FIG.1

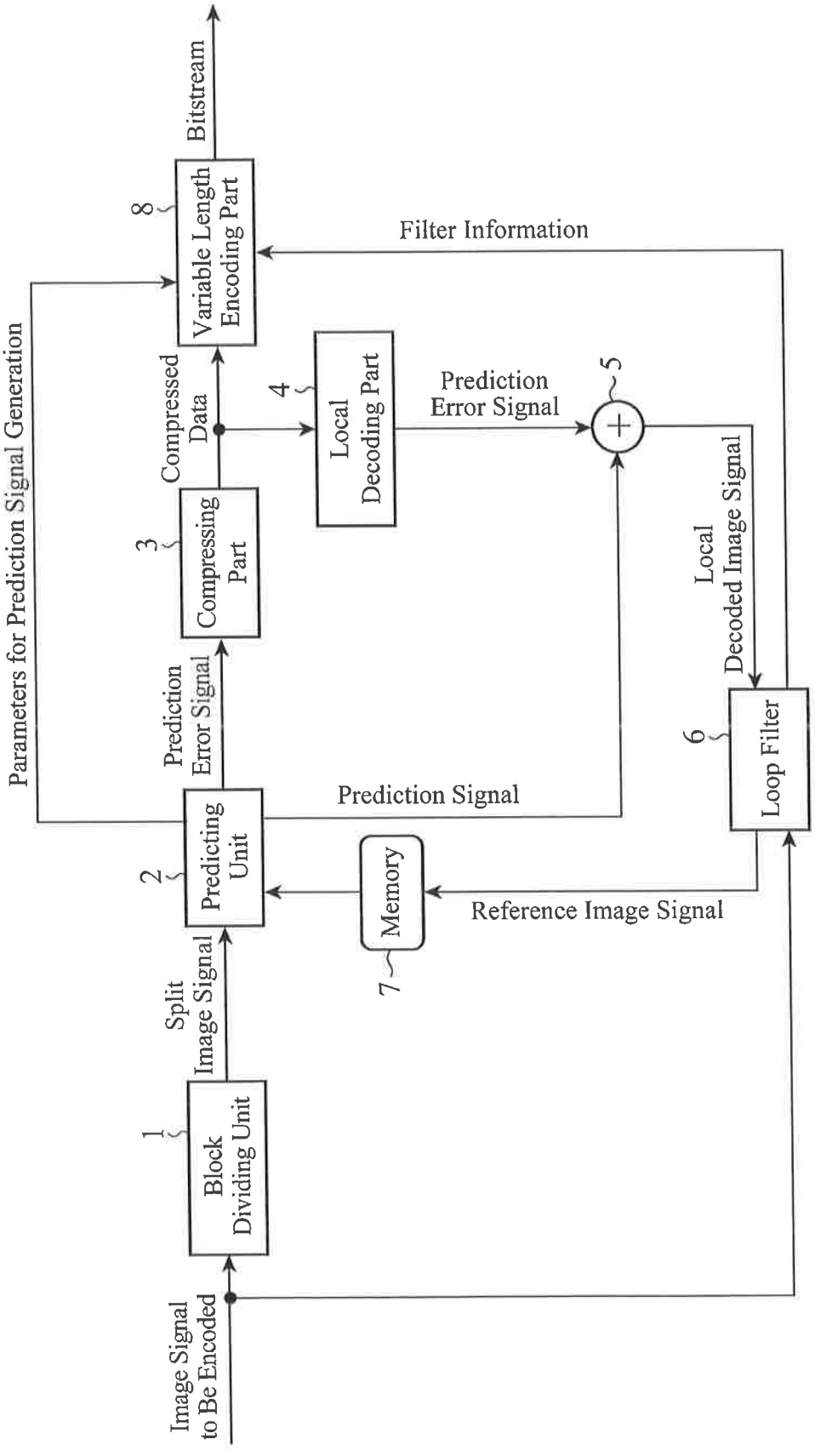

Image Signal to Be Encoded
1
Block Dividing Unit
Split Image Signal
2
Predicting Unit
Prediction Error Signal
3
Compressing Part
Compressed Data
4
Local Decoding Part
Prediction Error Signal
5
Local Decoded Image Signal
6
Loop Filter
7
Memory
Reference Image Signal
Prediction Signal
8
Variable Length Encoding Part
Bitstream
Filter Information
Parameters for Prediction Signal Generation

FIG.2

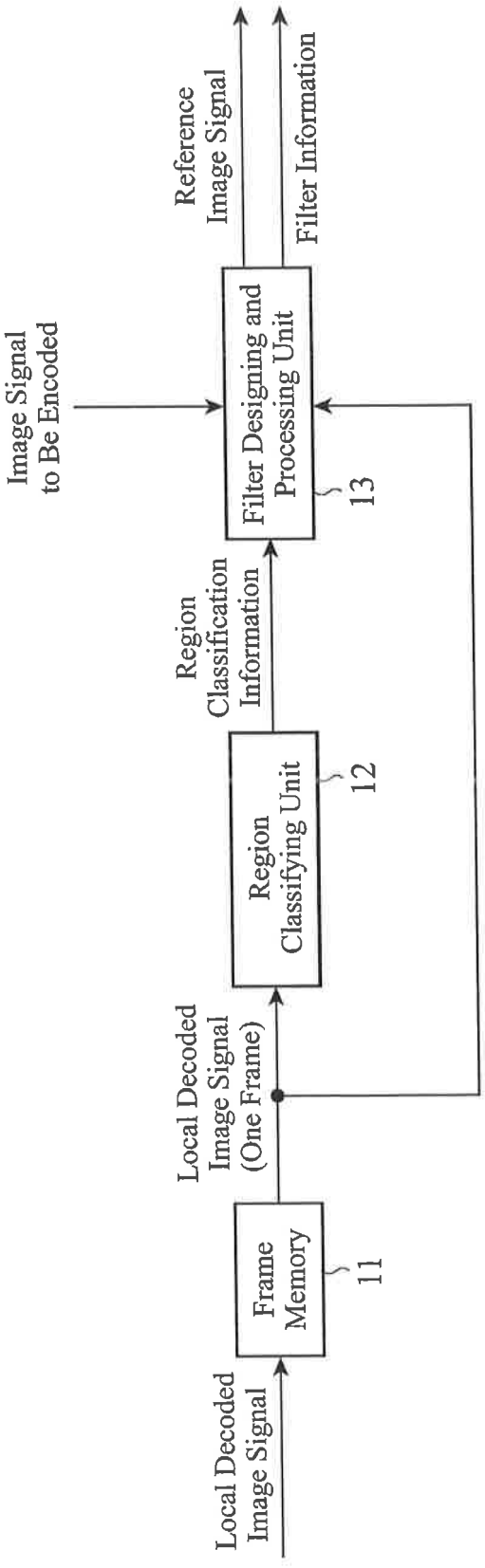

Local Decoded Image Signal
Frame Memory
11
Local Decoded Image Signal (One Frame)
Region Classifying Unit
12
Region Classification Information
Filter Designing and Processing Unit
13
Image Signal to Be Encoded
Reference Image Signal
Filter Information

FIG.3

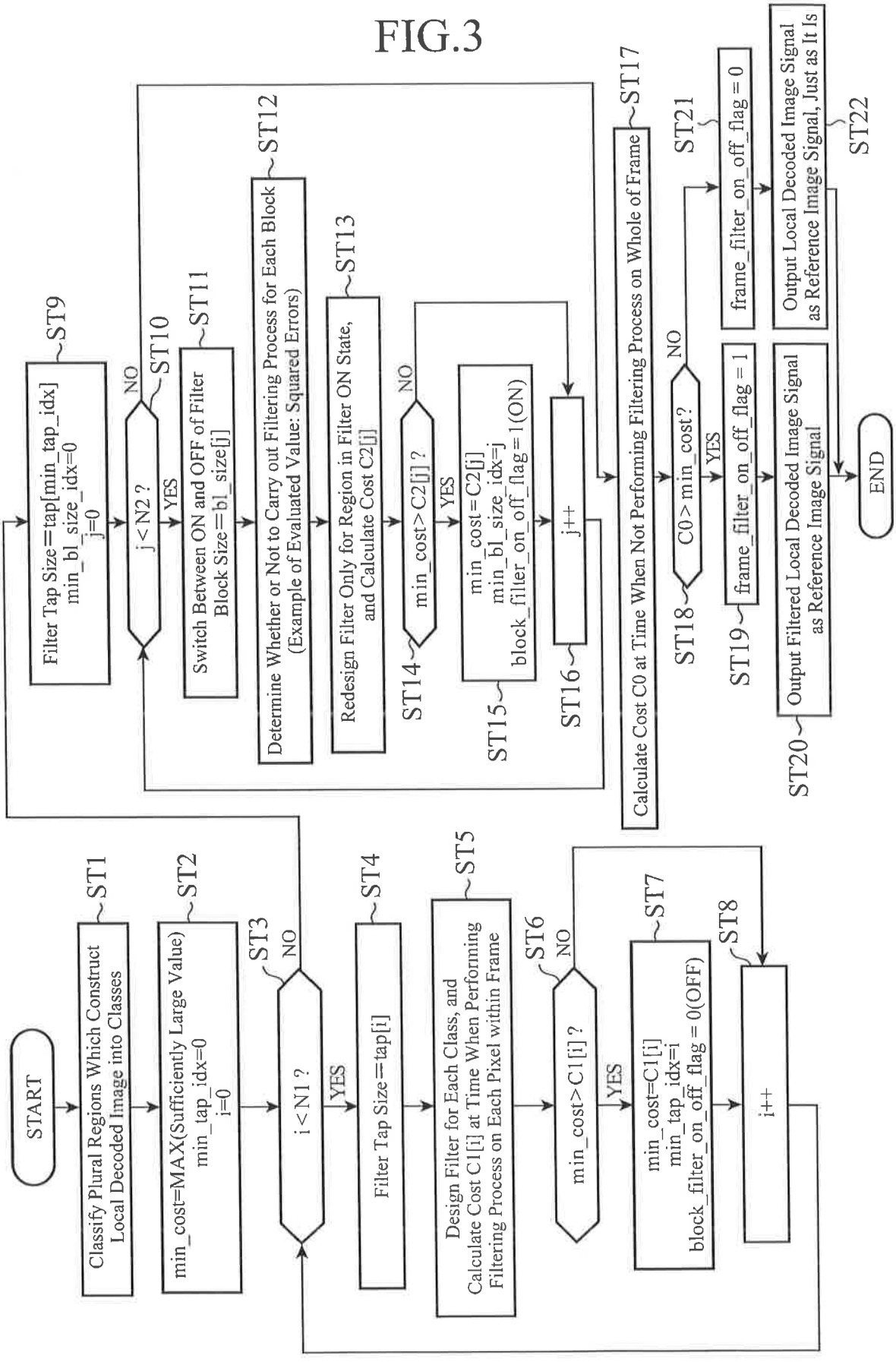

START
Classify Plural Regions Which Construct Local Decoded Image into Classes
ST1
min_cost=MAX(Sufficiently Large Value)
min_tap_idx=0
i=0
ST2
i < N1 ?
NO
YES
ST3
Filter Tap Size=tap[i]
ST4
Design Filter for Each Class, and Calculate Cost C1[i] at Time When Performing Filtering Process on Each Pixel within Frame
ST5
min_cost>C1[i] ?
NO
YES
ST6
min_cost=C1[i]
min_tap_idx=i
block_filter_on_off_flag = 0(OFF)
ST7
i++
ST8
Filter Tap Size=tap[min_tap_idx]
min_bl_size_idx=0
j=0
ST9
j < N2 ?
NO
YES
ST10
Switch Between ON and OFF of Filter Block Size=bl_size[j]
ST11
Determine Whether or Not to Carry out Filtering Process for Each Block (Example of Evaluated Value: Squared Errors)
ST12
Redesign Filter Only for Region in Filter ON State, and Calculate Cost C2[j]
ST13
min_cost>C2[j] ?
NO
YES
ST14
min_cost=C2[j]
min_bl_size_idx=j
block_filter_on_off_flag=1(ON)
ST15
j++
ST16
Calculate Cost C0 at Time When Not Performing Filtering Process on Whole of Frame
ST17
C0 > min_cost ?
NO
YES
ST18
frame_filter_on_off_flag = 1
ST19
Output Filtered Local Decoded Image Signal as Reference Image Signal
ST20
frame_filter_on_off_flag = 0
ST21
Output Local Decoded Image Signal as Reference Image Signal, Just as It Is
ST22
END

FIG.4

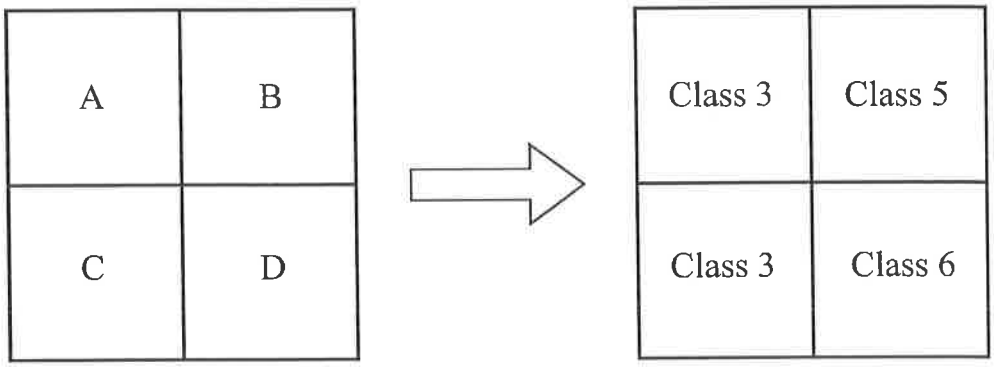


FIG.5

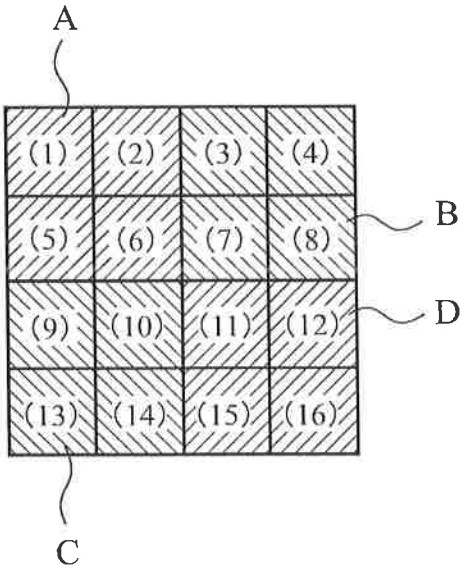


FIG.6

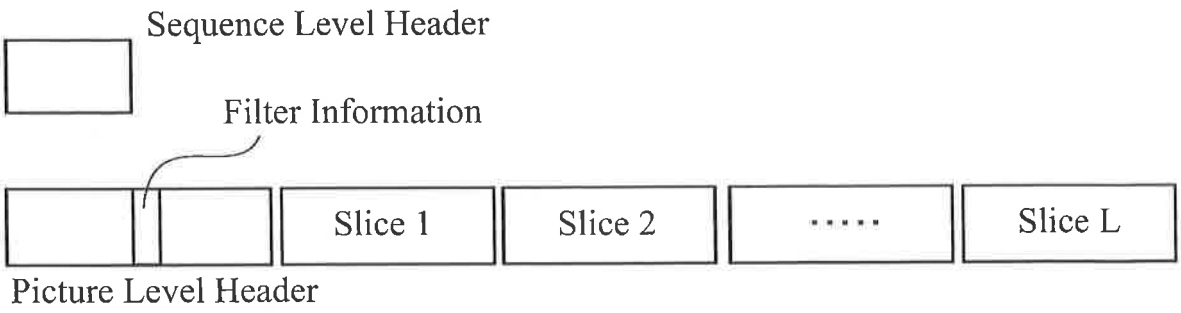


FIG.7

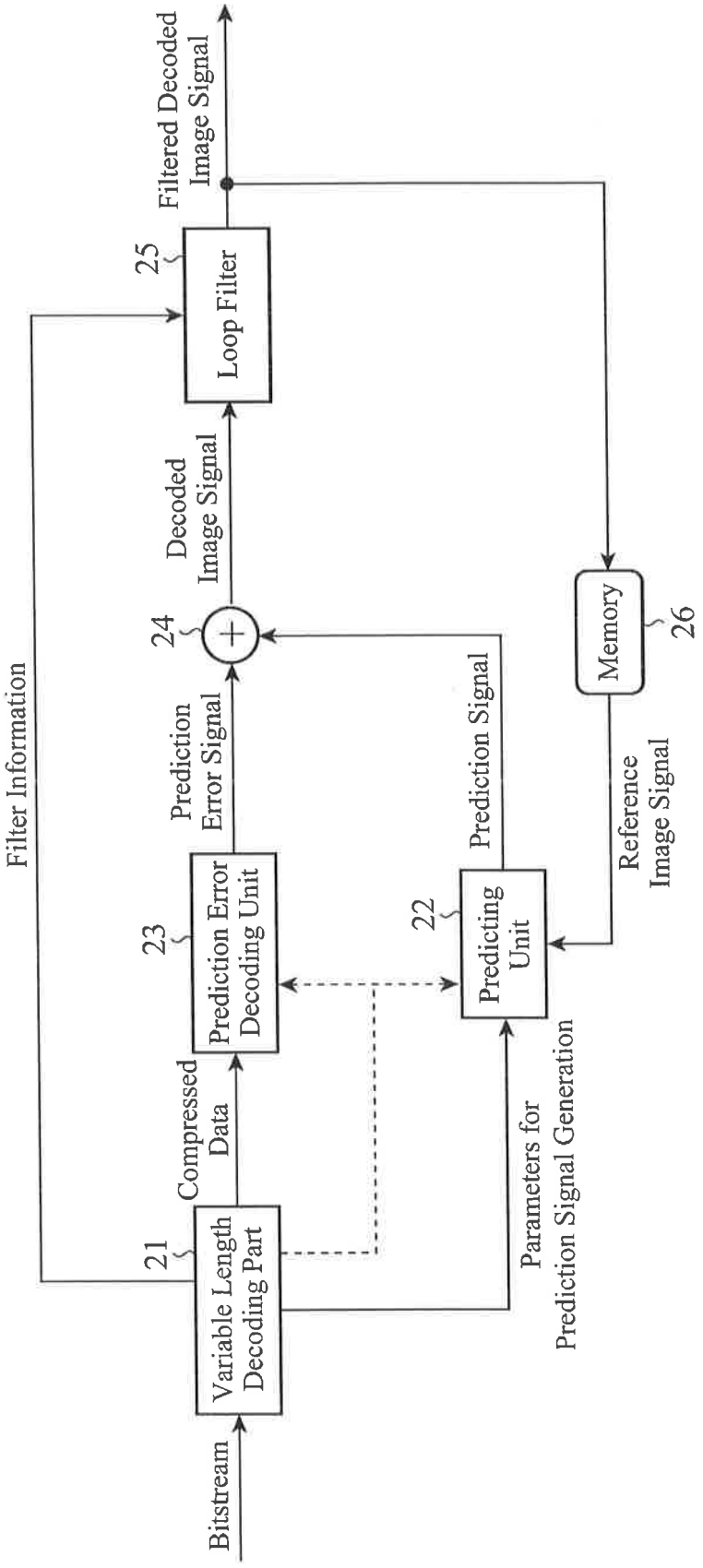

Bitstream
Variable Length Decoding Part
21
Compressed Data
Prediction Error Decoding Unit
23
Prediction Error Signal
24
Decoded Image Signal
Loop Filter
25
Filtered Decoded Image Signal
Filter Information
Predicting Unit
22
Prediction Signal
Parameters for Prediction Signal Generation
Memory
26
Reference Image Signal

FIG.8

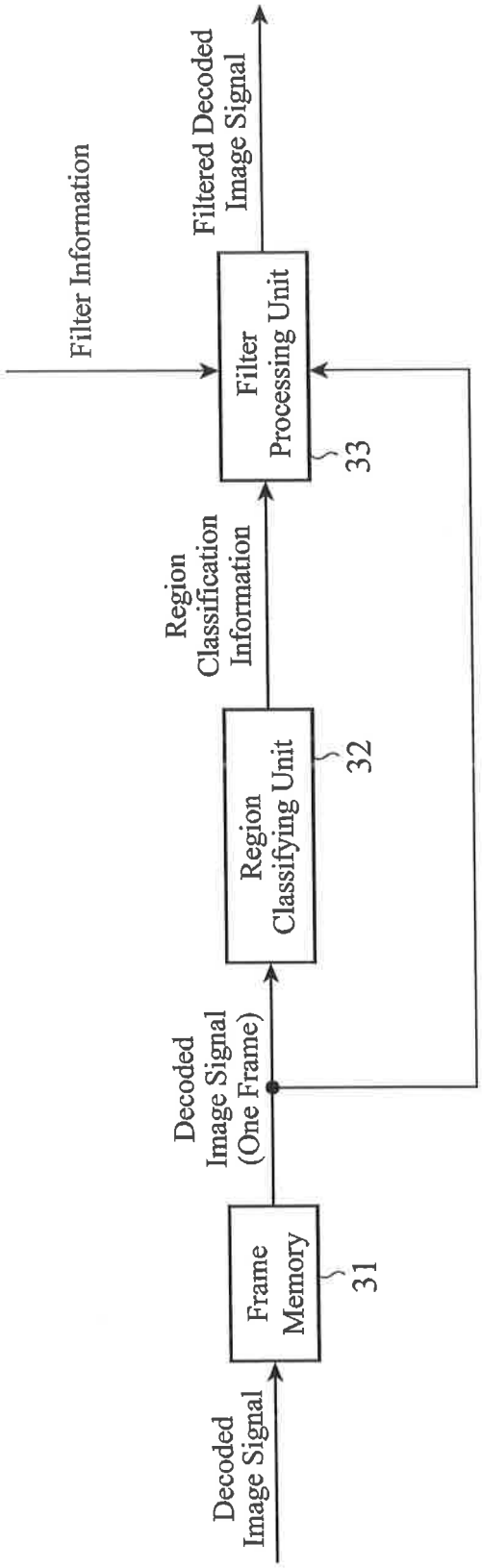

Decoded Image Signal
Frame Memory
31
Decoded Image Signal (One Frame)
Region Classifying Unit
32
Region Classification Information
Filter Processing Unit
33
Filter Information
Filtered Decoded Image Signal

FIG.9

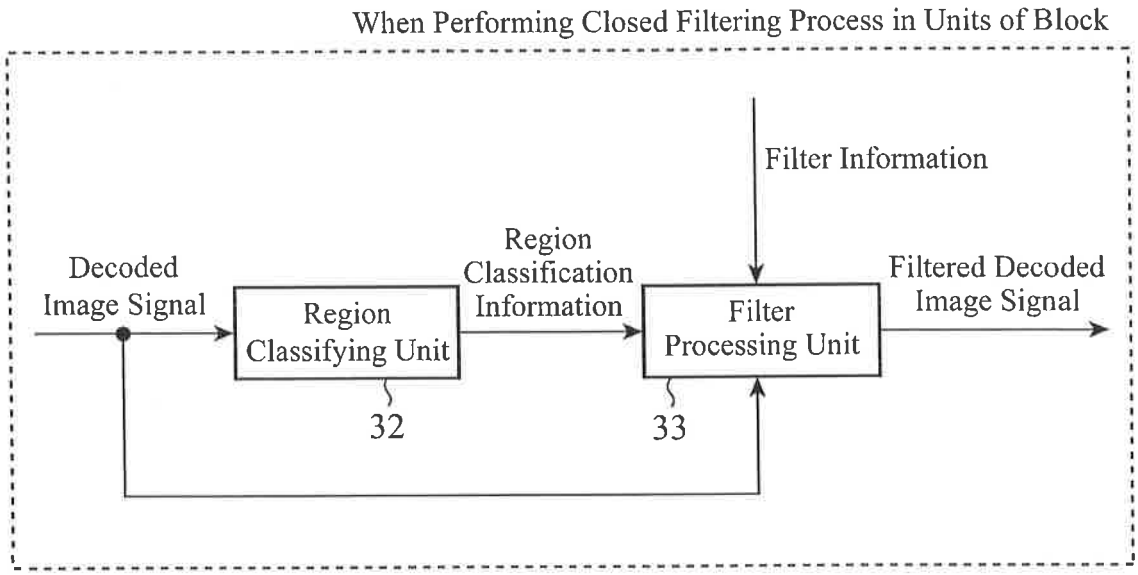

When Performing Closed Filtering Process in Units of Block
Filter Information
Decoded Image Signal
Region Classifying Unit
Region Classification Information
Filter Processing Unit
Filtered Decoded Image Signal
32
33

FIG.10

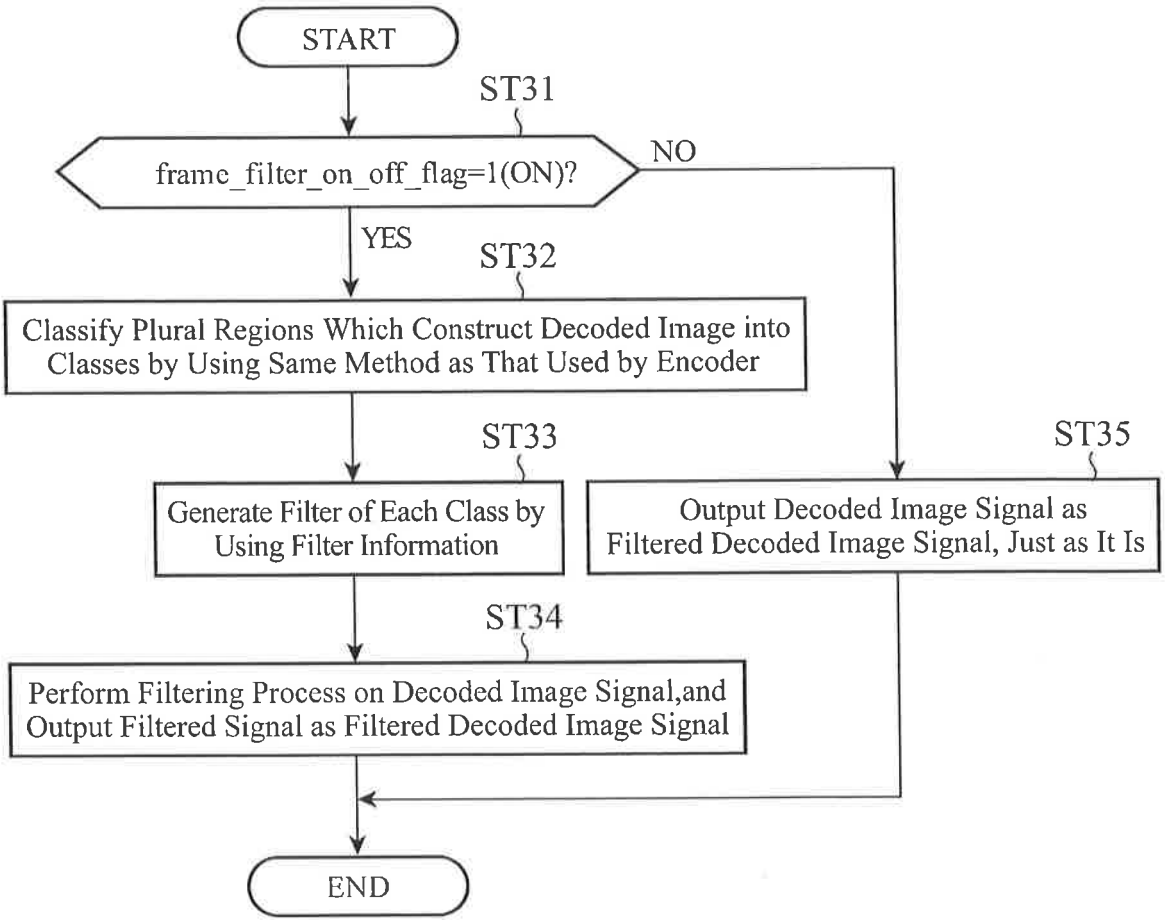

START
ST31
frame_filter_on_off_flag=1(ON)?
NO
YES
ST32
Classify Plural Regions Which Construct Decoded Image into Classes by Using Same Method as That Used by Encoder
ST33
Generate Filter of Each Class by Using Filter Information
ST35
Output Decoded Image Signal as Filtered Decoded Image Signal, Just as It Is
ST34
Perform Filtering Process on Decoded Image Signal,and Output Filtered Signal as Filtered Decoded Image Signal
END

FIG.11

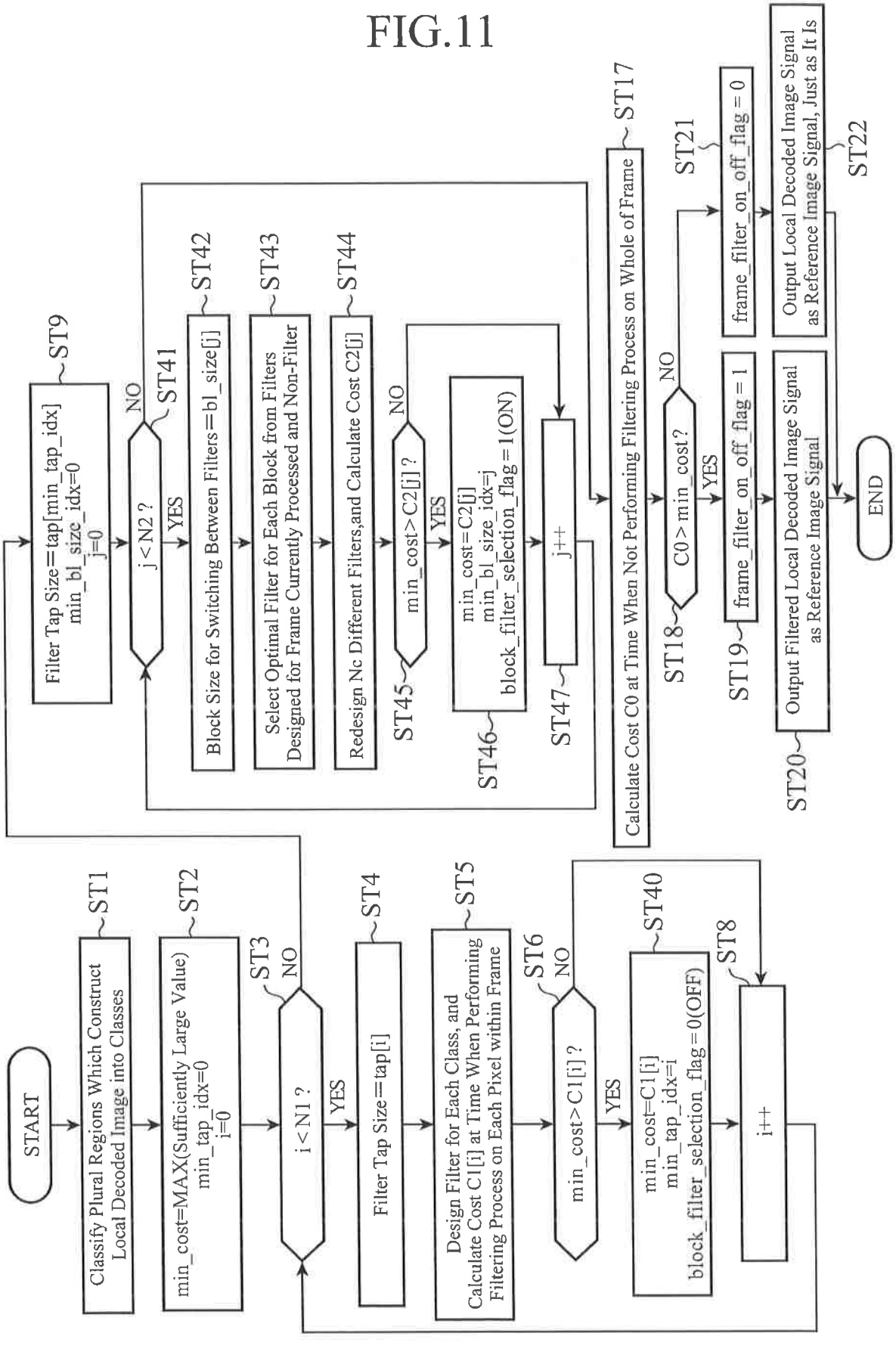

START
Classify Plural Regions Which Construct Local Decoded Image into Classes
ST1
min_cost=MAX(Sufficiently Large Value)
min_tap_idx=0
i=0
ST2
i < N1 ?
NO
YES
ST3
Filter Tap Size = tap[i]
ST4
Design Filter for Each Class, and Calculate Cost C1[i] at Time When Performing Filtering Process on Each Pixel within Frame
ST5
min_cost > C1[i] ?
NO
YES
ST6
min_cost=C1[i]
min_tap_idx=i
block_filter_selection_flag = 0(OFF)
ST40
i++
ST8
Filter Tap Size = tap[min_tap_idx]
min_bl_size_idx=0
j=0
ST9
j < N2 ?
NO
YES
ST41
Block Size for Switching Between Filters = bl_size[j]
ST42
Select Optimal Filter for Each Block from Filters Designed for Frame Currently Processed and Non-Filter
ST43
Redesign Nc Different Filters,and Calculate Cost C2[j]
ST44
min_cost > C2[j] ?
NO
YES
ST45
min_cost=C2[j]
min_bl_size_idx=j
block_filter_selection_flag = 1(ON)
ST46
j++
ST47
Calculate Cost C0 at Time When Not Performing Filtering Process on Whole of Frame
ST17
C0 > min_cost ?
NO
YES
ST18
frame_filter_on_off_flag = 0
ST21
frame_filter_on_off_flag = 1
ST19
Output Filtered Local Decoded Image Signal as Reference Image Signal
ST20
Output Local Decoded Image Signal as Reference Image Signal, Just as It Is
ST22
END

FIG.12

W_2	W_3	W_3	W_2
W_1	W_2	W_3	W_4
W_2	W_1	W_1	W_2
W_3	W_3	W_4	W_1

FIG.13

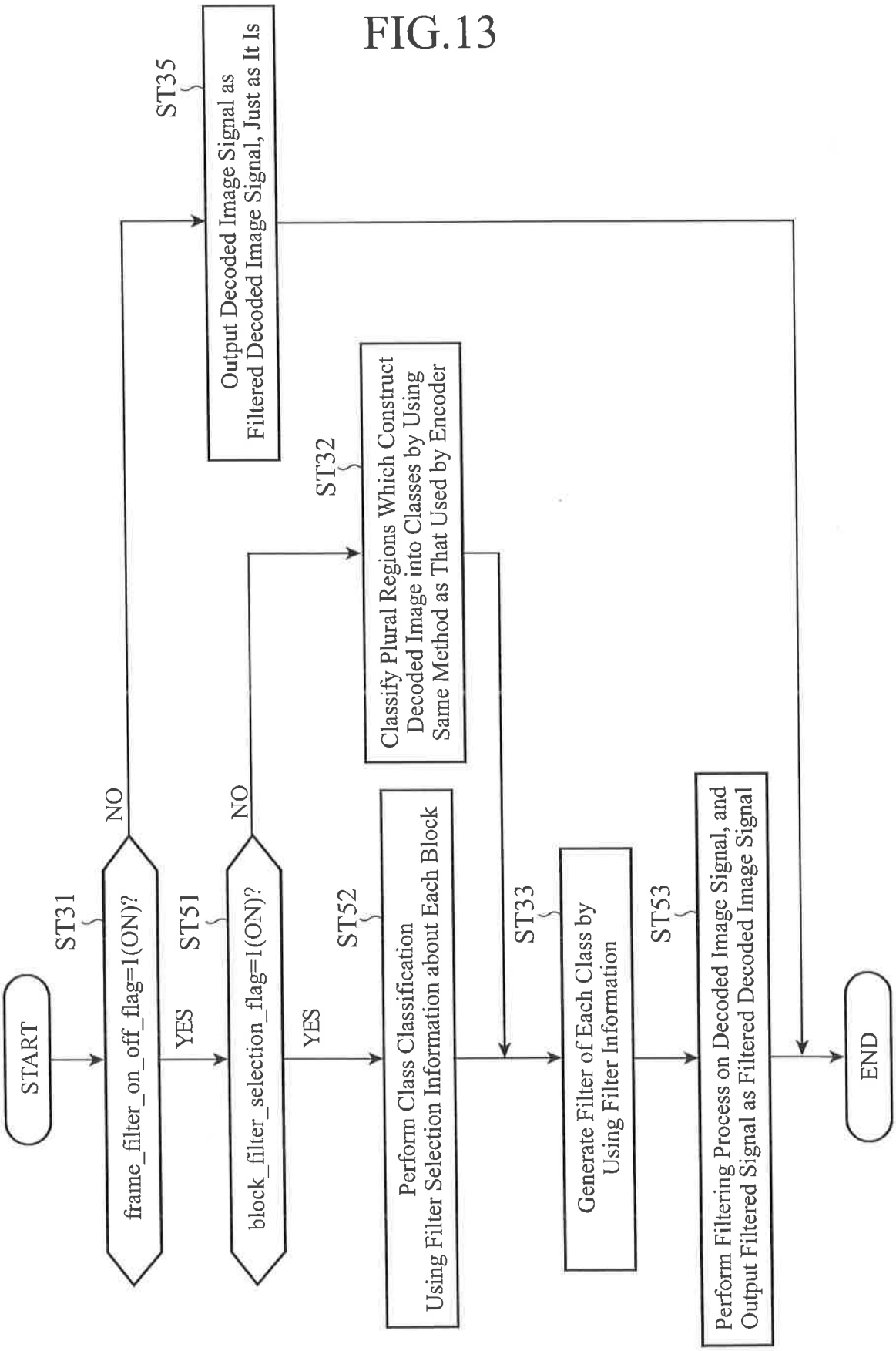

START
ST31
frame_filter_on_off_flag=1(ON)?
NO
YES
ST51
block_filter_selection_flag=1(ON)?
NO
YES
ST35
Output Decoded Image Signal as Filtered Decoded Image Signal, Just as It Is
ST32
Classify Plural Regions Which Construct Decoded Image into Classes by Using Same Method as That Used by Encoder
ST52
Perform Class Classification Using Filter Selection Information about Each Block
ST33
Generate Filter of Each Class by Using Filter Information
ST53
Perform Filtering Process on Decoded Image Signal, and Output Filtered Signal as Filtered Decoded Image Signal
END

FIG.14

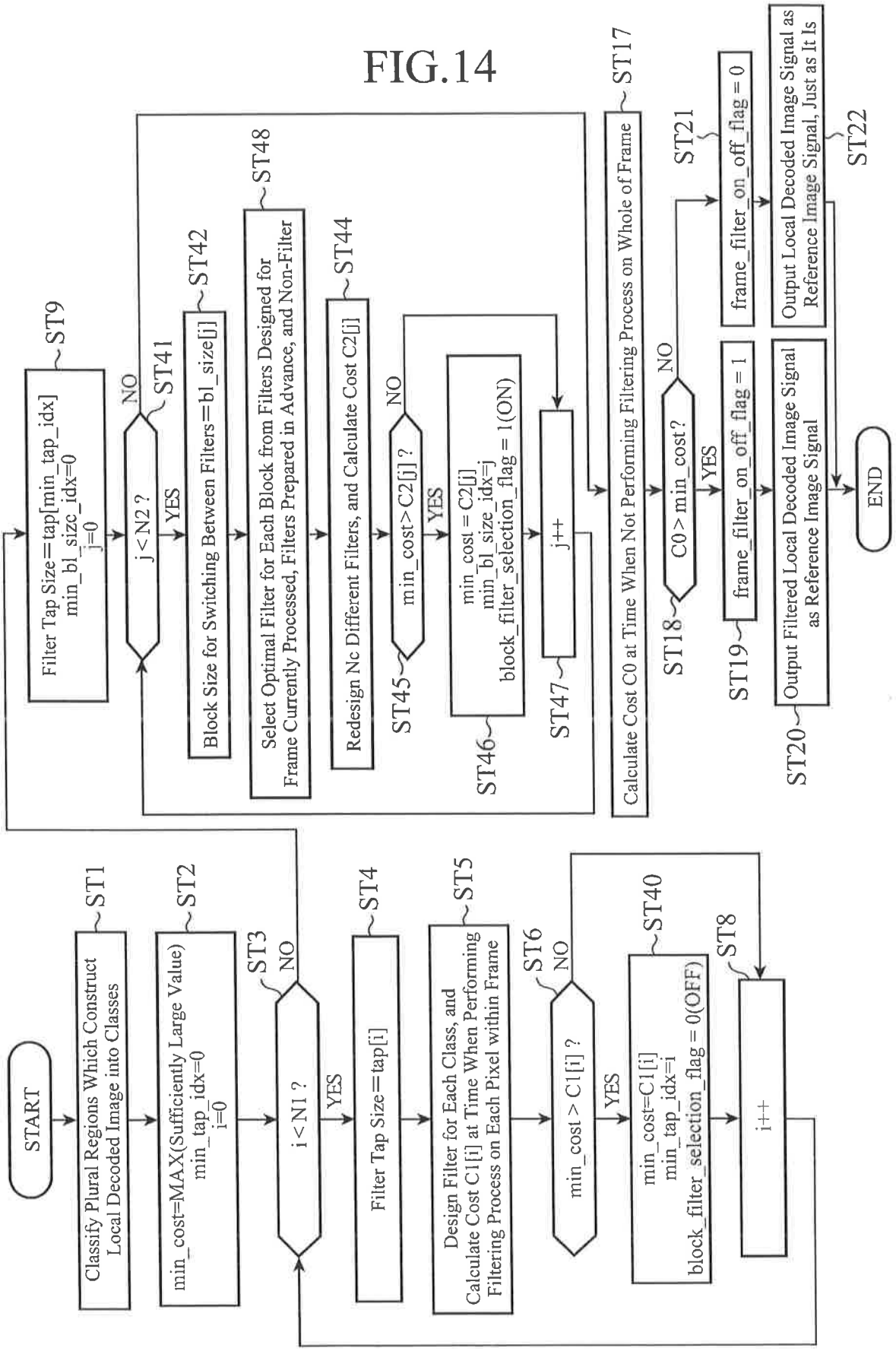

START
Classify Plural Regions Which Construct Local Decoded Image into Classes
ST1
min_cost=MAX(Sufficiently Large Value)
min_tap_idx=0
i=0
ST2
i < N1 ?
NO
YES
ST3
Filter Tap Size=tap[i]
ST4
Design Filter for Each Class, and Calculate Cost C1[i] at Time When Performing Filtering Process on Each Pixel within Frame
ST5
min_cost > C1[i] ?
NO
YES
ST6
min_cost=C1[i]
min_tap_idx=i
block_filter_selection_flag = 0(OFF)
ST40
i++
ST8
Filter Tap Size=tap[min_tap_idx]
min_bl_size_idx=0
j=0
ST9
j < N2 ?
NO
YES
ST41
Block Size for Switching Between Filters=bl_size[j]
ST42
Select Optimal Filter for Each Block from Filters Designed for Frame Currently Processed, Filters Prepared in Advance, and Non-Filter
ST48
Redesign Nc Different Filters, and Calculate Cost C2[j]
ST44
min_cost>C2[j] ?
NO
YES
ST45
min_cost = C2[j]
min_bl_size_idx=j
block_filter_selection_flag = 1(ON)
ST46
j++
ST47
Calculate Cost C0 at Time When Not Performing Filtering Process on Whole of Frame
ST17
C0 > min_cost ?
NO
YES
ST18
frame_filter_on_off_flag = 0
ST21
frame_filter_on_off_flag = 1
ST19
Output Filtered Local Decoded Image Signal as Reference Image Signal
ST20
Output Local Decoded Image Signal as Reference Image Signal, Just as It Is
ST22
END

FIG.15

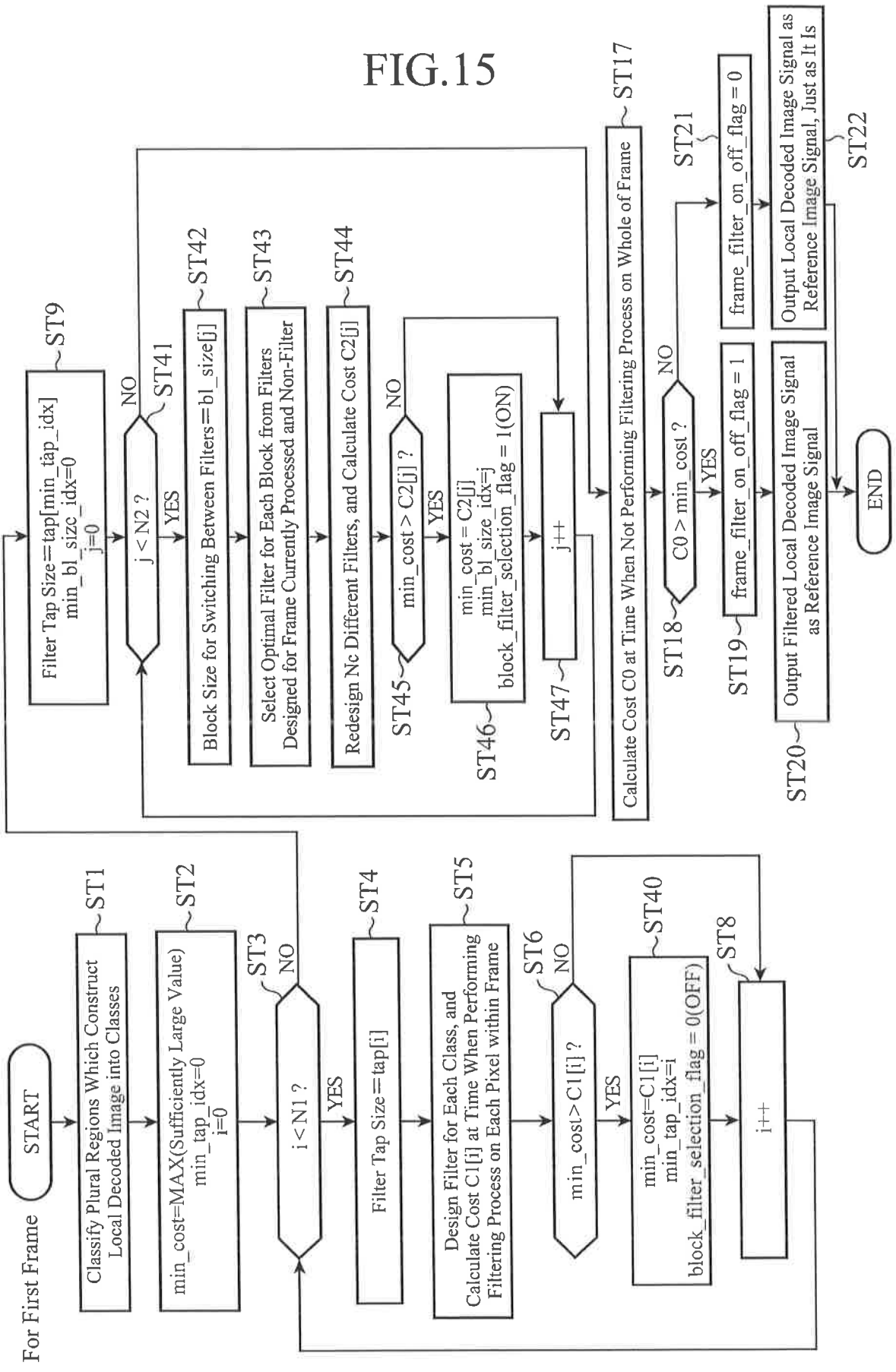

For First Frame
START
ST1
Classify Plural Regions Which Construct Local Decoded Image into Classes
ST2
min_cost=MAX(Sufficiently Large Value)
min_tap_idx=0
i=0
ST3
i < N1 ?
NO
YES
ST4
Filter Tap Size=tap[i]
ST5
Design Filter for Each Class, and Calculate Cost C1[i] at Time When Performing Filtering Process on Each Pixel within Frame
ST6
min_cost>C1[i] ?
NO
YES
ST40
min_cost=C1[i]
min_tap_idx=i
block_filter_selection_flag = 0(OFF)
ST8
i++
ST9
Filter Tap Size=tap[min_tap_idx]
min_bl_size_idx=0
j=0
ST41
j < N2 ?
NO
YES
ST42
Block Size for Switching Between Filters=bl_size[j]
ST43
Select Optimal Filter for Each Block from Filters Designed for Frame Currently Processed and Non-Filter
ST44
Redesign Nc Different Filters, and Calculate Cost C2[j]
ST45
min_cost > C2[j] ?
NO
YES
ST46
min_cost = C2[j]
min_bl_size_idx=j
block_filter_selection_flag = 1(ON)
ST47
j++
ST17
Calculate Cost C0 at Time When Not Performing Filtering Process on Whole of Frame
ST18
C0 > min_cost ?
NO
YES
ST19
frame_filter_on_off_flag = 1
ST21
frame_filter_on_off_flag = 0
ST20
Output Filtered Local Decoded Image Signal as Reference Image Signal
ST22
Output Local Decoded Image Signal as Reference Image Signal, Just as It Is
END

FIG.16

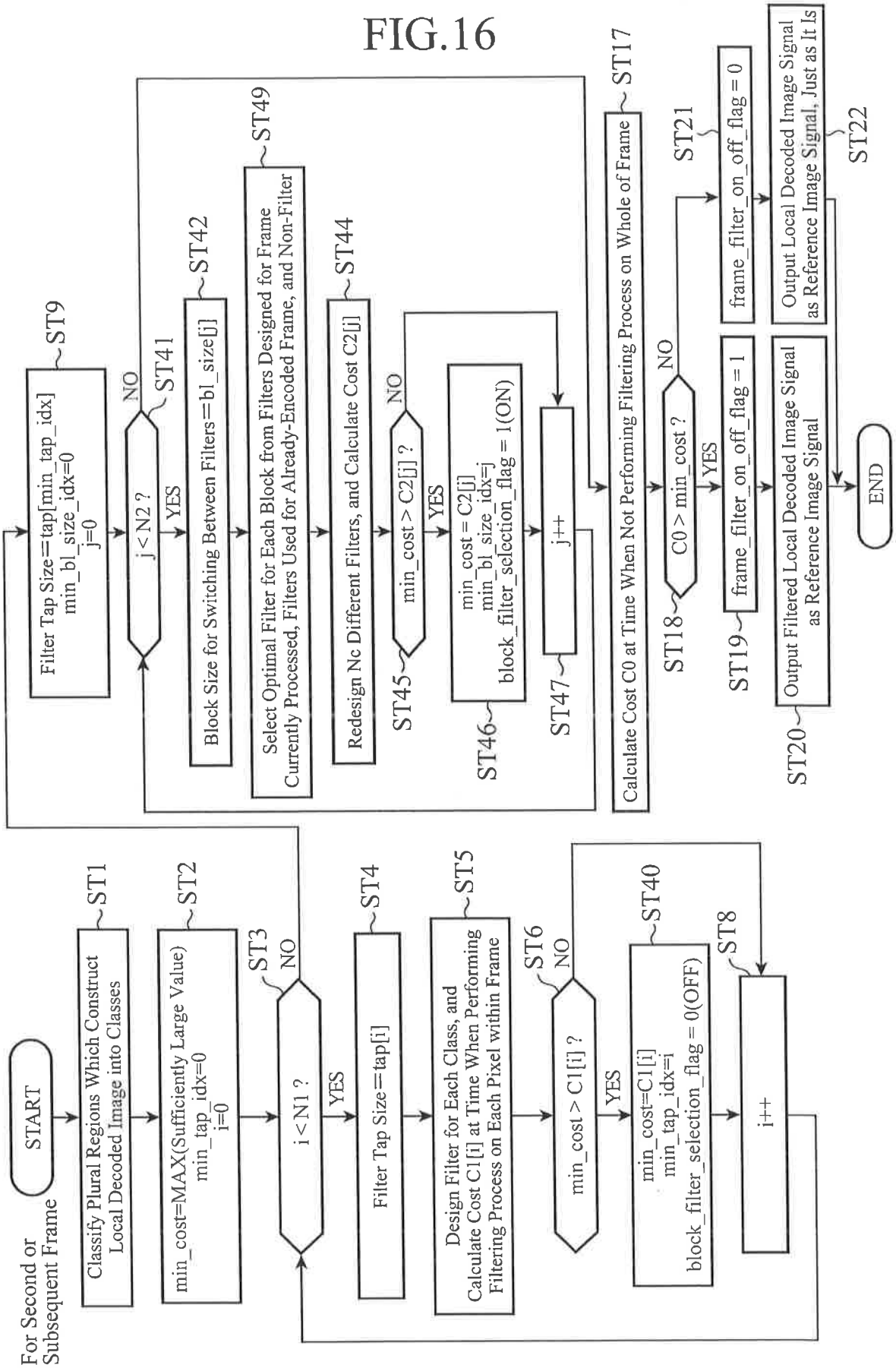

START
For Second or Subsequent Frame
Classify Plural Regions Which Construct Local Decoded Image into Classes
ST1
min_cost=MAX(Sufficiently Large Value)
min_tap_idx=0
i=0
ST2
i < N1 ?
ST3
NO
YES
Filter Tap Size=tap[i]
ST4
Design Filter for Each Class, and Calculate Cost C1[i] at Time When Performing Filtering Process on Each Pixel within Frame
ST5
min_cost > C1[i] ?
ST6
NO
YES
min_cost=C1[i]
min_tap_idx=i
block_filter_selection_flag = 0(OFF)
ST40
i++
ST8
Filter Tap Size=tap[min_tap_idx]
min_bl_size_idx=0
j=0
ST9
j < N2 ?
ST41
NO
YES
Block Size for Switching Between Filters=bl_size[j]
ST42
Select Optimal Filter for Each Block from Filters Designed for Frame Currently Processed, Filters Used for Already-Encoded Frame, and Non-Filter
ST49
Redesign Nc Different Filters, and Calculate Cost C2[j]
ST44
min_cost > C2[j] ?
ST45
NO
YES
min_cost = C2[j]
min_bl_size_idx=j
block_filter_selection_flag = 1(ON)
ST46
j++
ST47
Calculate Cost C0 at Time When Not Performing Filtering Process on Whole of Frame
ST17
C0 > min_cost ?
ST18
NO
YES
frame_filter_on_off_flag = 0
ST21
frame_filter_on_off_flag = 1
ST19
Output Filtered Local Decoded Image Signal as Reference Image Signal
ST20
Output Local Decoded Image Signal as Reference Image Signal, Just as It Is
ST22
END

FIG.17

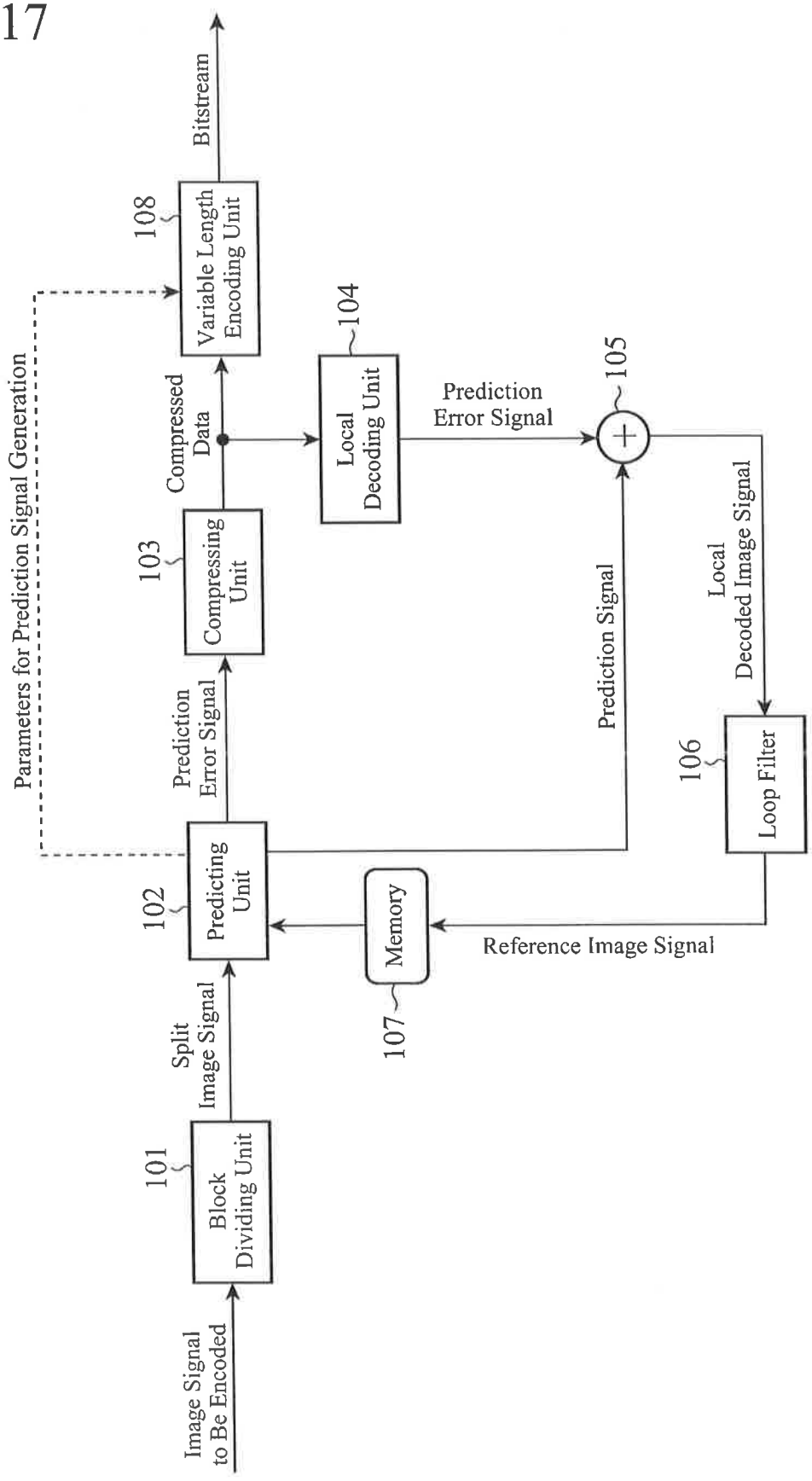

Image Signal to Be Encoded
101
Block Dividing Unit
Split Image Signal
102
Predicting Unit
Prediction Error Signal
103
Compressing Unit
Compressed Data
108
Variable Length Encoding Unit
Bitstream
Parameters for Prediction Signal Generation
104
Local Decoding Unit
Prediction Error Signal
105
Prediction Signal
Local Decoded Image Signal
106
Loop Filter
107
Memory
Reference Image Signal

FIG.18

