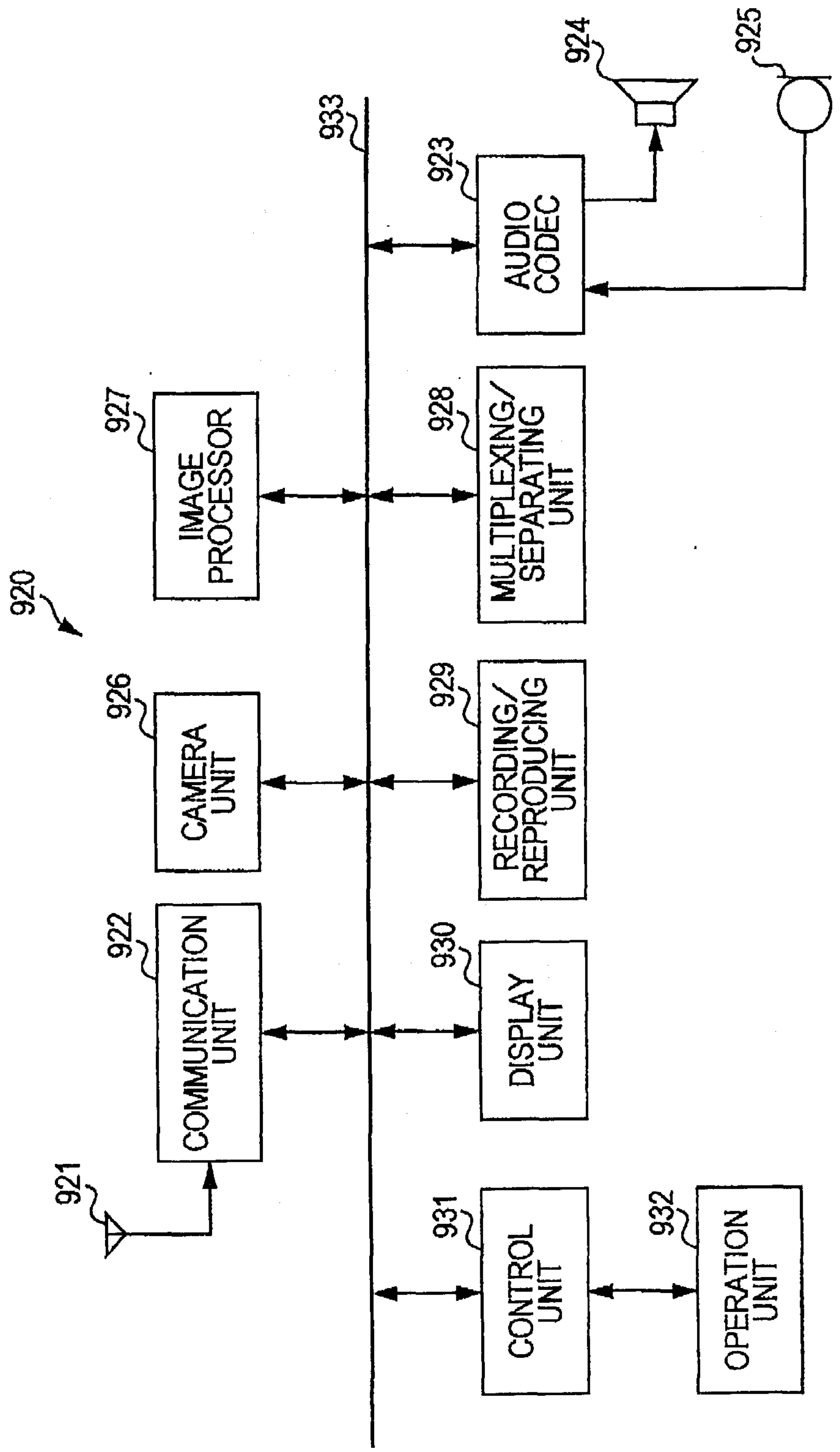

920
921
922
COMMUNICATION UNIT
926
CAMERA UNIT
927
IMAGE PROCESSOR
933
923
AUDIO CODEC
924
925
928
MULTIPLEXING/SEPARATING UNIT
929
RECORDING/REPRODUCING UNIT
930
DISPLAY UNIT
931
CONTROL UNIT
932
OPERATION UNIT

FIG. 98

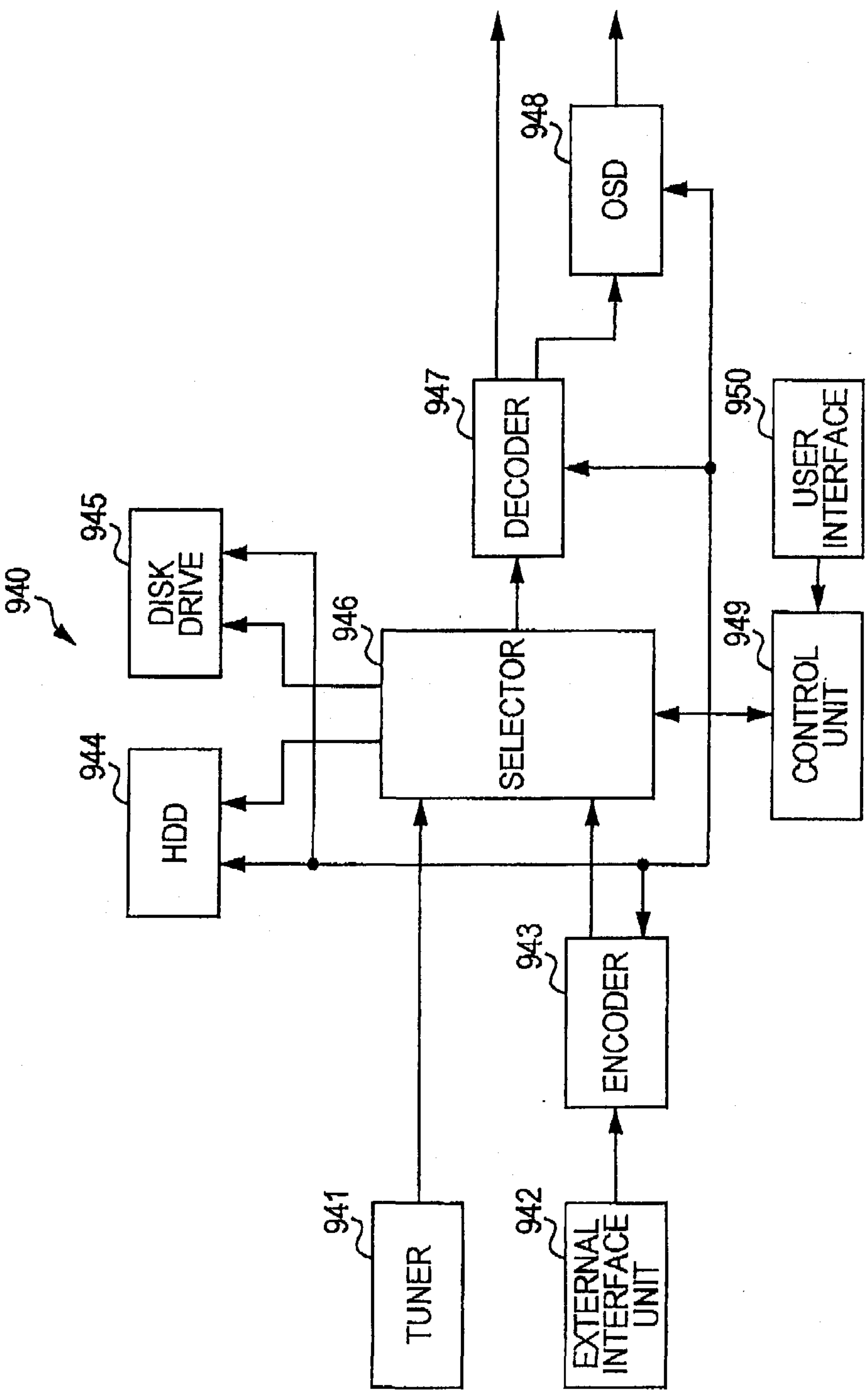
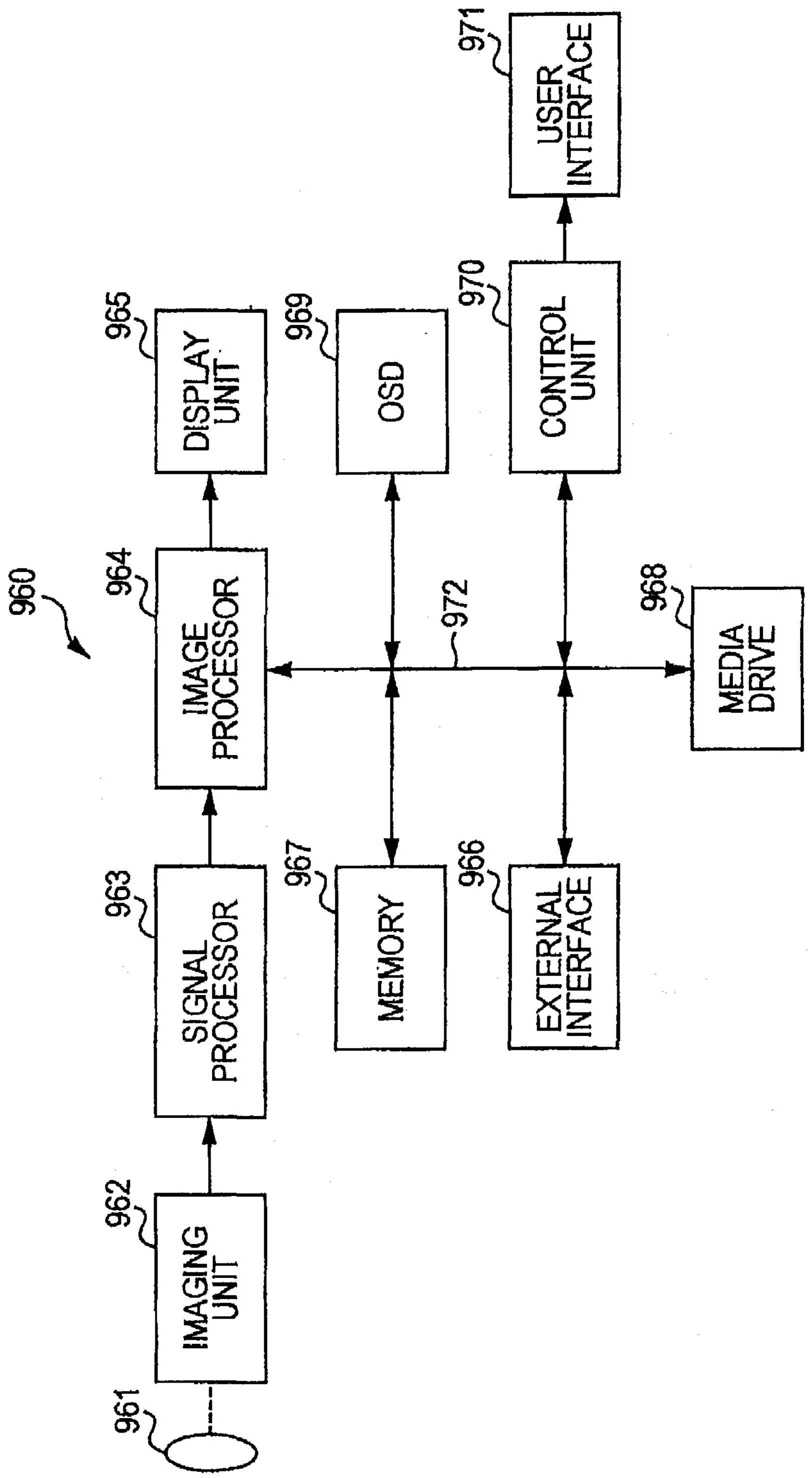

940
941
TUNER
942
EXTERNAL INTERFACE UNIT
943
ENCODER
944
HDD
945
DISK DRIVE
946
SELECTOR
947
DECODER
948
OSD
949
CONTROL UNIT
950
USER INTERFACE

FIG. 99


960
961
962
IMAGING UNIT
963
SIGNAL PROCESSOR
964
IMAGE PROCESSOR
965
DISPLAY UNIT
966
EXTERNAL INTERFACE
967
MEMORY
968
MEDIA DRIVE
969
OSD
970
CONTROL UNIT
971
USER INTERFACE
972

units.

[0333]

The different picture-based predictive vector generating unit 457 generates a predictive vector that refers to different pictures. That is, the different picture-based predictive vector generating unit 457 refers to different pictures in the temporal direction and the view direction to generate the predictive vector. When generating the predictive vector that refers to different pictures in the view direction, the different picture-based predictive vector generating unit 457 acquires the motion information of the base view from the base view encoder 421 and generates a predictive vector using the motion information.

[0334]

The predictive vector generated by the different picture-based predictive vector generating unit 457 is supplied to the vector cost calculating unit 453 via the selector 458, and the cost function value used for the mode determination is calculated.

[0335]

[Different picture-based predictive vector generating unit]

Fig. 40 is a block diagram illustrating a main configuration example of the different picture-based predictive vector generating unit 457.

[0336]

As illustrated in Fig. 40, the different picture-based predictive vector generating unit 457 includes a parallax vector determining unit 471, an inter-view reference vector generating unit 472, and an intra-view reference vector generating unit 473.

[0337]

The parallax vector determining unit 471 calculates a shift amount of the reference image from the parallax vector of the neighboring block. The shift amount calculating method is optional. For example, any one of the parallax vectors of the neighboring blocks may be selected and may be used as the shift amount. Moreover, for example, an average value or a median value of the parallax vectors of the neighboring blocks may be used as the shift amount.

[0338]

The parallax vector determining unit 471 supplies the shift amount obtained in this manner to the inter-view reference vector generating unit 472 as the parallax vector.

[0339]

The inter-view reference vector generating unit 472 generates a predictive vector that refers to different pictures in the view direction.

[0340]

The inter-view reference vector generating unit 472 generates the predictive vector by taking the parallax vector into consideration using the parallax vector (shift amount) selected by the parallax vector determining unit 471, the motion vector (also including the parallax vector in the case of the non-base view) of the base view supplied from the base view encoder 421, and information such as the reference image index or the inter-view motion/parallax vector of the same time, which is read from the vector information accumulation buffer

455.

[0341]

That is, the inter-view reference vector generating unit 472 aligns (shifts) the images of the view referring to using the shift amount calculated by the parallax vector determining unit 471. Moreover, the inter-view reference vector generating unit 472 generates the predictive vector from the aligned blocks.

[0342]

The inter-view reference vector generating unit 472 supplies the generated predictive vector to the vector cost calculating unit 453 via the selector 458 (not illustrated in Fig. 40).

[0343]

The intra-view reference vector generating unit 473 generates the predictive vector that refers to different pictures in the temporal direction.

[0344]

By doing so, the inter-view reference vector generating unit 472 can create an appropriate predictive vector with high prediction accuracy. In this way, the image encoding device 400 can improve the encoding efficiency.

[0345]

[Flow of motion prediction/compensation process]

An example of the flow of the motion prediction/compensation process will be described with reference to the flowchart of Fig. 41.

[0346]

When the motion prediction/compensation process starts, in step S401, the inter-mode generating unit 431 selects any one of an inter-prediction mode, a skip mode, a merge mode, and the like and generates an inter mode which is information designating the selected mode.

[0347]

In step S402, the inter-mode generating unit 431 determines whether the generated inter mode is the inter-prediction mode.

[0348]

When the inter mode is the inter-prediction mode, the inter-mode generating unit 431 determines the reference image in step S403, and the vector predicting unit 433 executes the vector prediction process in step S404.

[0349]

Moreover, when the inter mode is not the inter-prediction mode, in step S404, the vector predicting unit 434 performs a vector prediction process.

[0350]

In step S405, the mode determining unit 435 determines the mode based on the predictive vector or the like generated in step S404. This mode is used in the process of step S401.

[0351]

In step S405, the lossless encoding unit 106 encodes the information of the mode determined in step S405.

[0352]

[Flow of vector prediction process]

An example of the flow of the vector prediction process executed by the vector predicting unit 433 in step S404 of Fig. 41 will be described with reference to the flowchart of Fig. 42.

[0353]

When the vector prediction process starts, the motion/parallax vector search unit 451 searches vectors in step S421.

[0354]

In step S422, the predicted image generating unit 452 generates a predicted image.

[0355]

In step S423, the vector cost calculating unit 453 generates a residual image.

[0356]

In step S424, the neighboring block-based predictive vector generating unit 456 and the different picture-based predictive vector generating unit 457 generates a predictive vector from the encoded vector.

[0357]

In step S425, the vector cost calculating unit 453 calculates the residue of the vector.

[0358]

In step S426, the vector determining unit 454 determines a predictive vector having the smallest cost. This processing result is reflected on the process of step S424.

[0359]

In step S427, the vector information accumulation buffer 455 accumulates the vector information and the flow returns to the flowchart of Fig. 41.

[0360]

[Flow of predictive vector generation process]

Next, an example of the flow of the predictive vector generation process executed in step S424 of Fig. 42 will be described with reference to the flowchart of Fig. 43.

[0361]

When the predictive vector generation process starts, in step S441, the selector 458 determines which block is to be referred to.

[0362]

When it is determined that the neighboring block of the picture is to be referred to, in step S442, the neighboring block-based predictive vector generating unit 456 sets the encoded vector of the neighboring block to the predictive vector and the flow returns to the flowchart of Fig. 42.

[0363]

Moreover, when it is determined in step S441 that the block of a different picture is to be referred to, the selector 458 proceeds to the process of step S443 to determine a view of which the picture is to be referred to.

[0364]

When it is determined that the picture of a different view is to be referred to, in step S444, the different picture-based predictive vector generating unit 457 generates a predictive vector of the view direction from a encoded co-located block that is expanded in the view direction and the flow returns to the flowchart of Fig. 42.

[0365]

Moreover, when it is determined in step S443 that the picture of the same view is to be referred to, in step S445, the different picture-based predictive vector generating unit 457 generates the predictive vector of the temporal direction from the encoded co-located block and the flow returns to the flowchart of Fig. 42.

[0366]

[Flow of different picture-based predictive vector generation process]

Next, an example of the flow of the different picture-based predictive vector generation process executed in step S444 of Fig. 43 will be described with reference to the flowchart of Fig. 44.

[0367]

When the different picture-based predictive vector generation process starts, in step S461, the parallax vector determining unit 471 determines a shift amount from the parallax vector of the neighboring block.

[0368]

In step S462, the inter-view reference vector generating unit 472 selects a co-located block at a shifted position.

[0369]

In step S463, the inter-view reference vector generating unit 472 generates the predictive vector from the co-located block and the flow returns to the flowchart of Fig. 43.

[0370]

[Flow of shift amount determining process]

Next, an example of the flow of the shift amount determining process executed in step S461 of Fig. 44 will be described with reference to the flowchart of Fig. 45.

[0371]

In step S481, the parallax vector determining unit 471 determines whether there is a plurality of blocks in which the value of the Y-direction vector of the parallax vector of the neighboring block is not zero.

[0372]

The neighboring block is a block located near (including "adjacent") a current block (current block) of a processing target. For example, as illustrated in Fig. 46, a block (Left) adjacent to the left of a current block (Curr), a block (Above) adjacent above the current block, and a block (Above Right) adjacent to the top right corner of the current block are used as the neighboring blocks. Naturally, a block other than these blocks may be included in the neighboring block, and part or all of these blocks may not be used as the neighboring block.

[0373]

The positions of the neighboring blocks may be the same for all blocks and may be different from block to block. For example, when a block adjacent to a screen end or a slice boundary are used as the current block, part of the neighboring blocks may be set to be not usable.

[0374]

When it is determined in step S481 that there is not a plurality of blocks in which the value of the Y-direction vector is non-zero, the parallax vector determining unit 471 proceeds to the process of step S482 to use the parallax vector in the X-direction of the target as the shift amount, and the flow returns to the flowchart of Fig. 44.