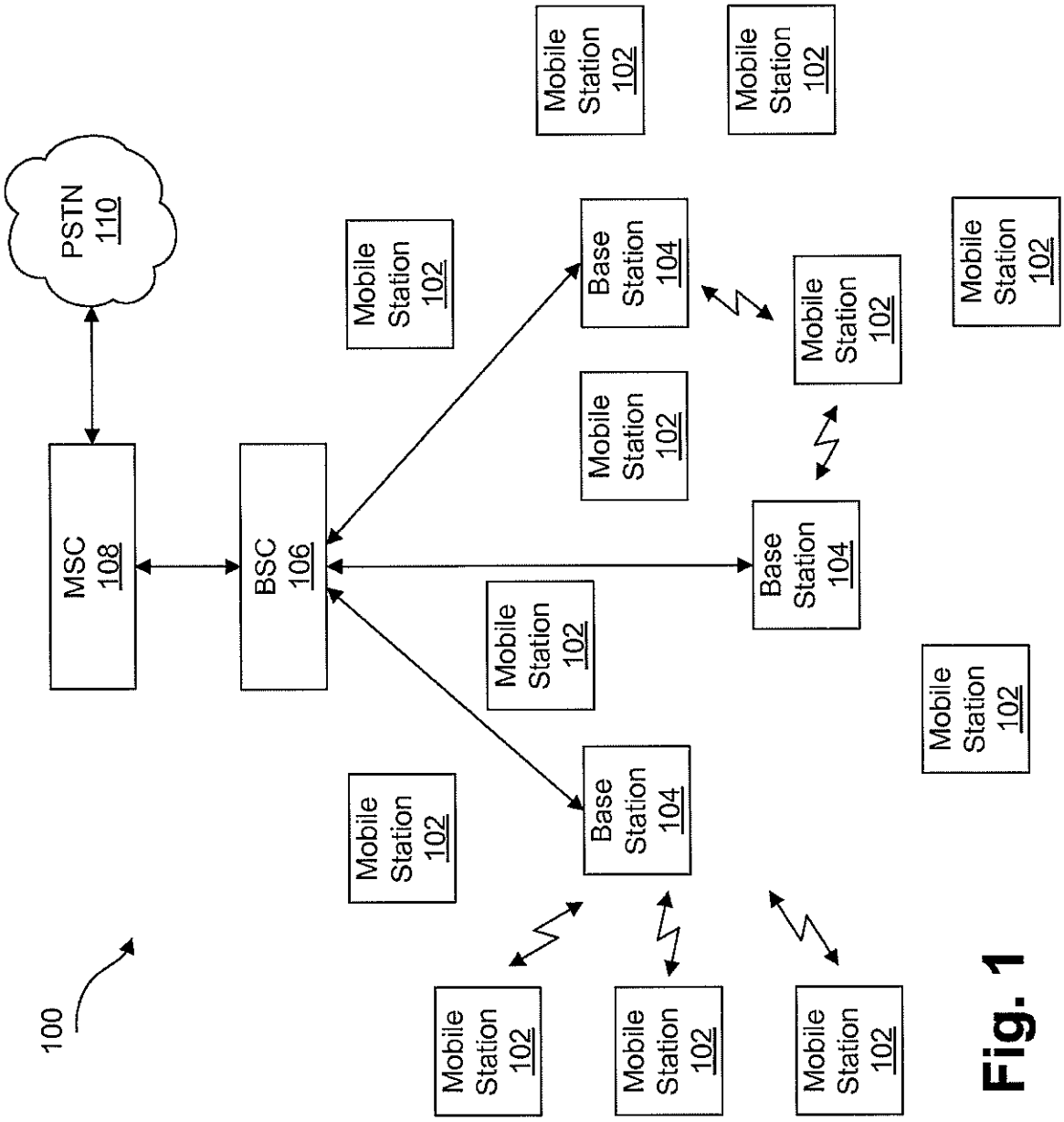

PSTN 110
MSC 108
BSC 106
Base Station 104
Base Station 104
Base Station 104
Mobile Station 102
Mobile Station 102
Mobile Station 102
Mobile Station 102
Mobile Station 102
Mobile Station 102
Mobile Station 102
Mobile Station 102
Mobile Station 102
Mobile Station 102
Mobile Station 102
Mobile Station 102
100

Fig. 1

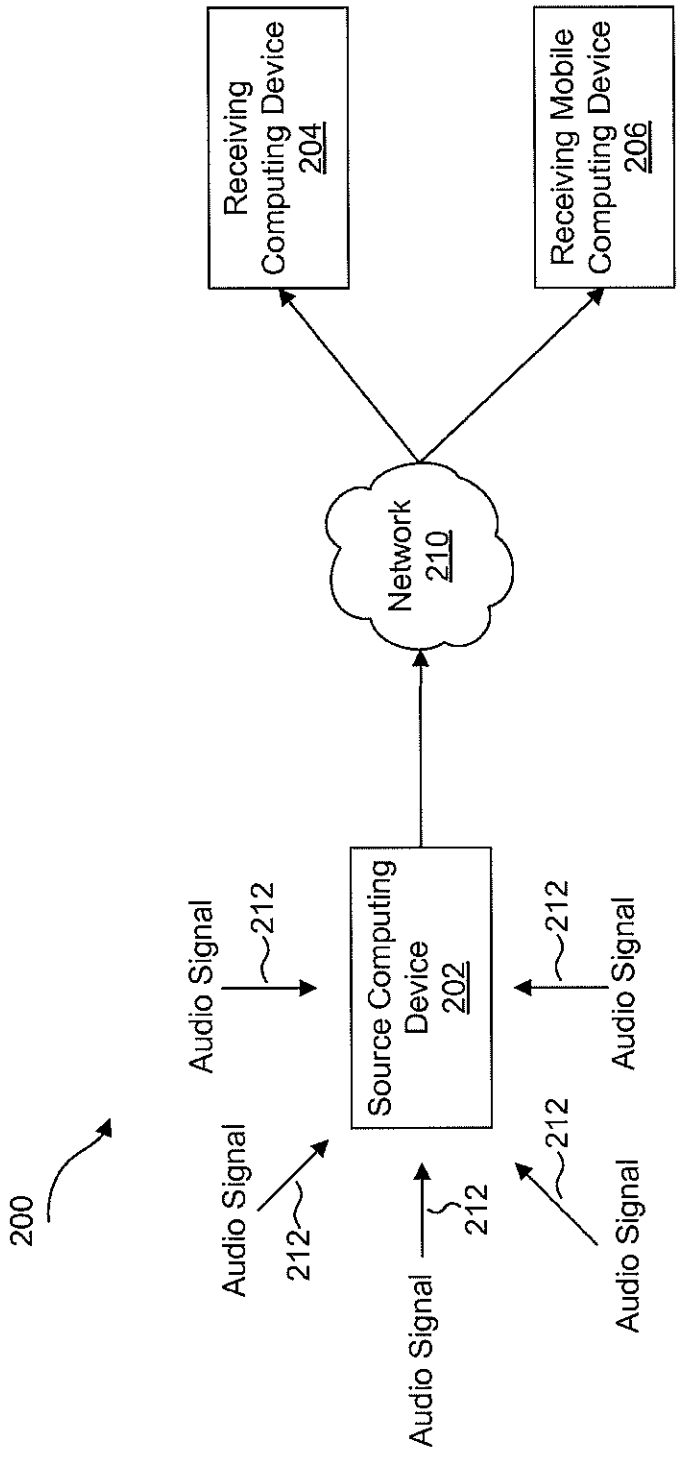

Receiving Computing Device 204
Receiving Mobile Computing Device 206
Network 210
Source Computing Device 202
Audio Signal
212
200

Fig. 2

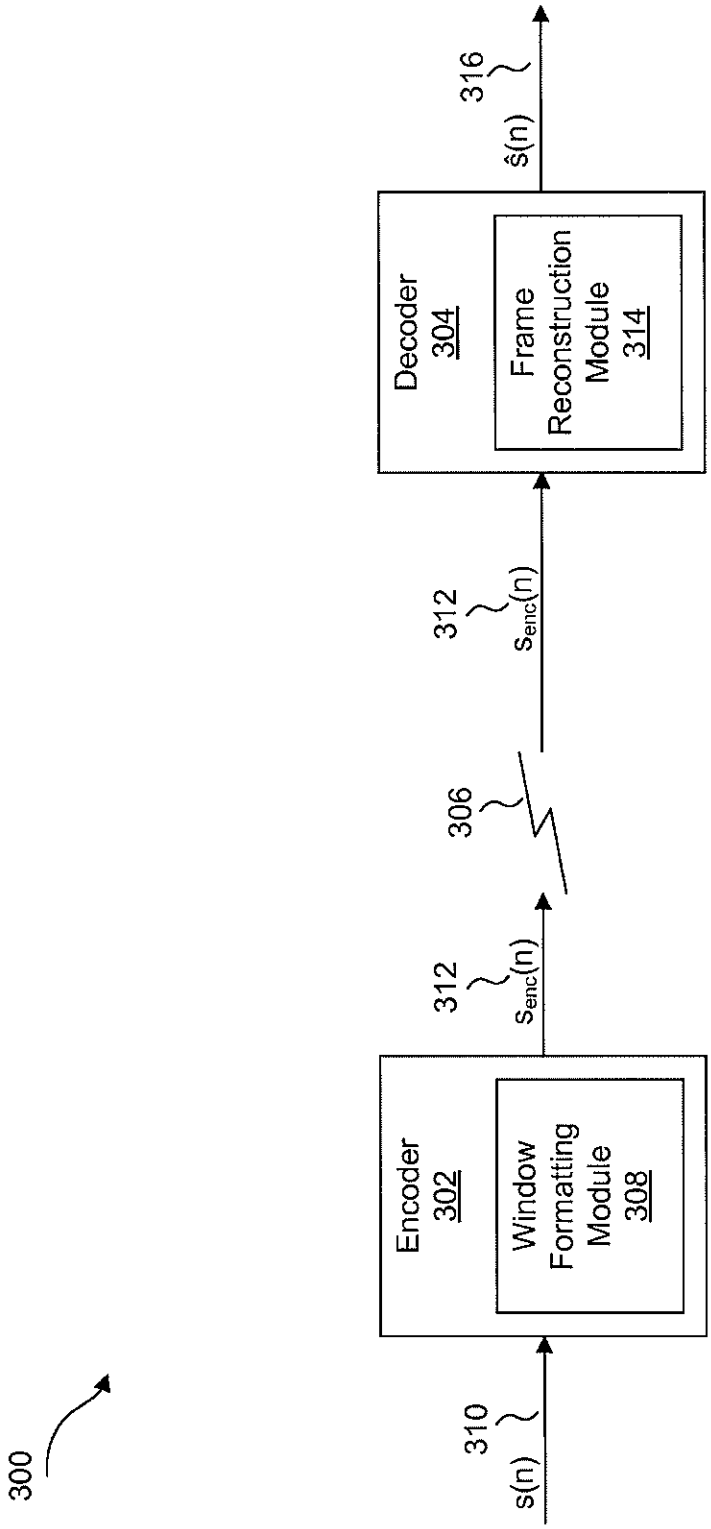

300
310
s(n)
Encoder
302
Window
Formatting
Module
308
312
$s_{enc}(n)$
306
312
$s_{enc}(n)$
Decoder
304
Frame
Reconstruction
Module
314
316
ŝ(n)

Fig. 3

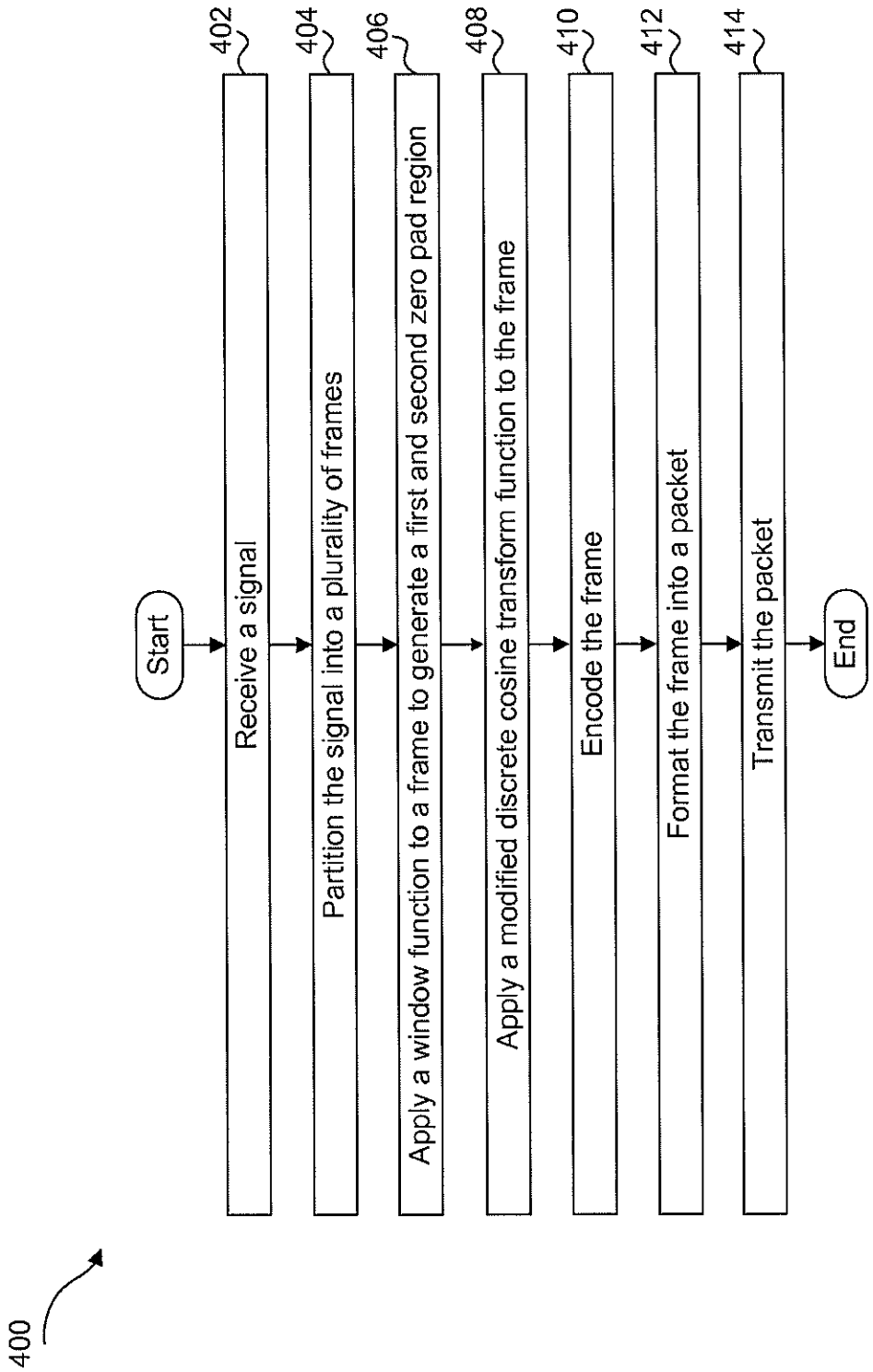

400
Start
Receive a signal
402
Partition the signal into a plurality of frames
404
Apply a window function to a frame to generate a first and second zero pad region
406
Apply a modified discrete cosine transform function to the frame
408
Encode the frame
410
Format the frame into a packet
412
Transmit the packet
414
End

Fig. 4A

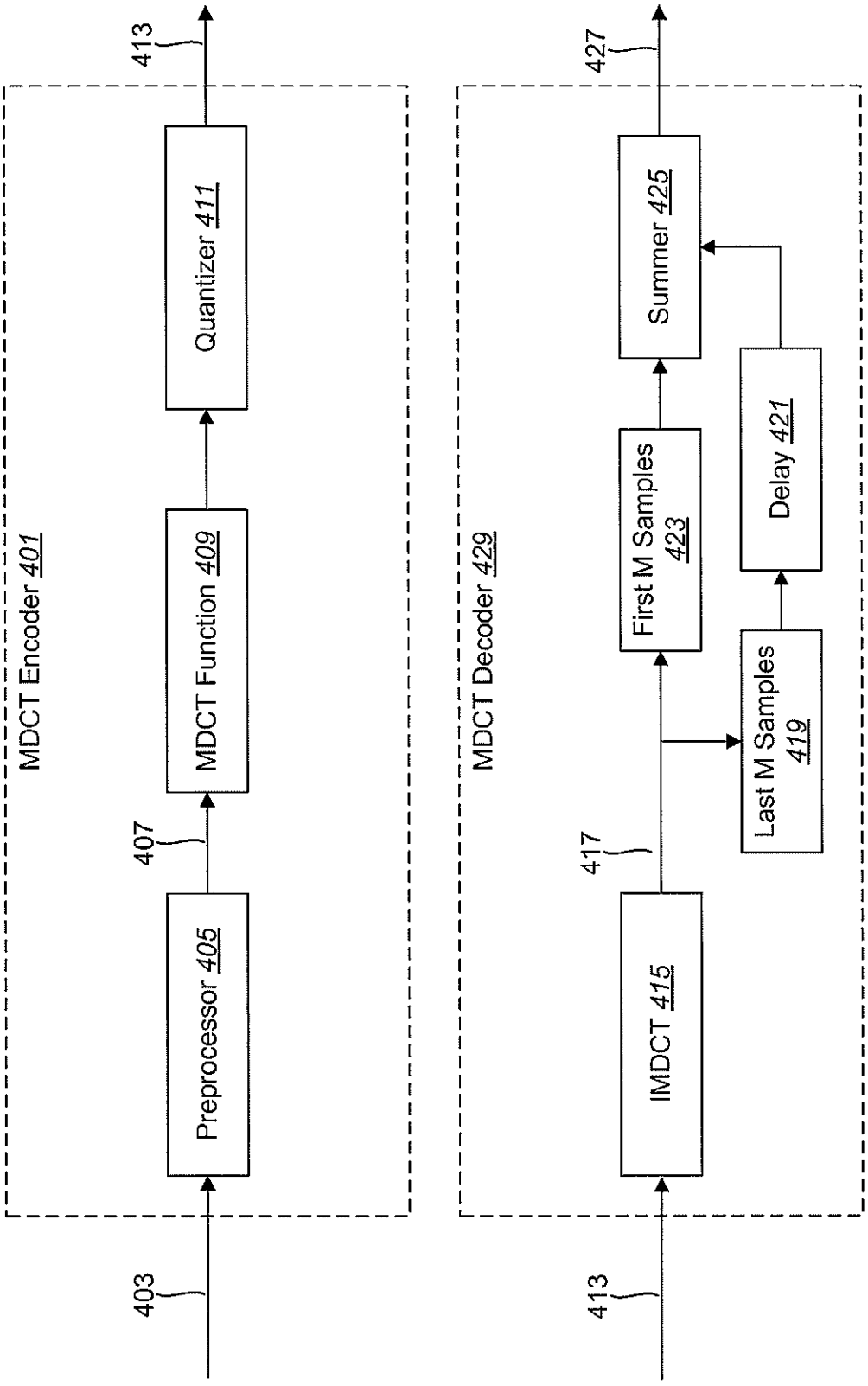

MDCT Encoder 401
Preprocessor 405
MDCT Function 409
Quantizer 411
403
407
413
MDCT Decoder 429
IMDCT 415
First M Samples 423
Last M Samples 419
Delay 421
Summer 425
413
417
427

Fig. 4B

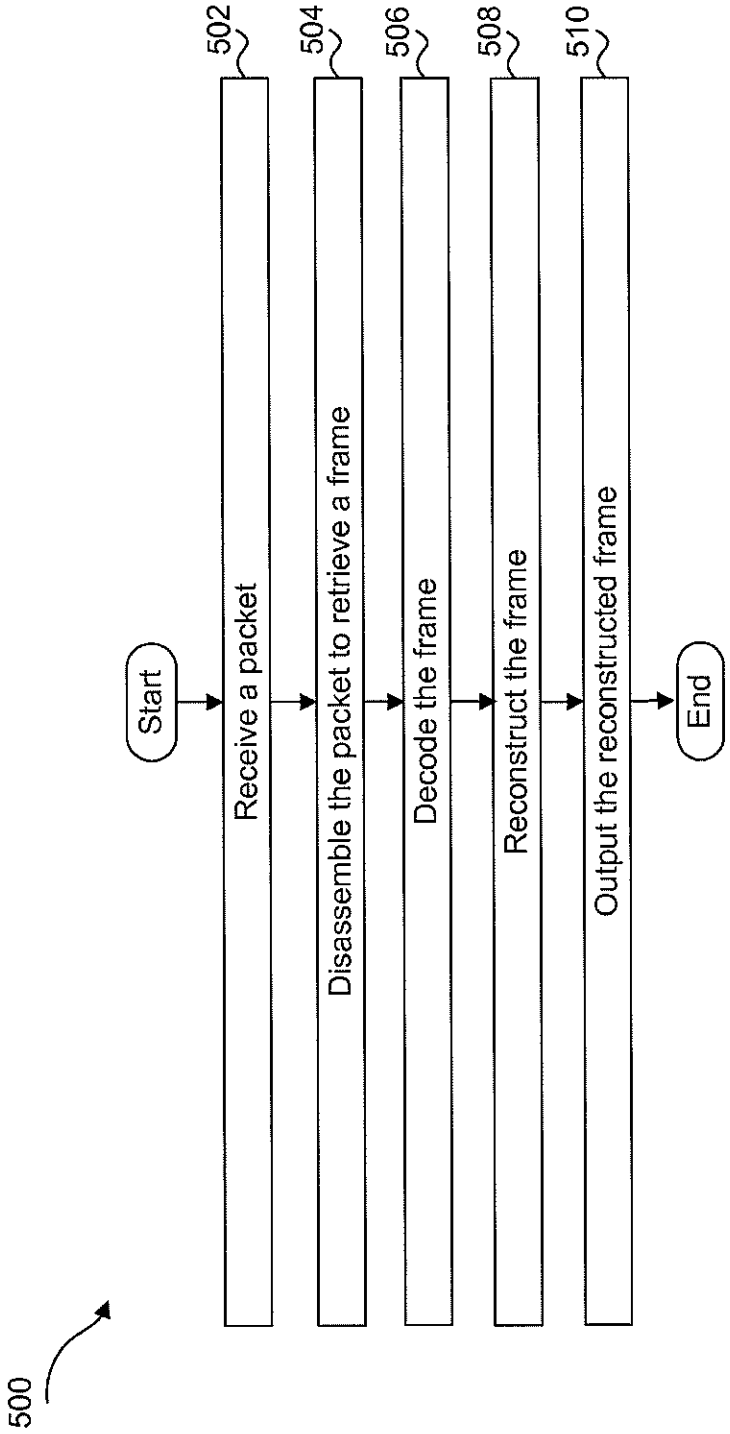

500
Start
Receive a packet
502
Disassemble the packet to retrieve a frame
504
Decode the frame
506
Reconstruct the frame
508
Output the reconstructed frame
510
End

Fig. 5

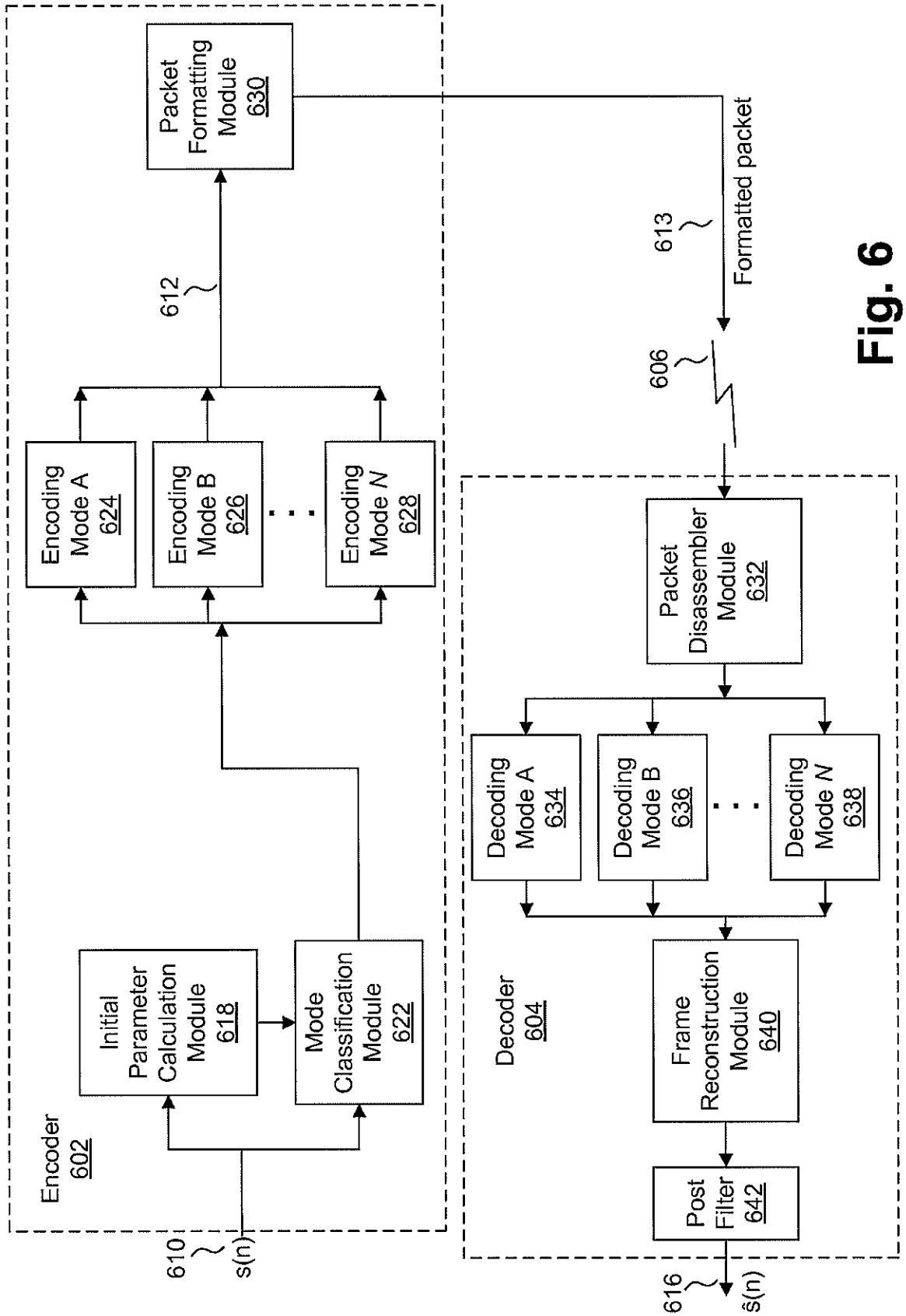

Encoder 602
Initial Parameter Calculation Module 618
Mode Classification Module 622
Encoding Mode A 624
Encoding Mode B 626
Encoding Mode N 628
Packet Formatting Module 630
610
s(n)
612
613
Formatted packet
606
Decoder 604
Packet Disassembler Module 632
Decoding Mode A 634
Decoding Mode B 636
Decoding Mode N 638
Frame Reconstruction Module 640
Post Filter 642
616
ŝ(n)

Fig. 6

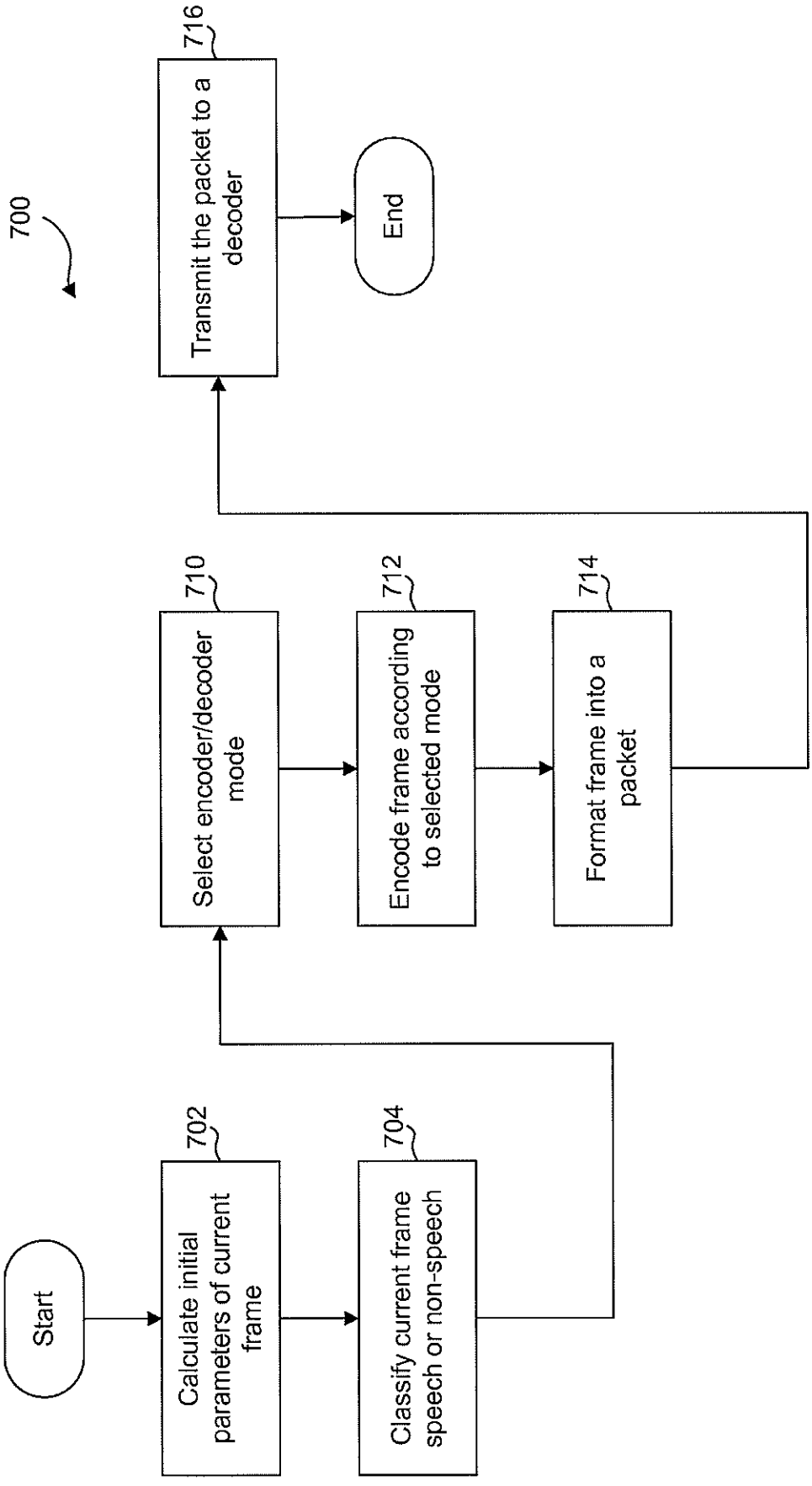

700
Start
Calculate initial parameters of current frame
702
Classify current frame speech or non-speech
704
Select encoder/decoder mode
710
Encode frame according to selected mode
712
Format frame into a packet
714
Transmit the packet to a decoder
716
End

Fig. 7

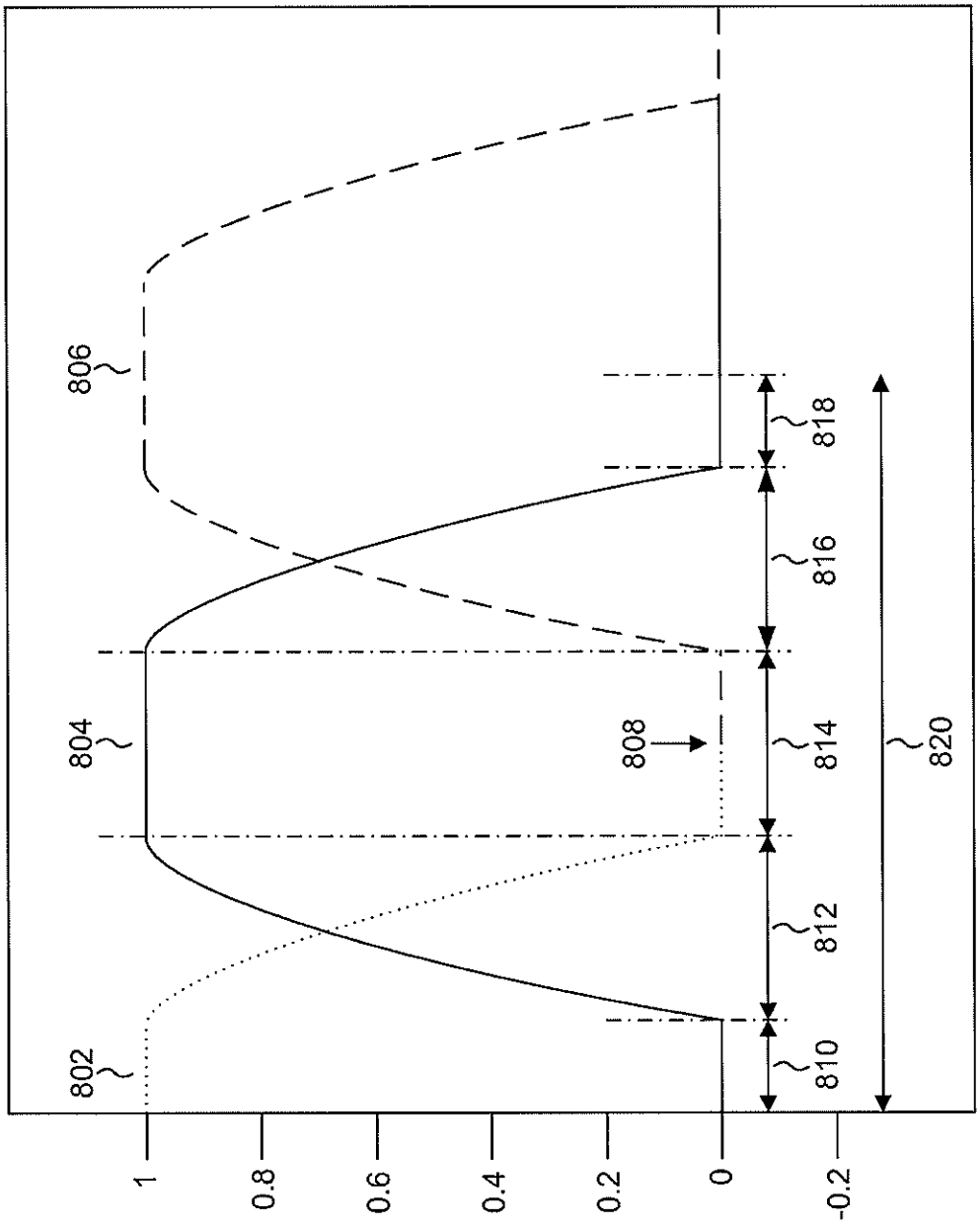


Fig. 8

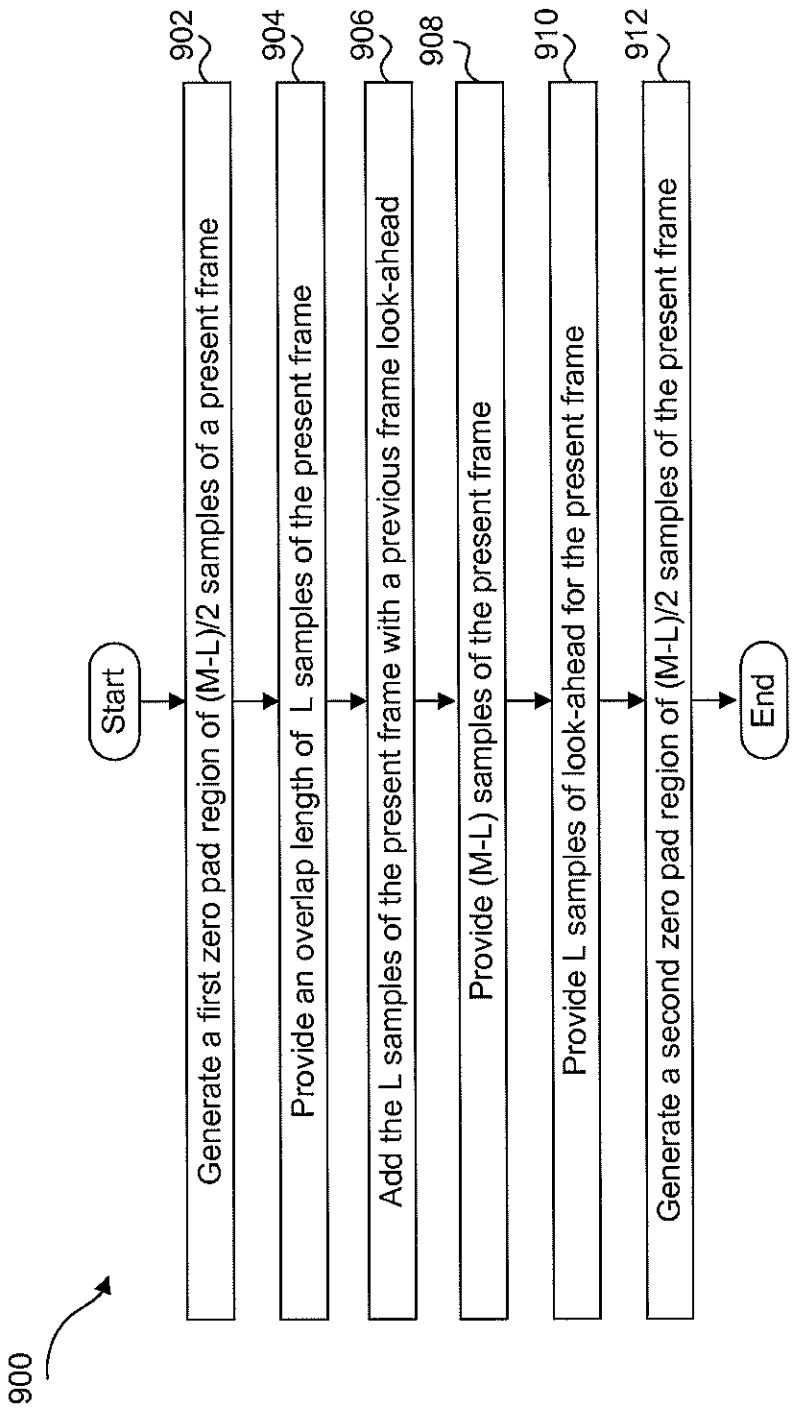

900
Start
902
Generate a first zero pad region of (M-L)/2 samples of a present frame
904
Provide an overlap length of L samples of the present frame
906
Add the L samples of the present frame with a previous frame look-ahead
908
Provide (M-L) samples of the present frame
910
Provide L samples of look-ahead for the present frame
912
Generate a second zero pad region of (M-L)/2 samples of the present frame
End

Fig. 9

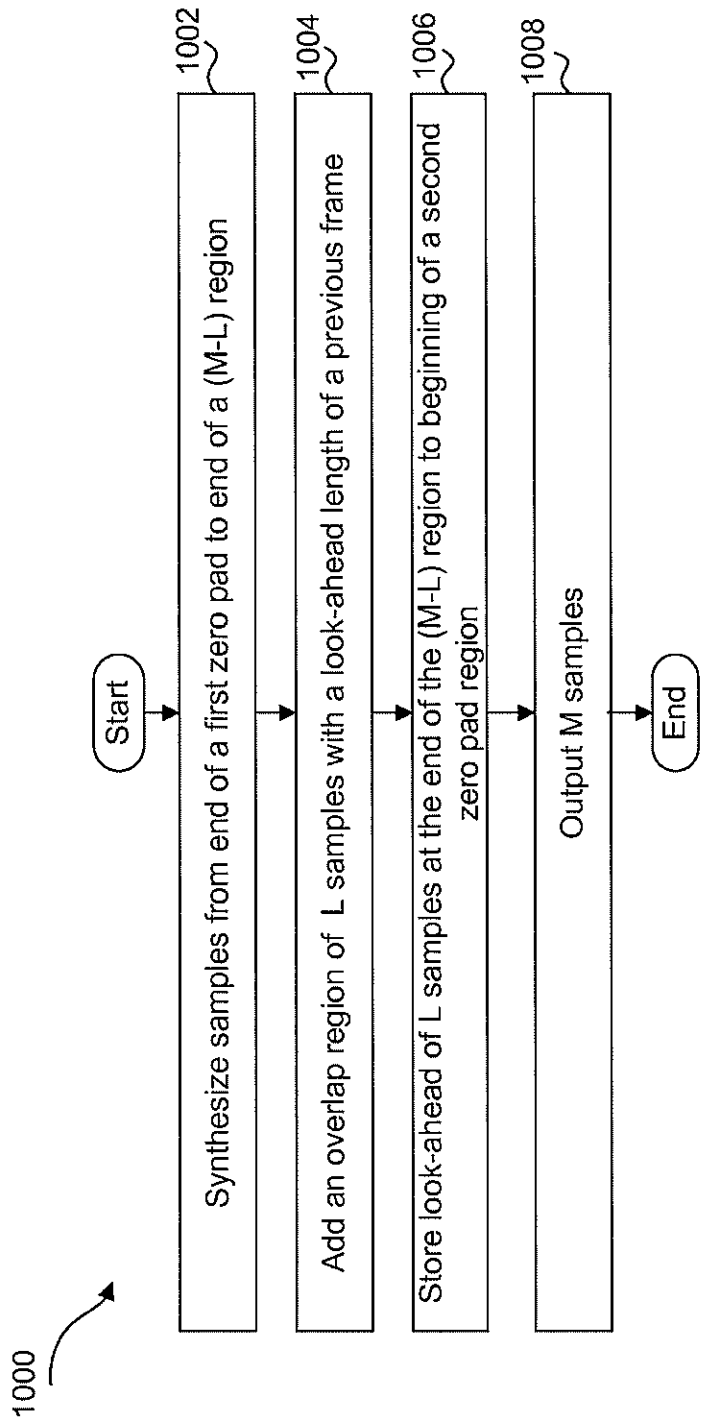

1000
Start
1002
Synthesize samples from end of a first zero pad to end of a (M-L) region
1004
Add an overlap region of L samples with a look-ahead length of a previous frame
1006
Store look-ahead of L samples at the end of the (M-L) region to beginning of a second zero pad region
1008
Output M samples
End

Fig. 10

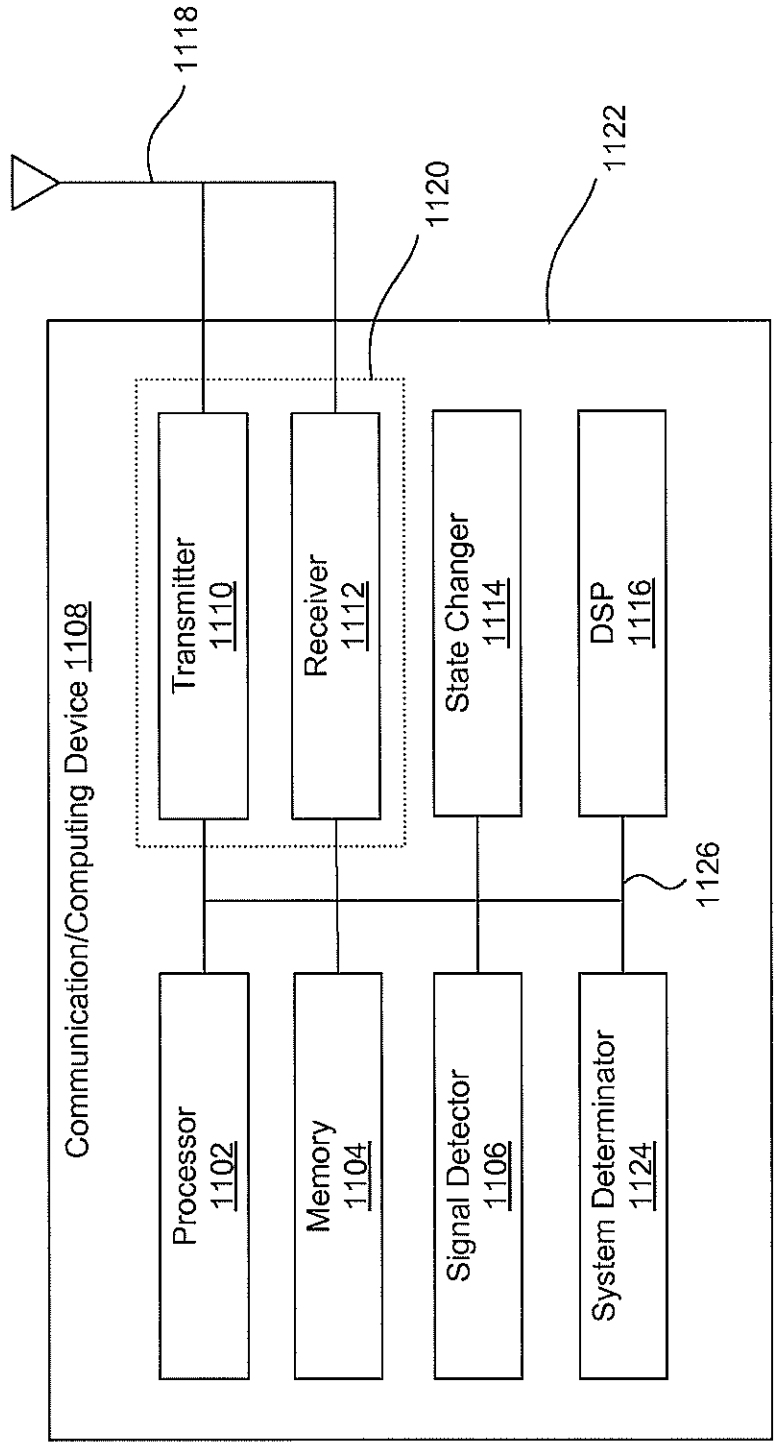

1118
1120
1122
Communication/Computing Device 1108
Transmitter 1110
Receiver 1112
State Changer 1114
DSP 1116
1126
Processor 1102
Memory 1104
Signal Detector 1106
System Determinator 1124

Fig. 11