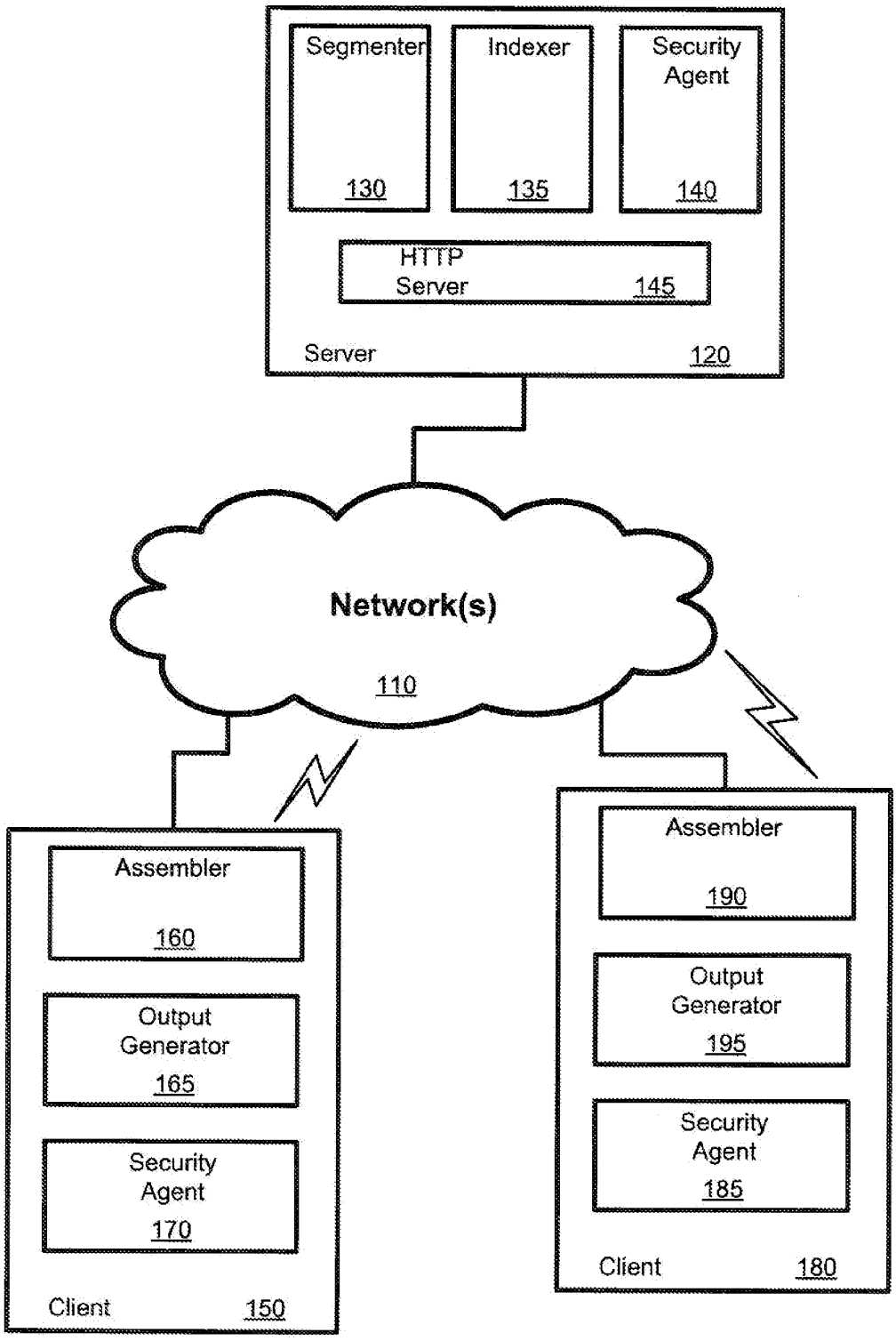

Segmenter
130
Indexer
135
Security Agent
140
HTTP Server
145
Server
120
Network(s)
110
Assembler
160
Output Generator
165
Security Agent
170
Client
150
Assembler
190
Output Generator
195
Security Agent
185
Client
180

Fig. 1

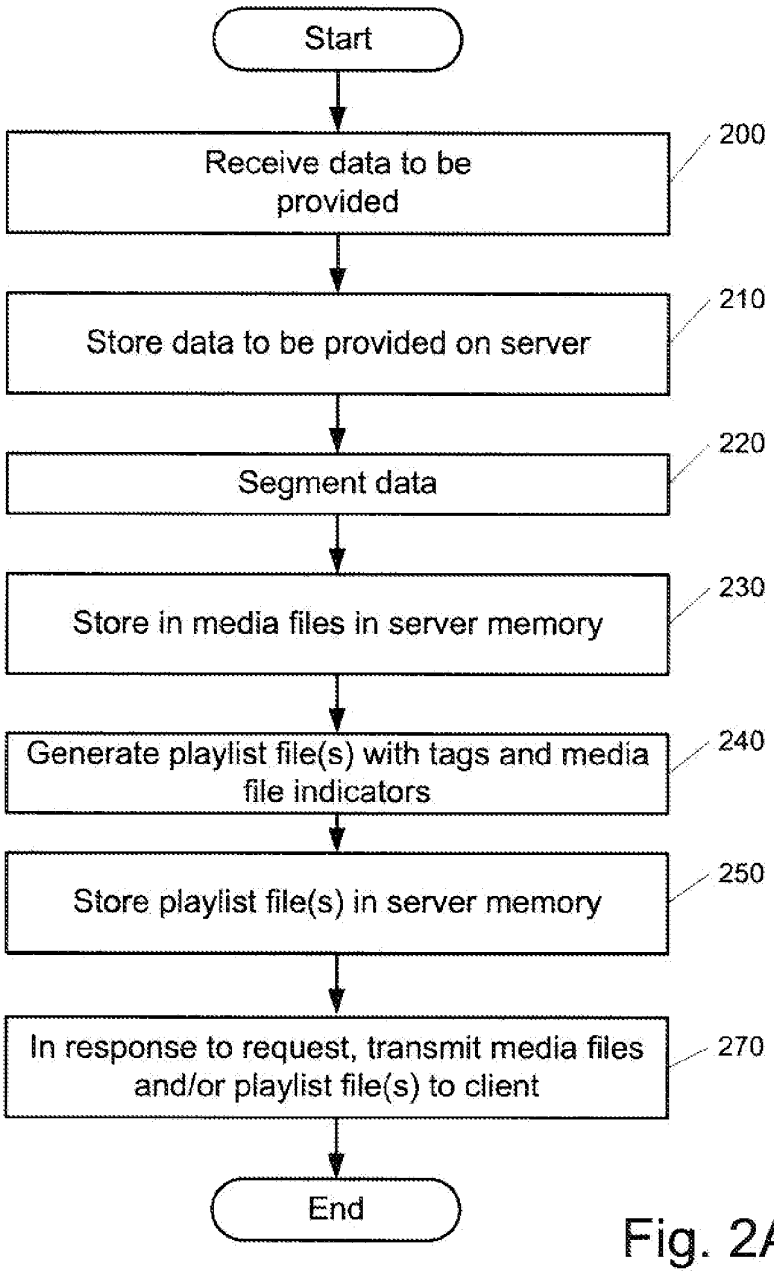

Start
Receive data to be provided
200
Store data to be provided on server
210
Segment data
220
Store in media files in server memory
230
Generate playlist file(s) with tags and media file indicators
240
Store playlist file(s) in server memory
250
In response to request, transmit media files and/or playlist file(s) to client
270
End

Fig. 2A

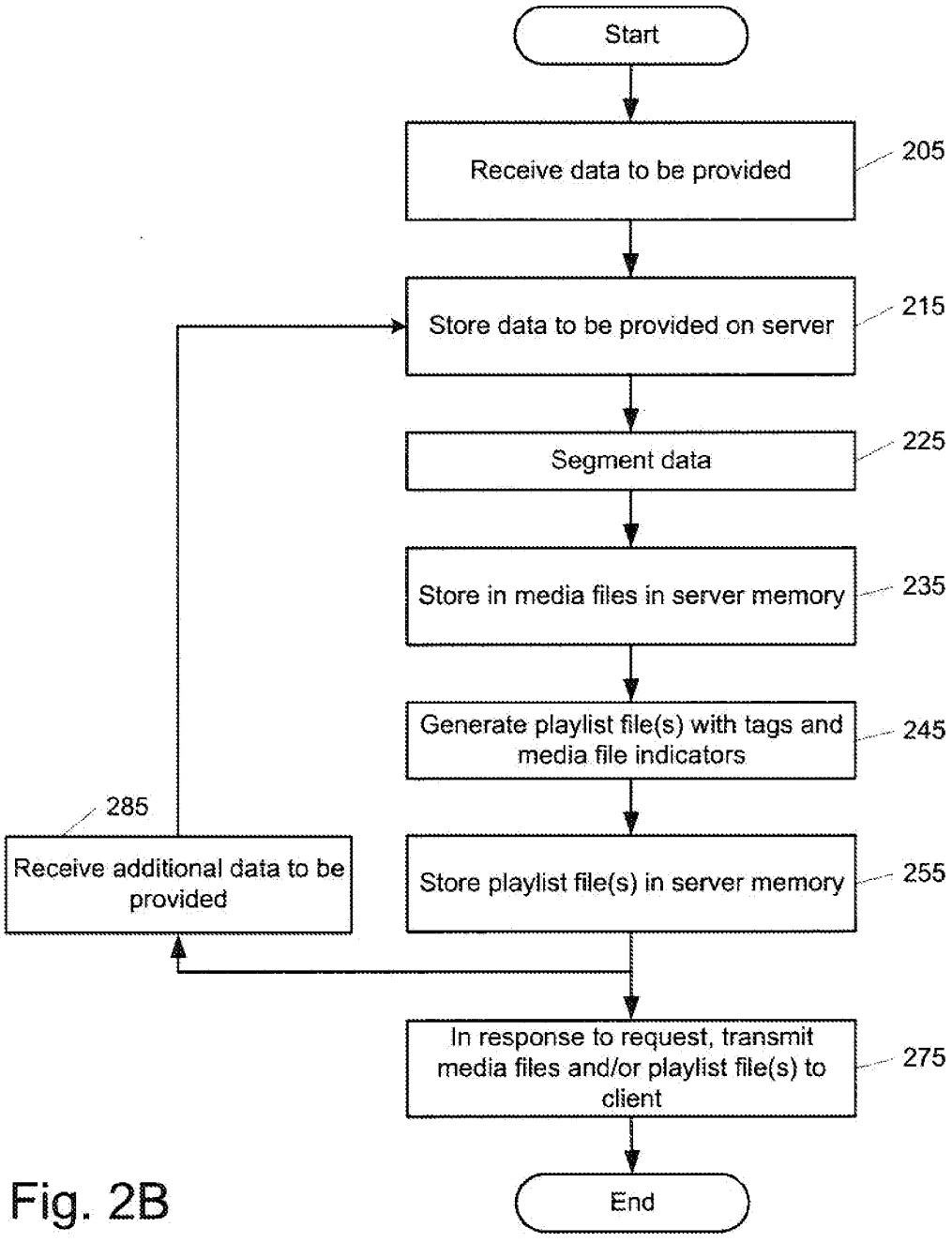

Start
Receive data to be provided
205
Store data to be provided on server
215
Segment data
225
Store in media files in server memory
235
Generate playlist file(s) with tags and media file indicators
245
285
Receive additional data to be provided
Store playlist file(s) in server memory
255
In response to request, transmit media files and/or playlist file(s) to client
275
End

Fig. 2B

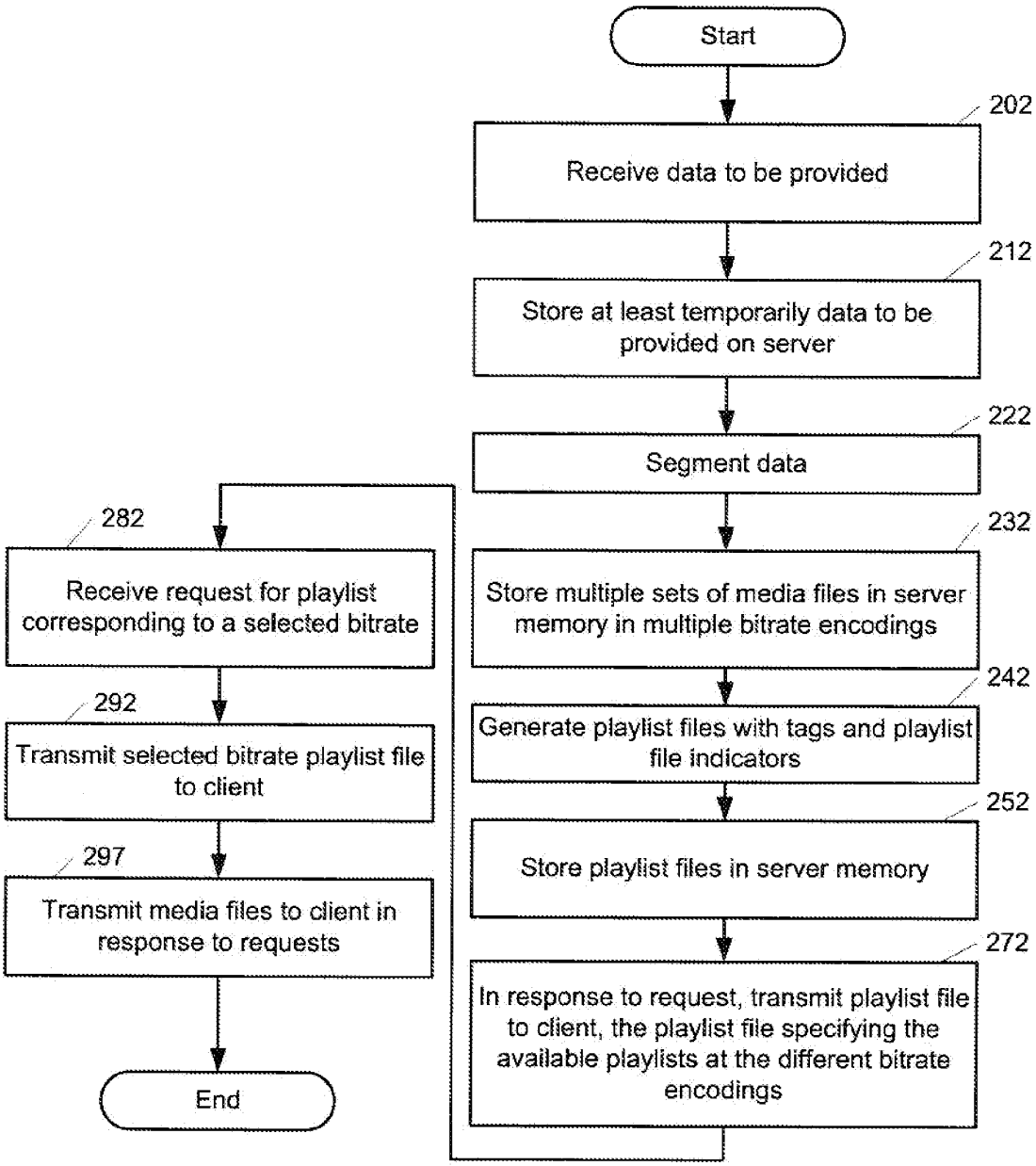

Start
202
Receive data to be provided
212
Store at least temporarily data to be provided on server
222
Segment data
232
Store multiple sets of media files in server memory in multiple bitrate encodings
242
Generate playlist files with tags and playlist file indicators
252
Store playlist files in server memory
272
In response to request, transmit playlist file to client, the playlist file specifying the available playlists at the different bitrate encodings
282
Receive request for playlist corresponding to a selected bitrate
292
Transmit selected bitrate playlist file to client
297
Transmit media files to client in response to requests
End

Fig. 2C

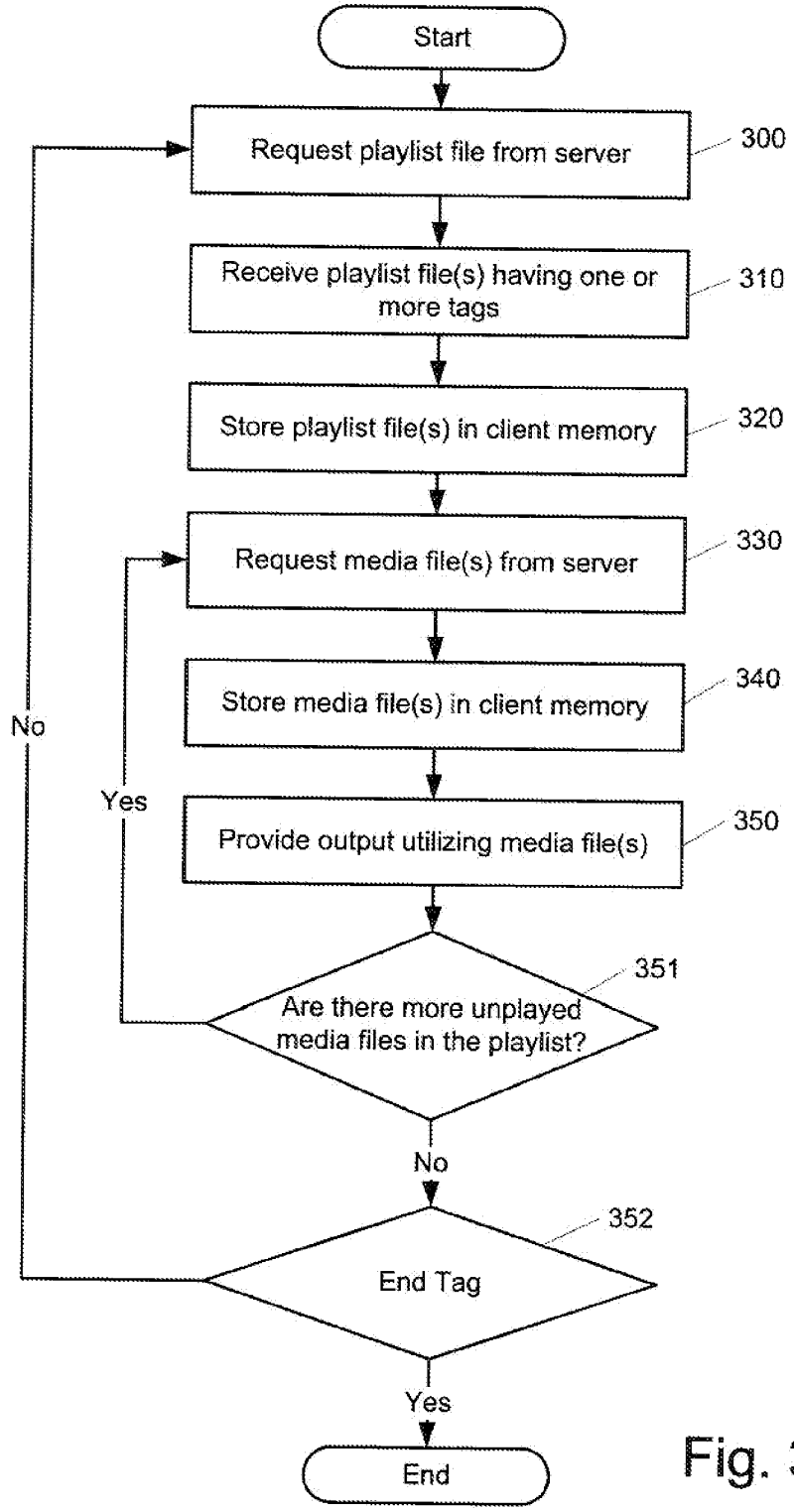

Start
Request playlist file from server
300
Receive playlist file(s) having one or more tags
310
Store playlist file(s) in client memory
320
Request media file(s) from server
330
Store media file(s) in client memory
340
Provide output utilizing media file(s)
350
Are there more unplayed media files in the playlist?
351
Yes
No
End Tag
352
No
Yes
End

Fig. 3A

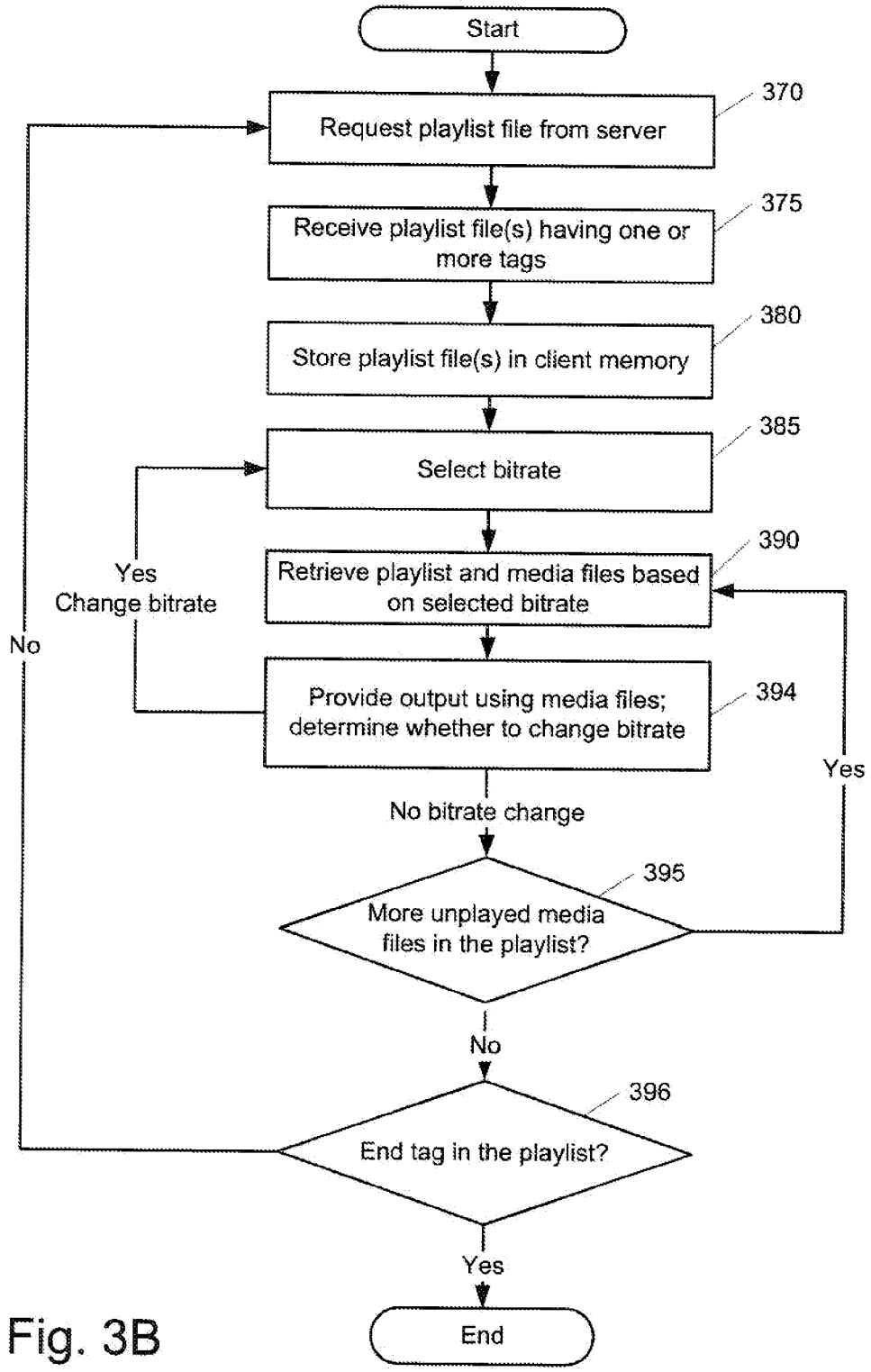

Start
Request playlist file from server
370
Receive playlist file(s) having one or more tags
375
Store playlist file(s) in client memory
380
Select bitrate
385
Retrieve playlist and media files based on selected bitrate
390
Provide output using media files; determine whether to change bitrate
394
Yes
Change bitrate
No
Yes
No bitrate change
More unplayed media files in the playlist?
395
No
End tag in the playlist?
396
Yes
End

Fig. 3B

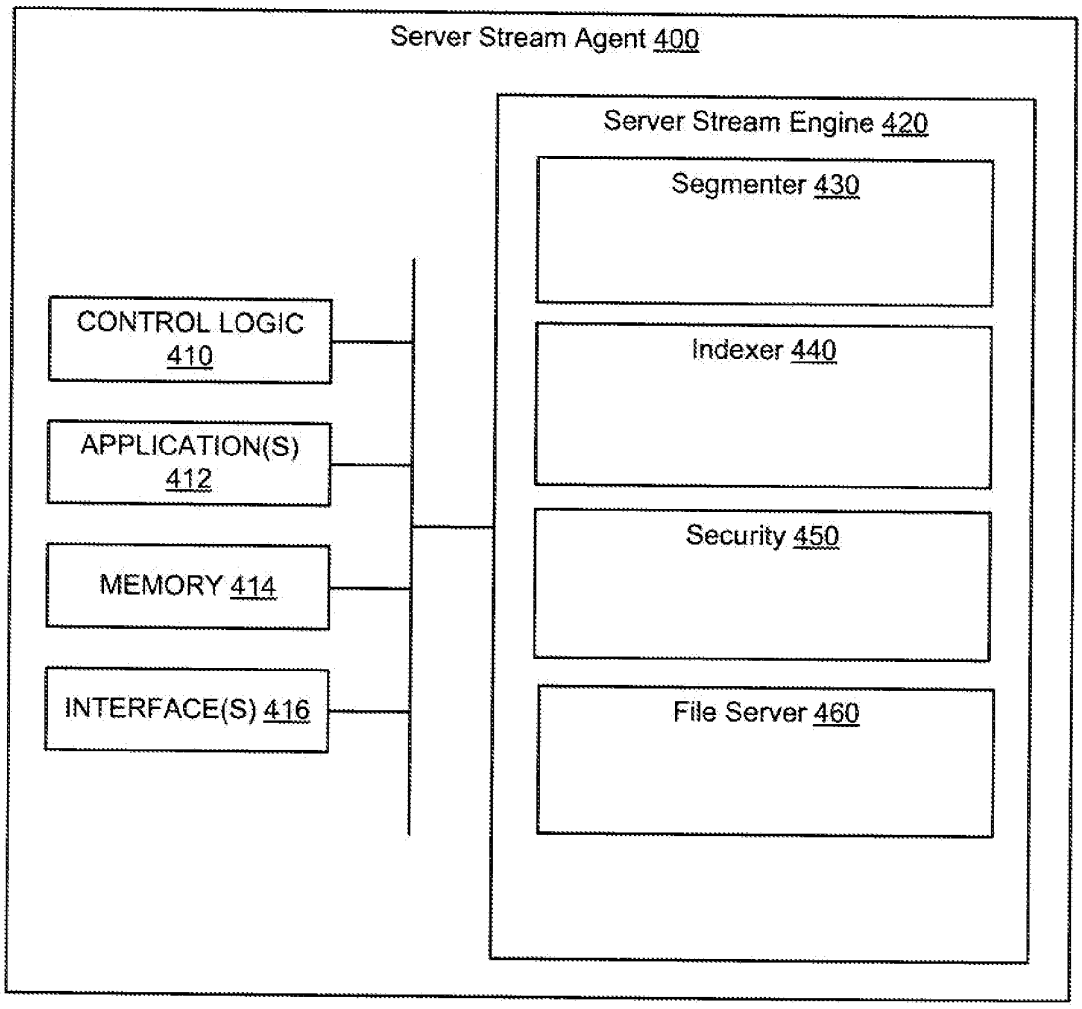

Server Stream Agent 400
Server Stream Engine 420
Segmenter 430
Indexer 440
Security 450
File Server 460
CONTROL LOGIC 410
APPLICATION(S) 412
MEMORY 414
INTERFACE(S) 416

Fig. 4

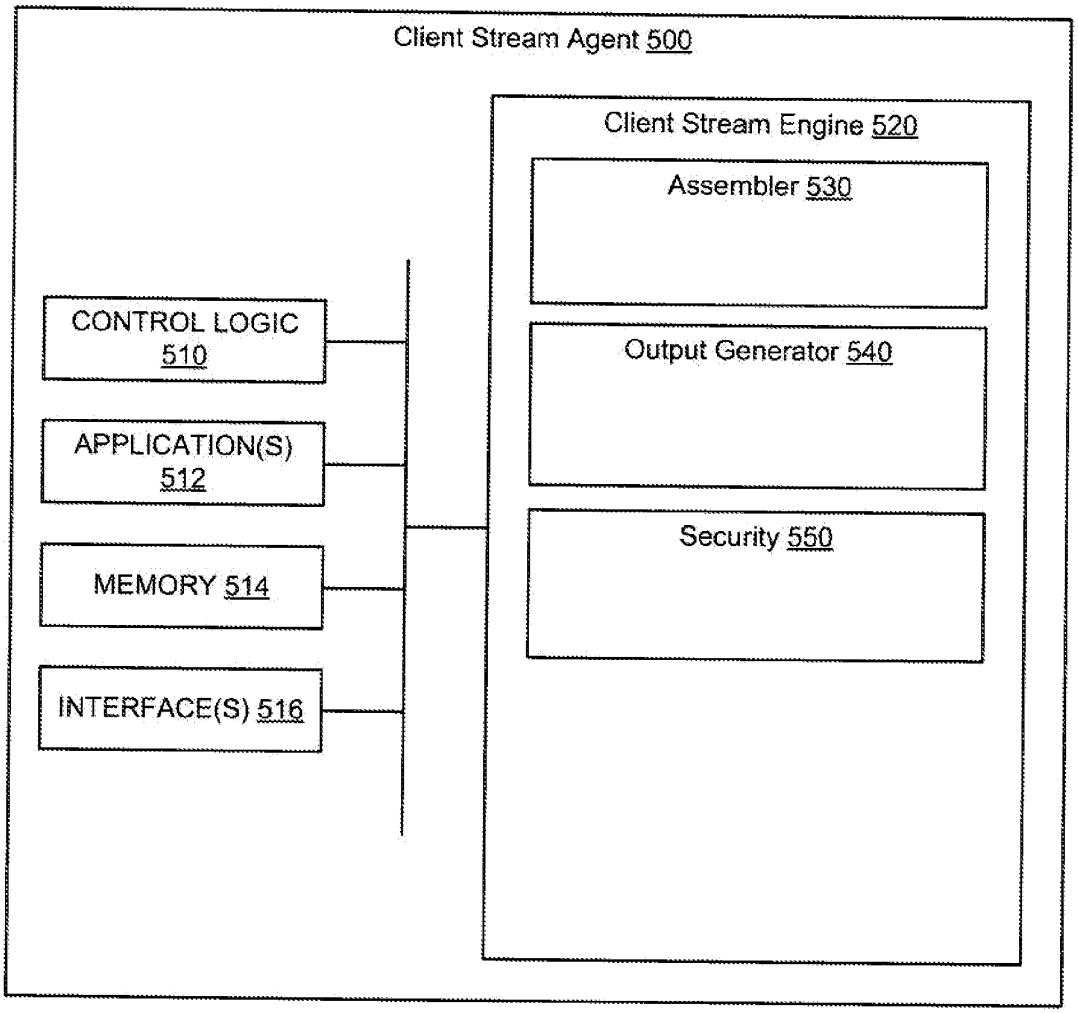

Client Stream Agent 500
Client Stream Engine 520
Assembler 530
Output Generator 540
Security 550
CONTROL LOGIC 510
APPLICATION(S) 512
MEMORY 514
INTERFACE(S) 516

Fig. 5

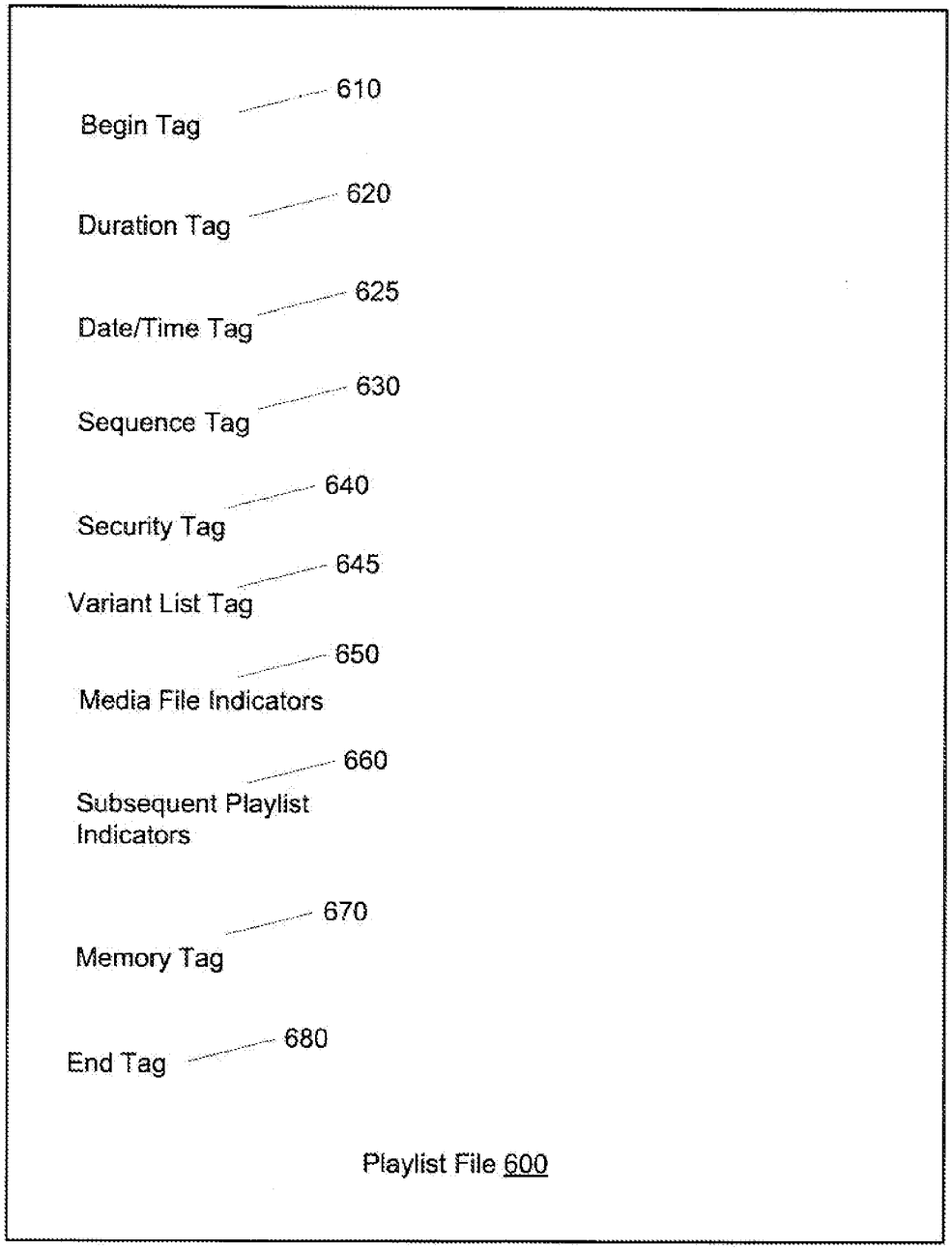

Begin Tag
610
Duration Tag
620
Date/Time Tag
625
Sequence Tag
630
Security Tag
640
Variant List Tag
645
Media File Indicators
650
Subsequent Playlist Indicators
660
Memory Tag
670
End Tag
680
Playlist File 600

Fig. 6

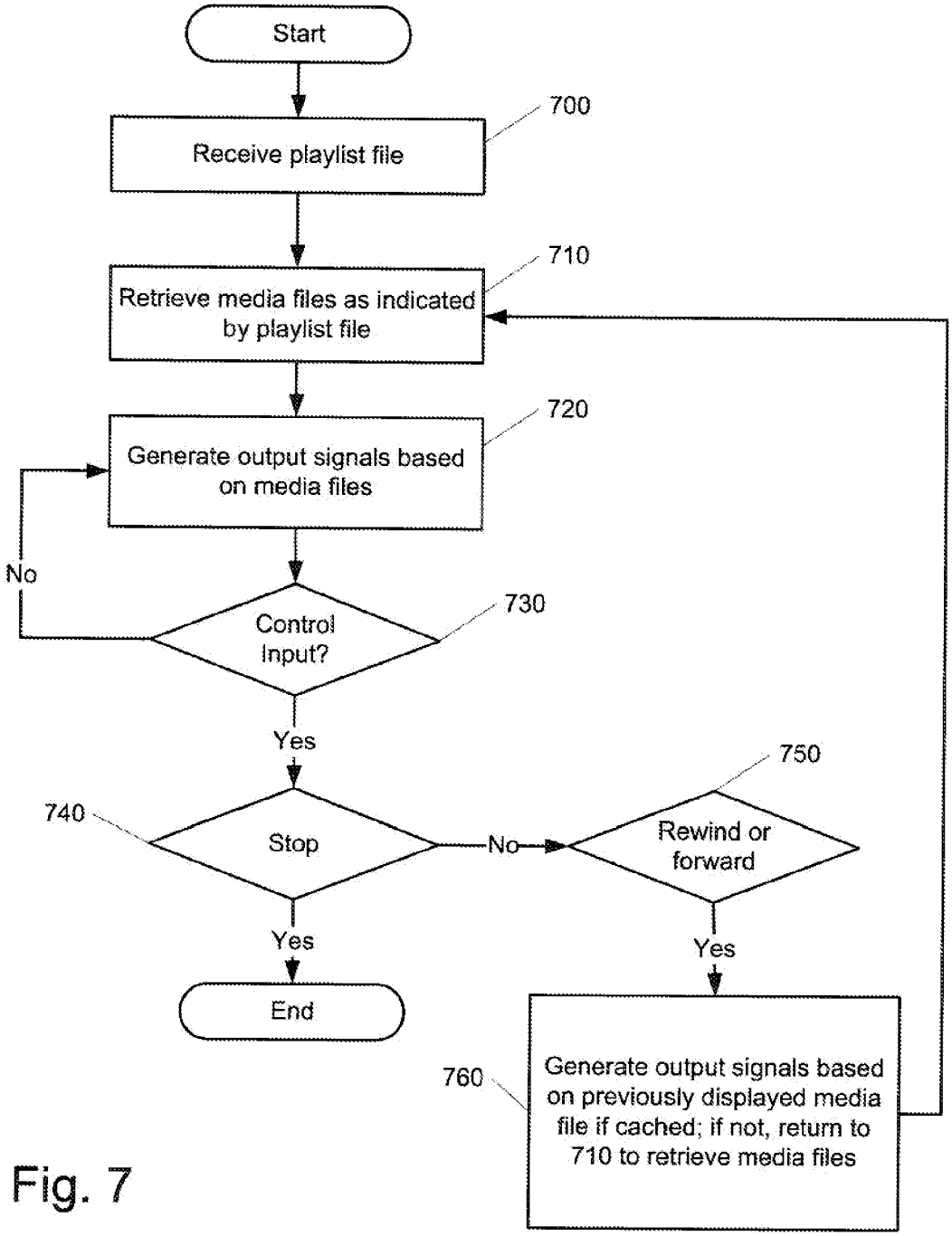

Start
Receive playlist file
700
Retrieve media files as indicated by playlist file
710
Generate output signals based on media files
720
No
Control Input?
730
Yes
740
Stop
No
Rewind or forward
750
Yes
Yes
End
760
Generate output signals based on previously displayed media file if cached; if not, return to 710 to retrieve media files

Fig. 7

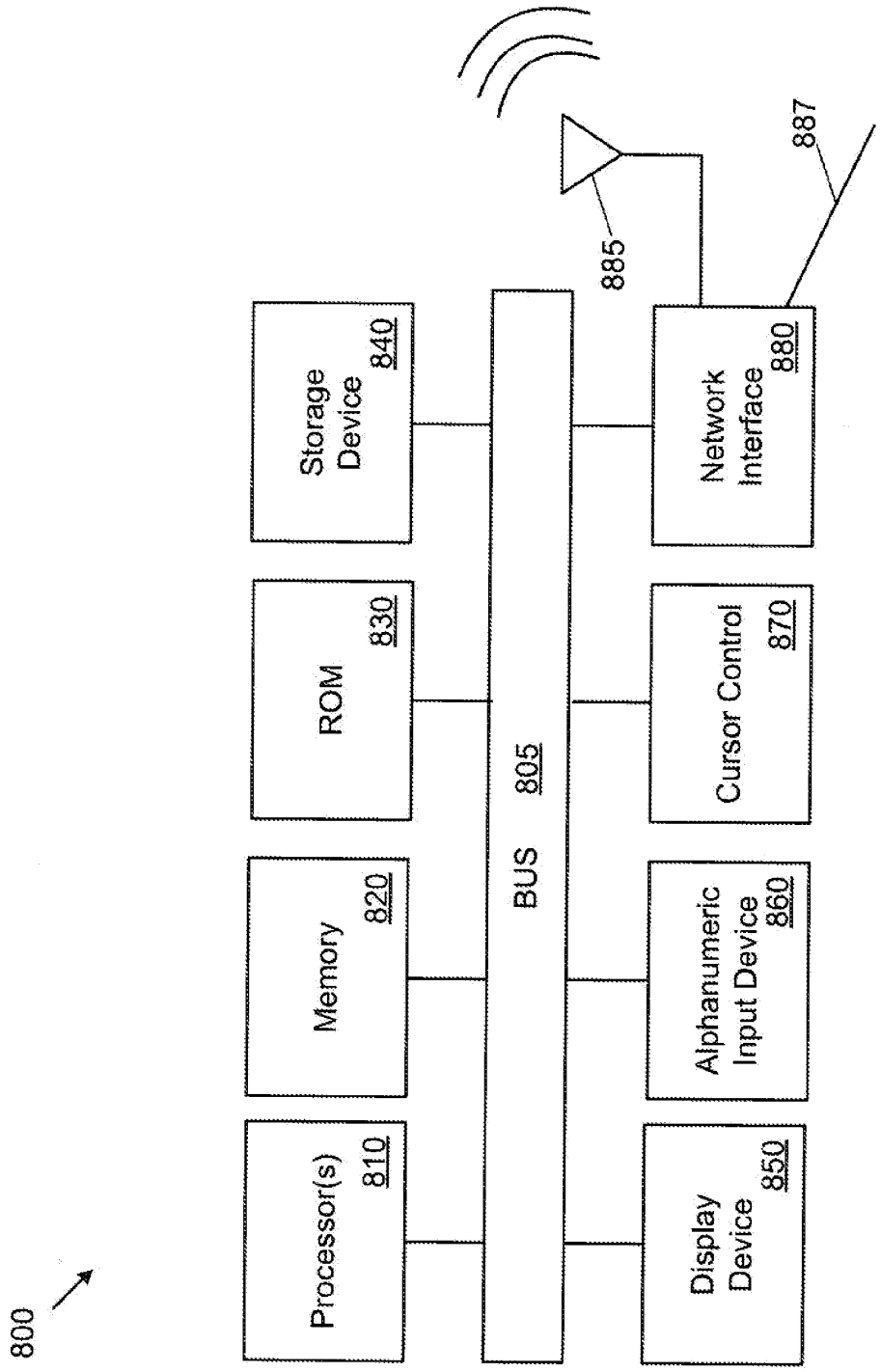

800
Processor(s) 810
Memory 820
ROM 830
Storage Device 840
BUS 805
Display Device 850
Alphanumeric Input Device 860
Cursor Control 870
Network Interface 880
885
887

Fig. 8

FIG. 9A

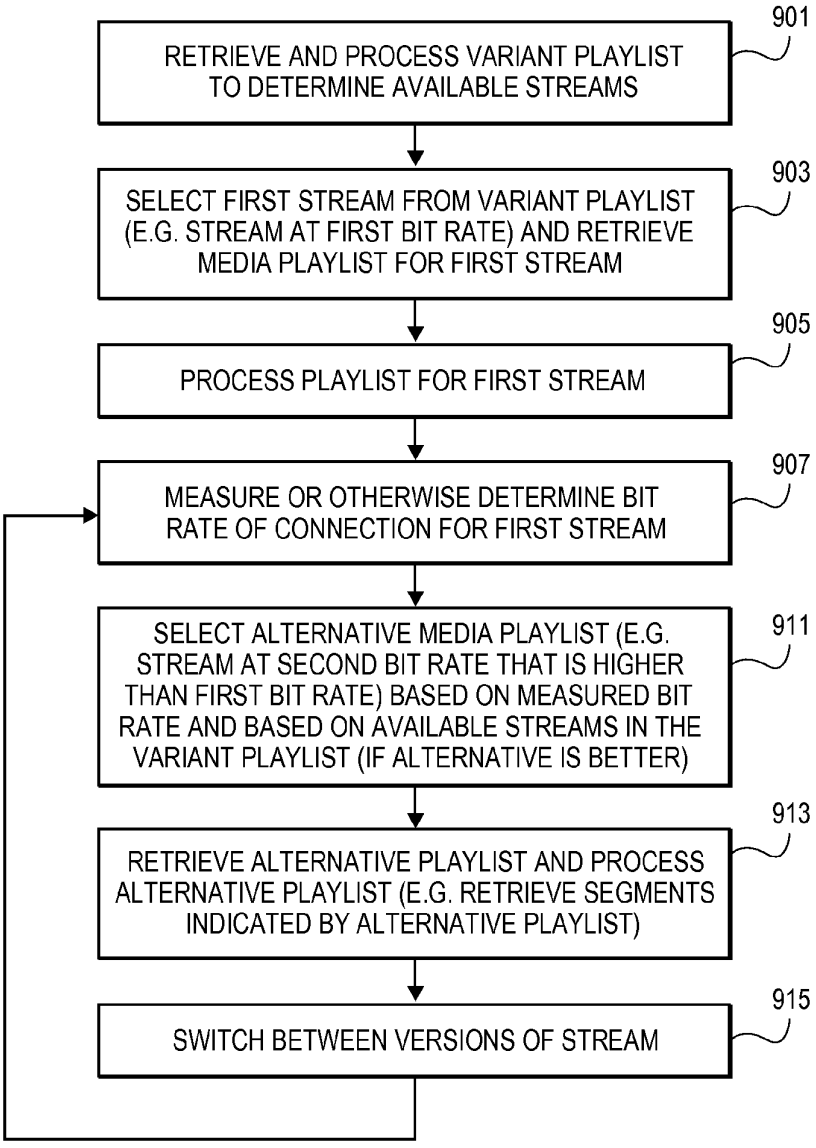

RETRIEVE AND PROCESS VARIANT PLAYLIST TO DETERMINE AVAILABLE STREAMS
901
SELECT FIRST STREAM FROM VARIANT PLAYLIST (E.G. STREAM AT FIRST BIT RATE) AND RETRIEVE MEDIA PLAYLIST FOR FIRST STREAM
903
PROCESS PLAYLIST FOR FIRST STREAM
905
MEASURE OR OTHERWISE DETERMINE BIT RATE OF CONNECTION FOR FIRST STREAM
907
SELECT ALTERNATIVE MEDIA PLAYLIST (E.G. STREAM AT SECOND BIT RATE THAT IS HIGHER THAN FIRST BIT RATE) BASED ON MEASURED BIT RATE AND BASED ON AVAILABLE STREAMS IN THE VARIANT PLAYLIST (IF ALTERNATIVE IS BETTER)
911
RETRIEVE ALTERNATIVE PLAYLIST AND PROCESS ALTERNATIVE PLAYLIST (E.G. RETRIEVE SEGMENTS INDICATED BY ALTERNATIVE PLAYLIST)
913
SWITCH BETWEEN VERSIONS OF STREAM
915

FIG. 9B

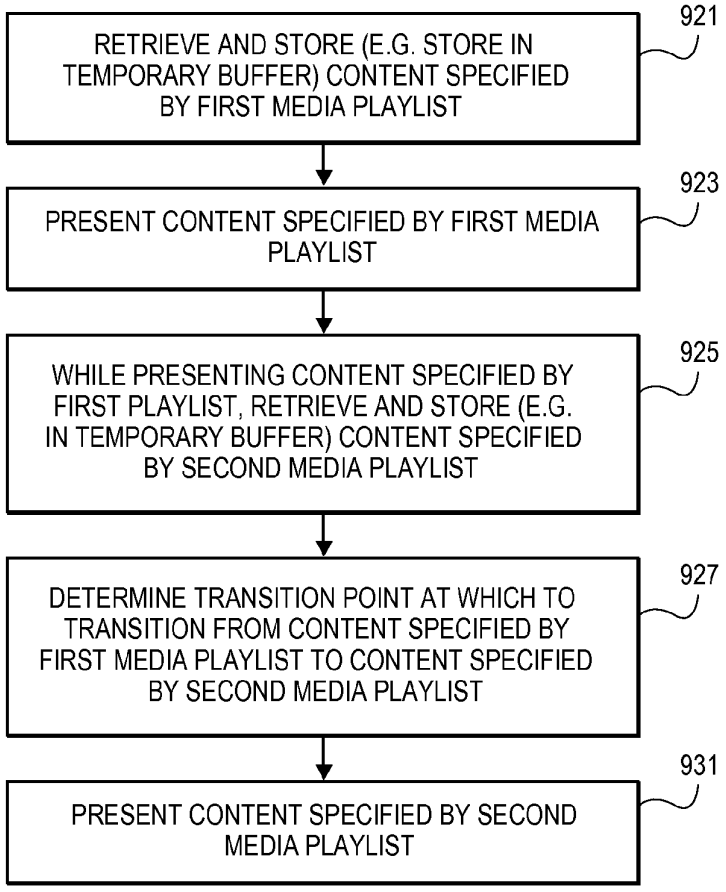

RETRIEVE AND STORE (E.G. STORE IN TEMPORARY BUFFER) CONTENT SPECIFIED BY FIRST MEDIA PLAYLIST
921
PRESENT CONTENT SPECIFIED BY FIRST MEDIA PLAYLIST
923
WHILE PRESENTING CONTENT SPECIFIED BY FIRST PLAYLIST, RETRIEVE AND STORE (E.G. IN TEMPORARY BUFFER) CONTENT SPECIFIED BY SECOND MEDIA PLAYLIST
925
DETERMINE TRANSITION POINT AT WHICH TO TRANSITION FROM CONTENT SPECIFIED BY FIRST MEDIA PLAYLIST TO CONTENT SPECIFIED BY SECOND MEDIA PLAYLIST
927
PRESENT CONTENT SPECIFIED BY SECOND MEDIA PLAYLIST
931

FIG. 9C

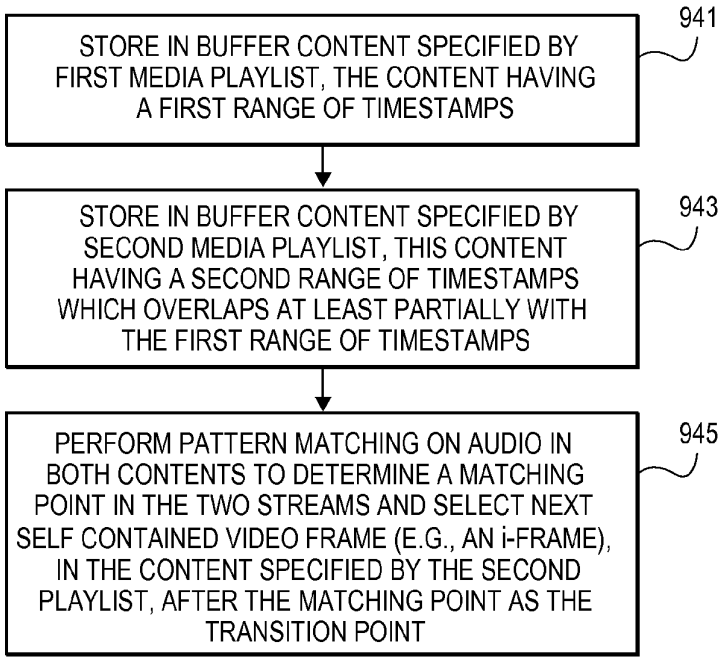
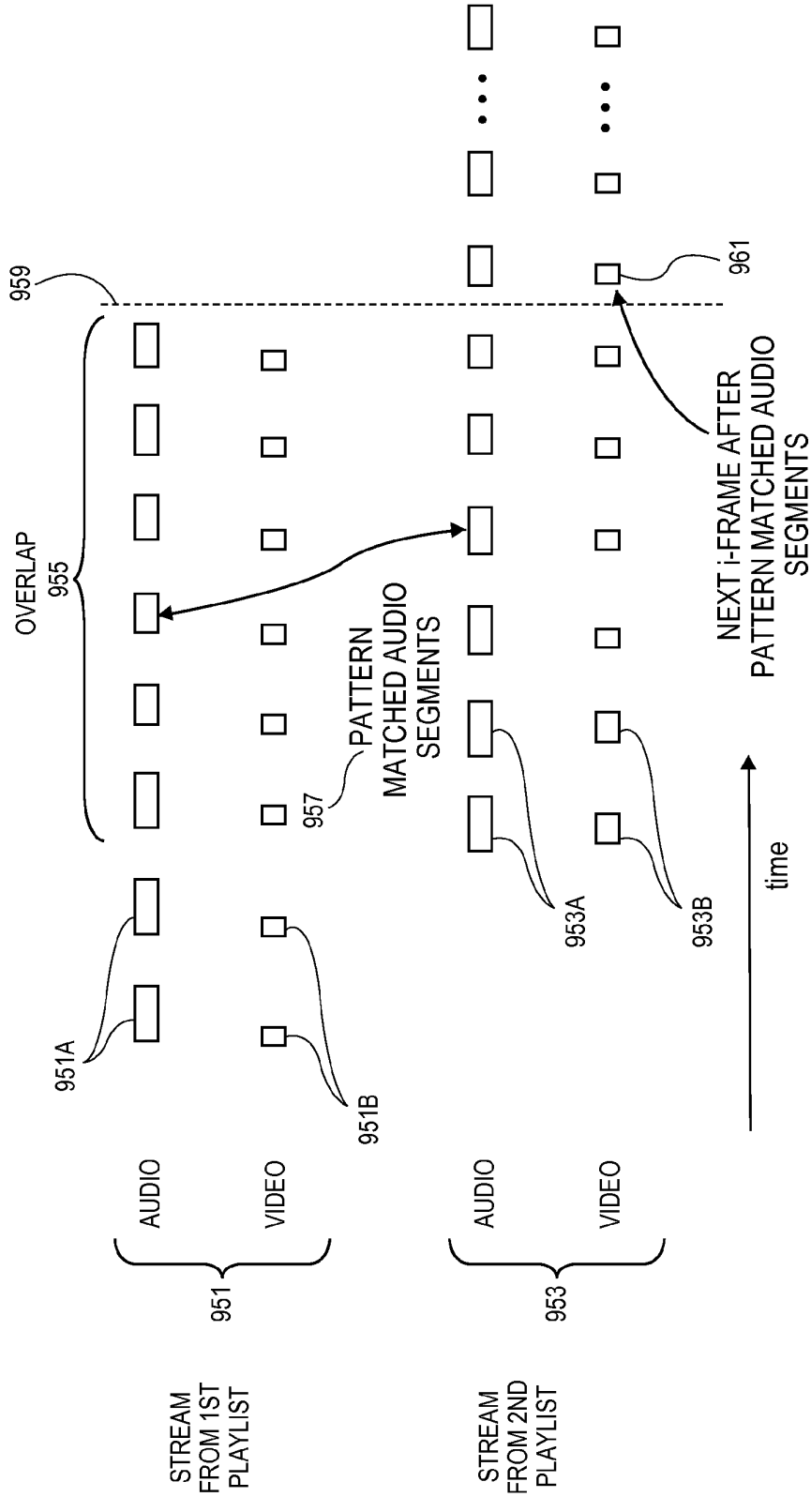

STORE IN BUFFER CONTENT SPECIFIED BY FIRST MEDIA PLAYLIST, THE CONTENT HAVING A FIRST RANGE OF TIMESTAMPS
941
STORE IN BUFFER CONTENT SPECIFIED BY SECOND MEDIA PLAYLIST, THIS CONTENT HAVING A SECOND RANGE OF TIMESTAMPS WHICH OVERLAPS AT LEAST PARTIALLY WITH THE FIRST RANGE OF TIMESTAMPS
943
PERFORM PATTERN MATCHING ON AUDIO IN BOTH CONTENTS TO DETERMINE A MATCHING POINT IN THE TWO STREAMS AND SELECT NEXT SELF CONTAINED VIDEO FRAME (E.G., AN i-FRAME), IN THE CONTENT SPECIFIED BY THE SECOND PLAYLIST, AFTER THE MATCHING POINT AS THE TRANSITION POINT
945

FIG. 9D


STREAM FROM 1ST PLAYLIST
AUDIO
VIDEO
951
951A
951B
OVERLAP
955
959
PATTERN MATCHED AUDIO SEGMENTS
957
STREAM FROM 2ND PLAYLIST
AUDIO
VIDEO
953
953A
953B
961
NEXT i-FRAME AFTER PATTERN MATCHED AUDIO SEGMENTS
time

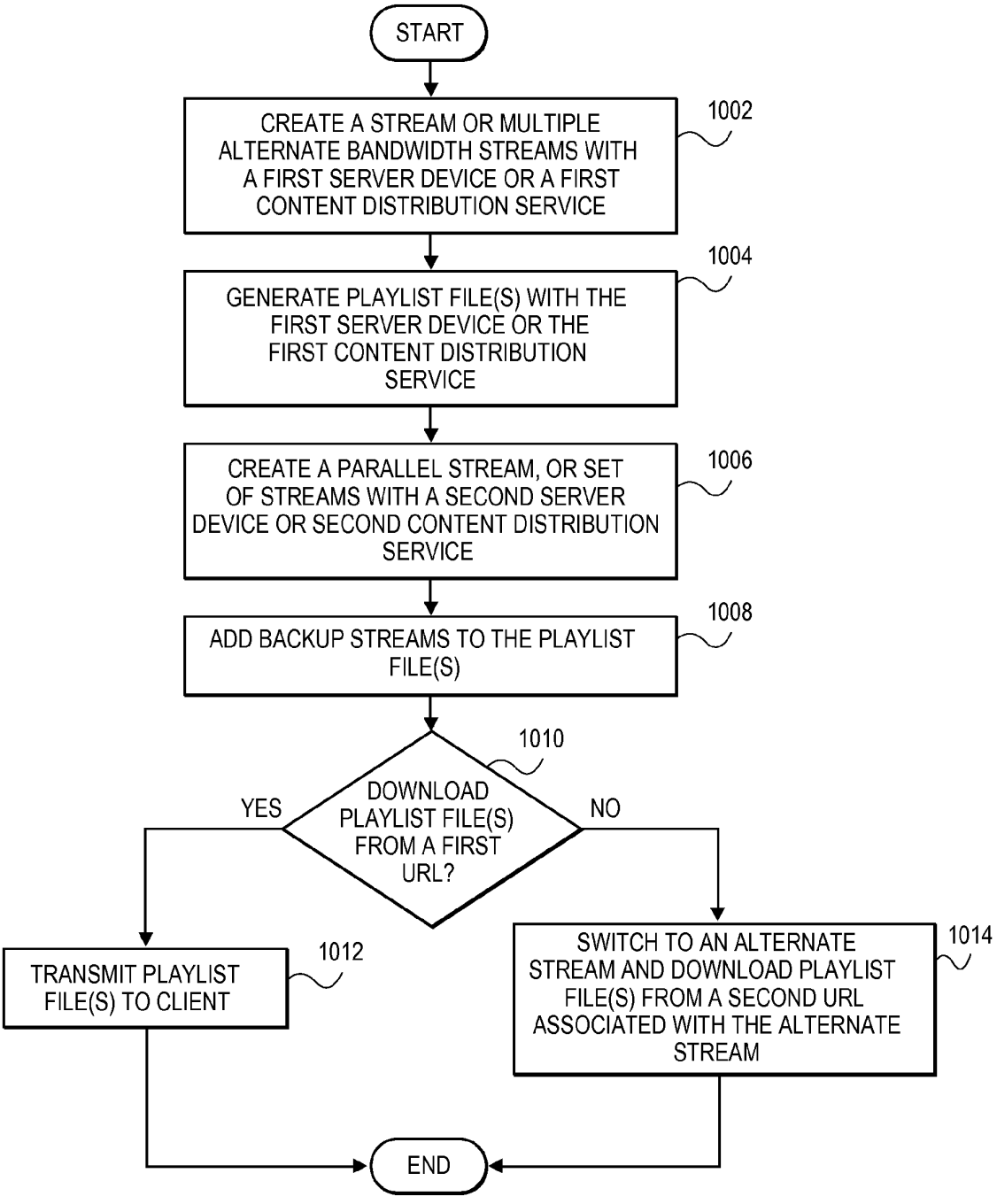

START
CREATE A STREAM OR MULTIPLE ALTERNATE BANDWIDTH STREAMS WITH A FIRST SERVER DEVICE OR A FIRST CONTENT DISTRIBUTION SERVICE
1002
GENERATE PLAYLIST FILE(S) WITH THE FIRST SERVER DEVICE OR THE FIRST CONTENT DISTRIBUTION SERVICE
1004
CREATE A PARALLEL STREAM, OR SET OF STREAMS WITH A SECOND SERVER DEVICE OR SECOND CONTENT DISTRIBUTION SERVICE
1006
ADD BACKUP STREAMS TO THE PLAYLIST FILE(S)
1008
DOWNLOAD PLAYLIST FILE(S) FROM A FIRST URL?
1010
YES
NO
TRANSMIT PLAYLIST FILE(S) TO CLIENT
1012
SWITCH TO AN ALTERNATE STREAM AND DOWNLOAD PLAYLIST FILE(S) FROM A SECOND URL ASSOCIATED WITH THE ALTERNATE STREAM
1014
END

FIG. 10

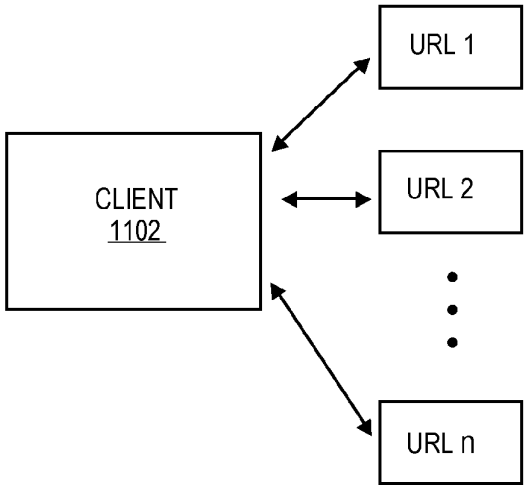


FIG. 11