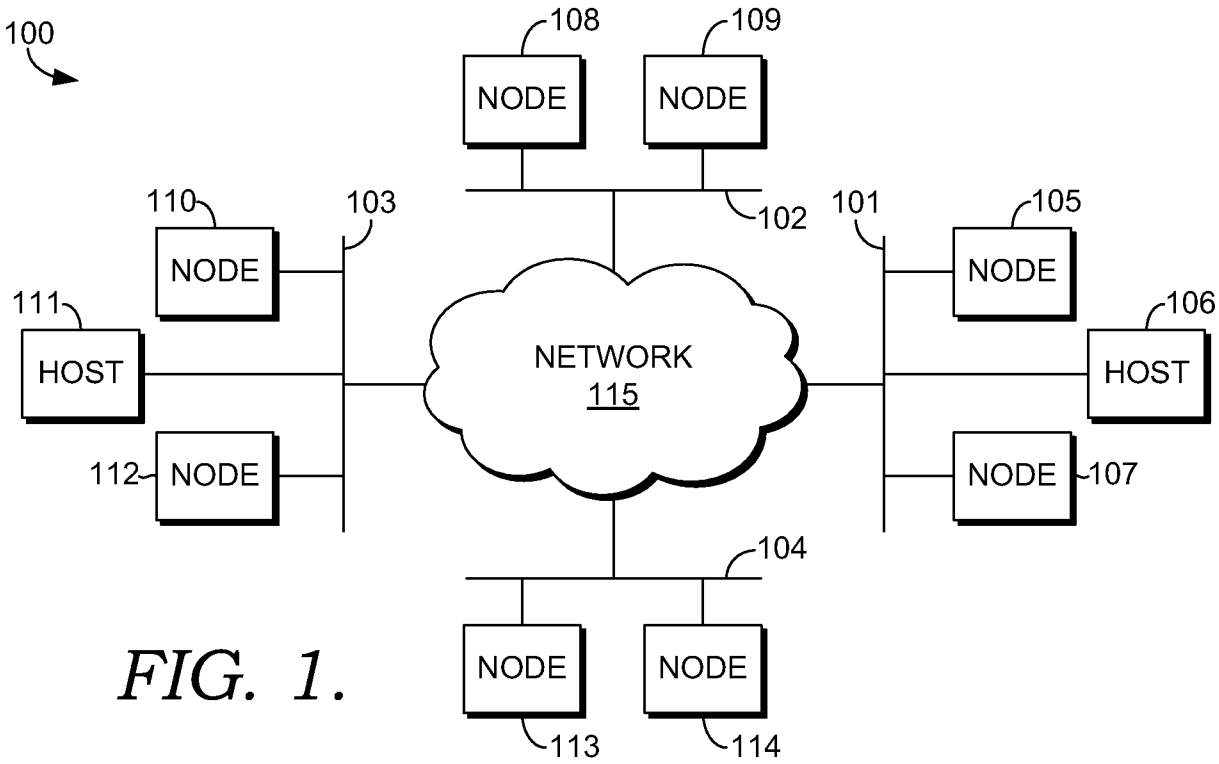

100
108
NODE
109
NODE
110
NODE
103
102
101
105
NODE
111
HOST
NETWORK
115
106
HOST
112
NODE
NODE
107
104
NODE
NODE
113
114

FIG. 1.

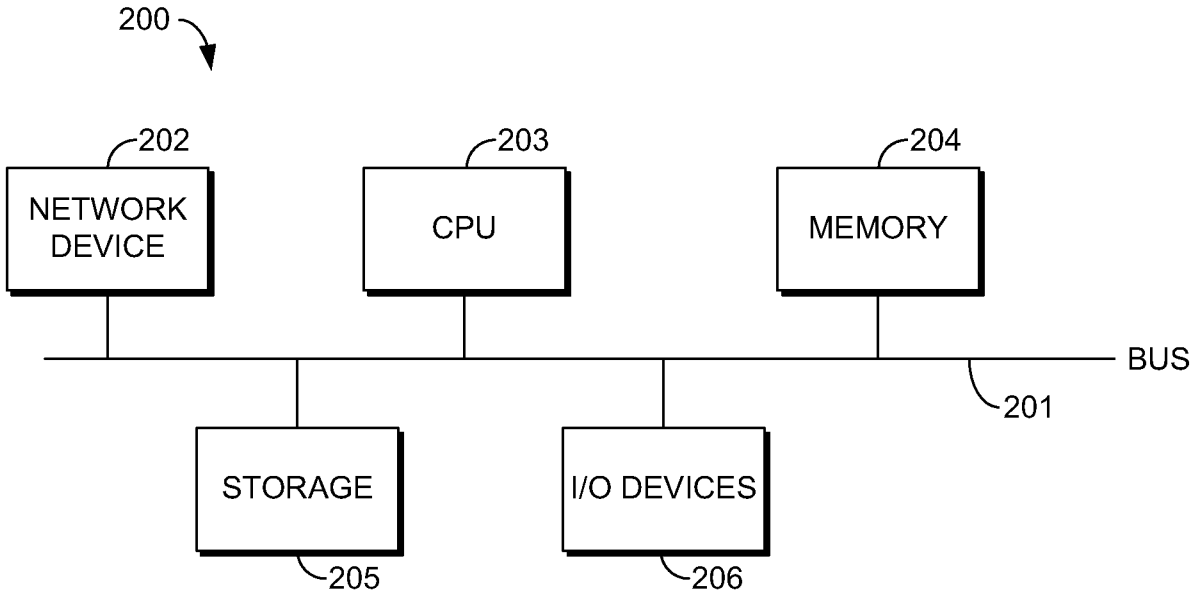

200
202
NETWORK
DEVICE
203
CPU
204
MEMORY
BUS
201
STORAGE
205
I/O DEVICES
206

FIG. 2.

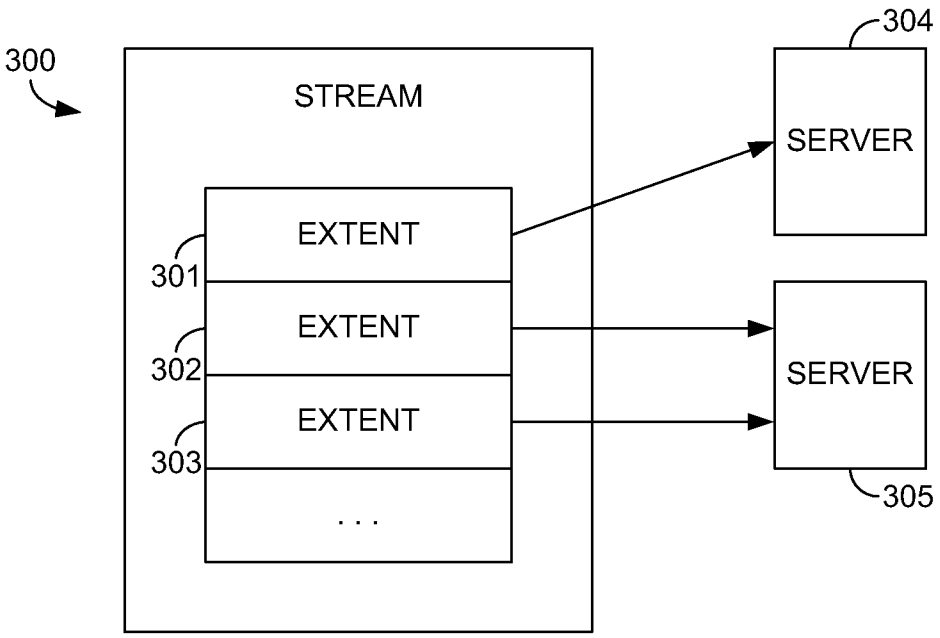

300
STREAM
EXTENT
301
EXTENT
302
EXTENT
303
. . .
304
SERVER
SERVER
305

FIG. 3.

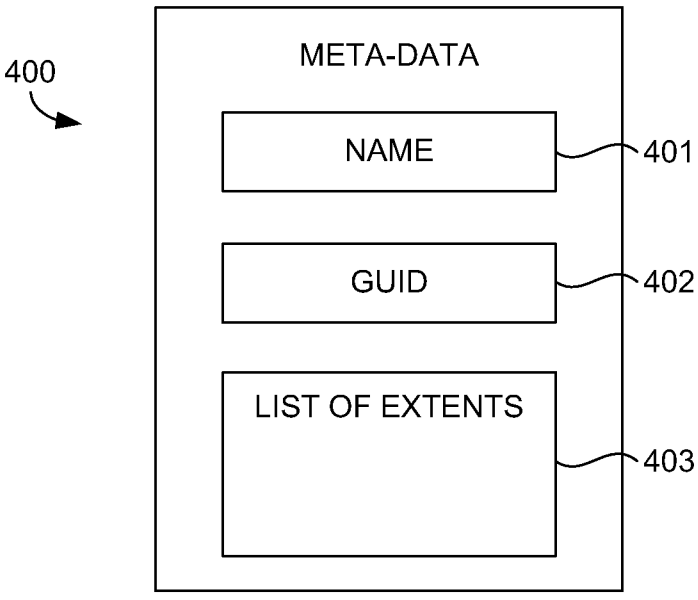
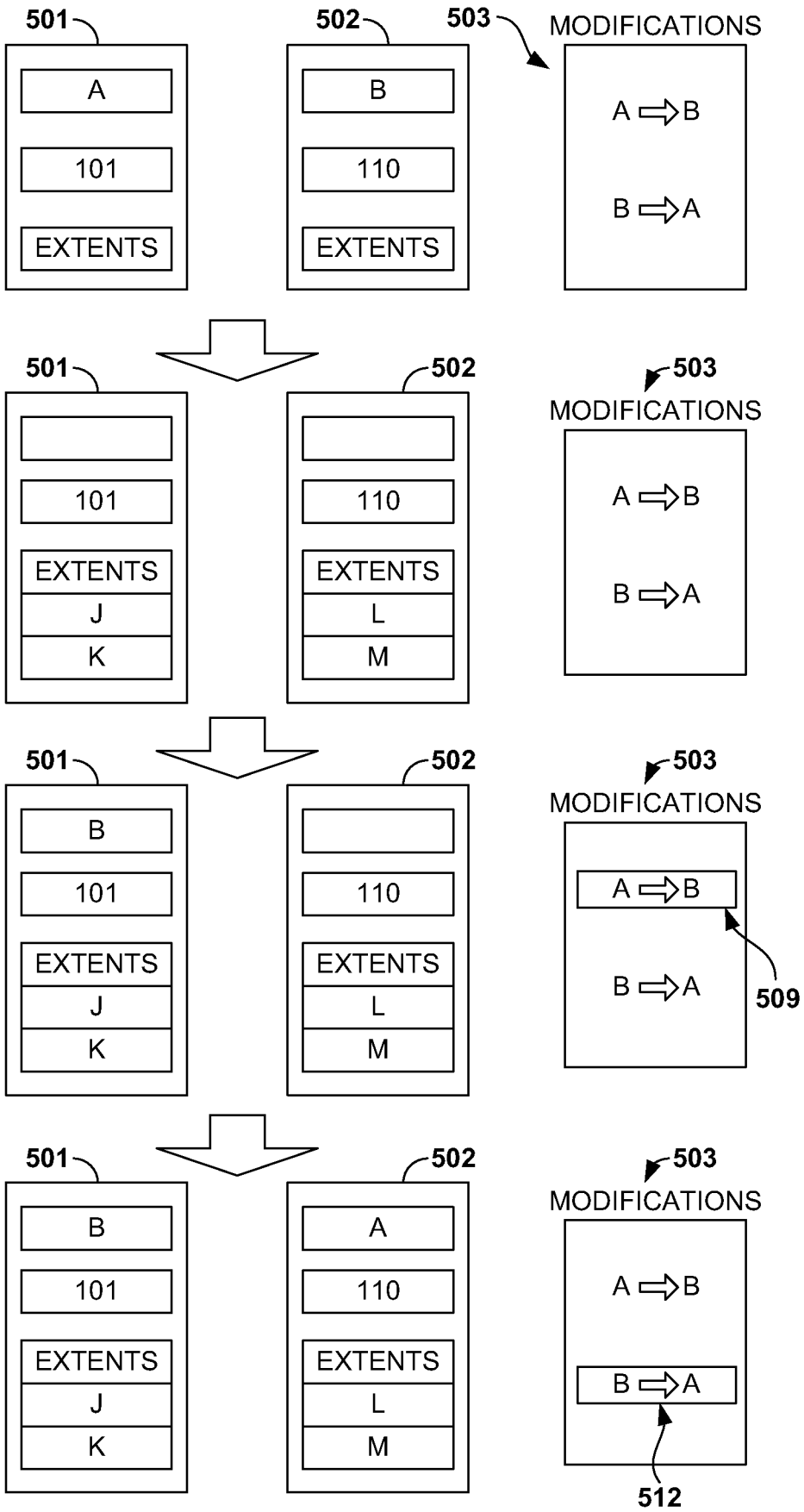

400
META-DATA
NAME
401
GUID
402
LIST OF EXTENTS
403

FIG. 4.

FIG. 5.


501
502
503
MODIFICATIONS
A
101
EXTENTS
B
110
EXTENTS
A ⇨ B
B ⇨ A
501
502
503
MODIFICATIONS
101
EXTENTS
J
K
110
EXTENTS
L
M
A ⇨ B
B ⇨ A
501
502
503
MODIFICATIONS
B
101
EXTENTS
J
K
110
EXTENTS
L
M
A ⇨ B
B ⇨ A
509
501
502
503
MODIFICATIONS
B
101
EXTENTS
J
K
A
110
EXTENTS
L
M
A ⇨ B
B ⇨ A
512

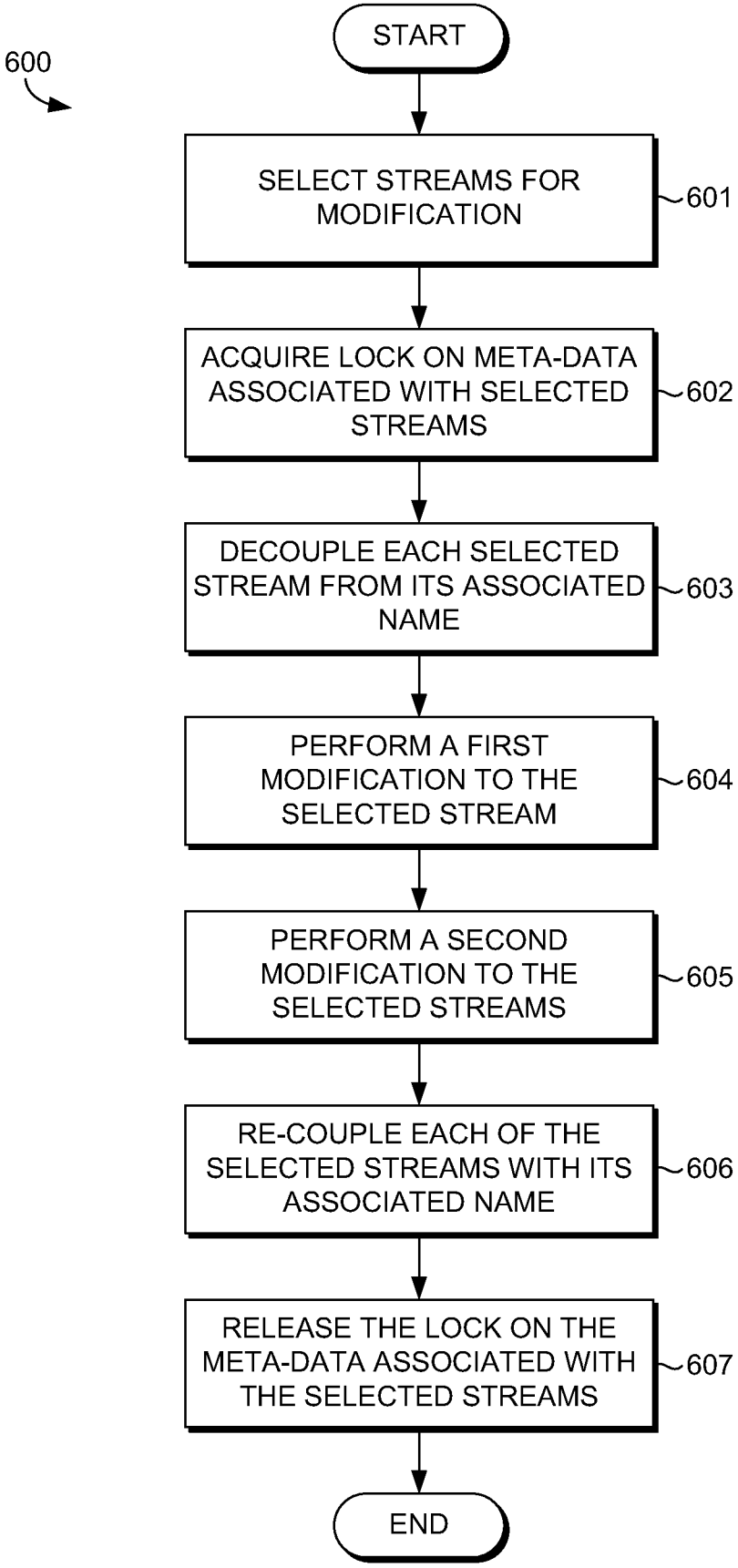

600
START
SELECT STREAMS FOR MODIFICATION
601
ACQUIRE LOCK ON META-DATA ASSOCIATED WITH SELECTED STREAMS
602
DECOUPLE EACH SELECTED STREAM FROM ITS ASSOCIATED NAME
603
PERFORM A FIRST MODIFICATION TO THE SELECTED STREAM
604
PERFORM A SECOND MODIFICATION TO THE SELECTED STREAMS
605
RE-COUPLE EACH OF THE SELECTED STREAMS WITH ITS ASSOCIATED NAME
606
RELEASE THE LOCK ON THE META-DATA ASSOCIATED WITH THE SELECTED STREAMS
607
END

FIG. 6.

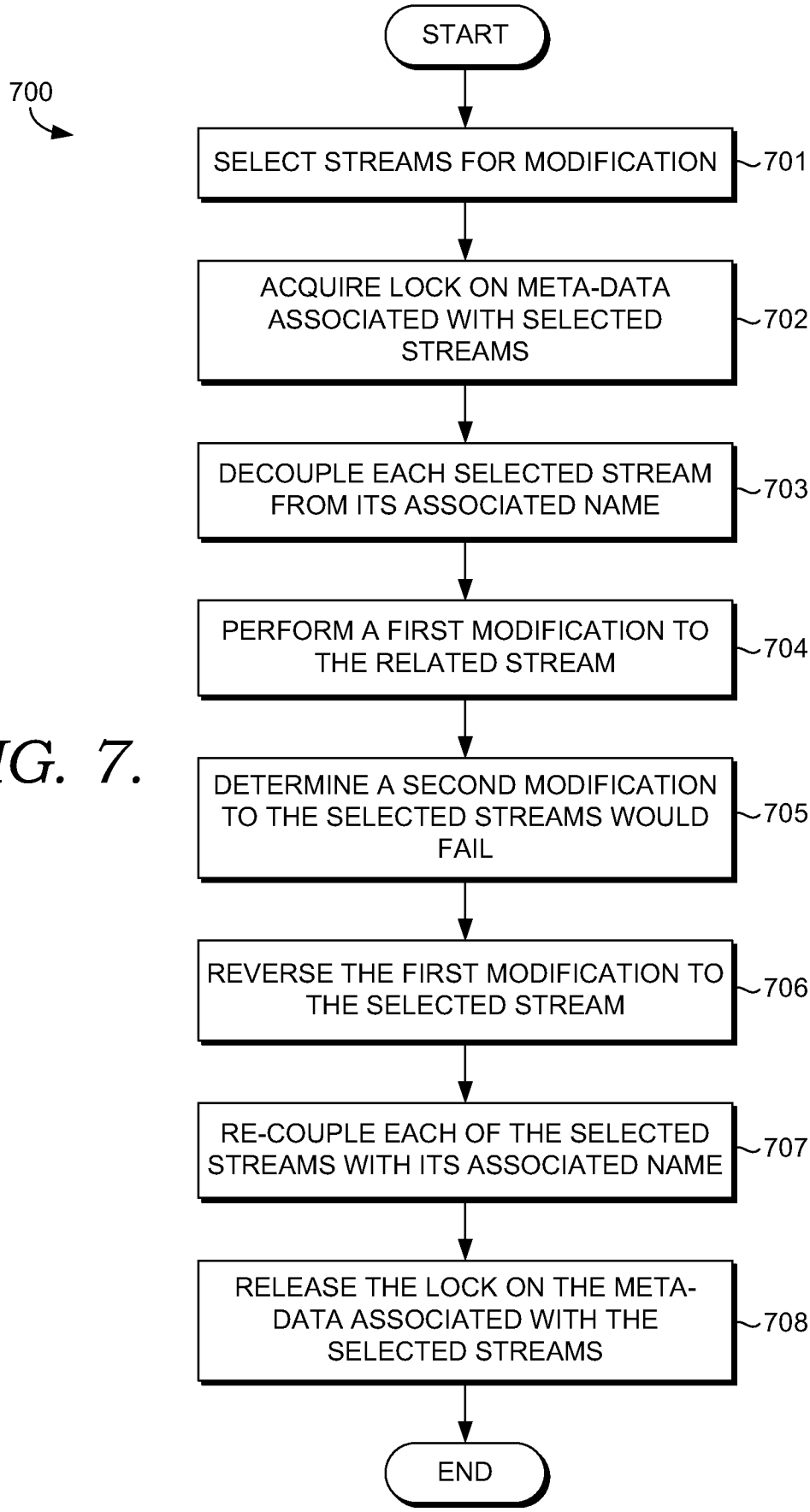

700
START
SELECT STREAMS FOR MODIFICATION
701
ACQUIRE LOCK ON META-DATA ASSOCIATED WITH SELECTED STREAMS
702
DECOUPLE EACH SELECTED STREAM FROM ITS ASSOCIATED NAME
703
PERFORM A FIRST MODIFICATION TO THE RELATED STREAM
704
DETERMINE A SECOND MODIFICATION TO THE SELECTED STREAMS WOULD FAIL
705
REVERSE THE FIRST MODIFICATION TO THE SELECTED STREAM
706
RE-COUPLE EACH OF THE SELECTED STREAMS WITH ITS ASSOCIATED NAME
707
RELEASE THE LOCK ON THE META-DATA ASSOCIATED WITH THE SELECTED STREAMS
708
END

FIG. 7.

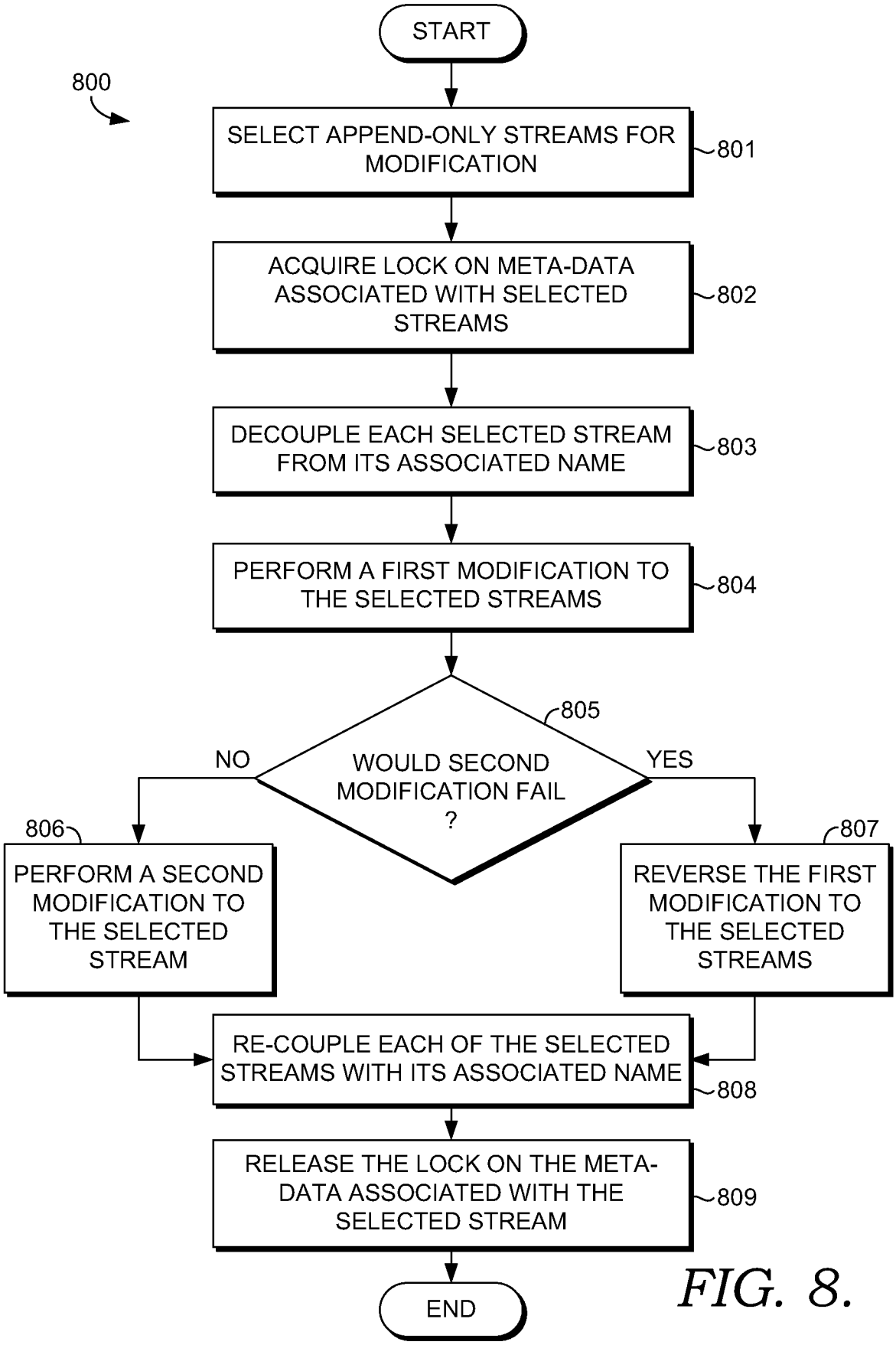

START
800
SELECT APPEND-ONLY STREAMS FOR MODIFICATION
801
ACQUIRE LOCK ON META-DATA ASSOCIATED WITH SELECTED STREAMS
802
DECOUPLE EACH SELECTED STREAM FROM ITS ASSOCIATED NAME
803
PERFORM A FIRST MODIFICATION TO THE SELECTED STREAMS
804
805
WOULD SECOND MODIFICATION FAIL ?
NO
YES
806
PERFORM A SECOND MODIFICATION TO THE SELECTED STREAM
807
REVERSE THE FIRST MODIFICATION TO THE SELECTED STREAMS
RE-COUPLE EACH OF THE SELECTED STREAMS WITH ITS ASSOCIATED NAME
808
RELEASE THE LOCK ON THE META-DATA ASSOCIATED WITH THE SELECTED STREAM
809
END

FIG. 8.

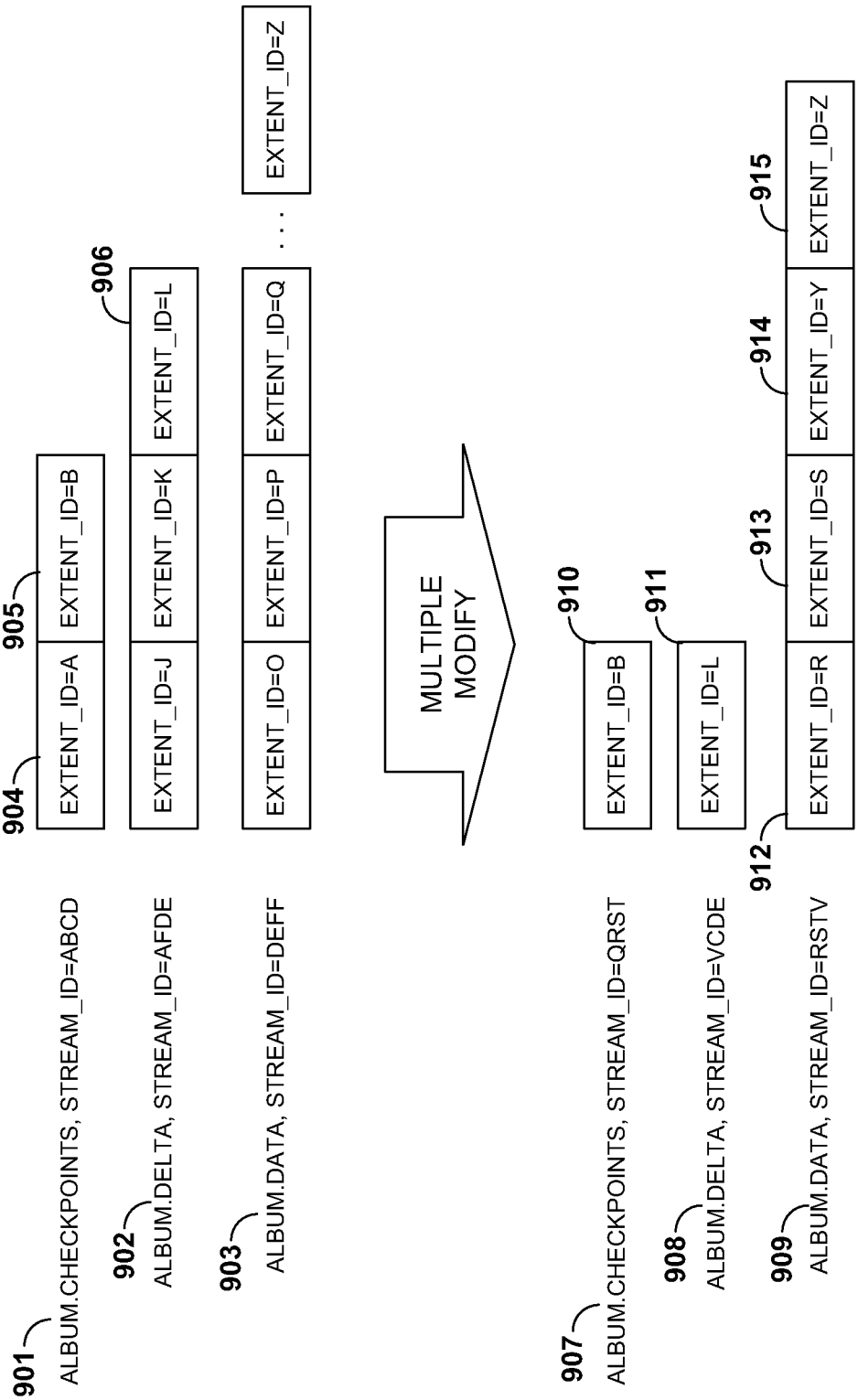

901
ALBUM.CHECKPOINTS, STREAM_ID=ABCD
902
ALBUM.DELTA, STREAM_ID=AFDE
903
ALBUM.DATA, STREAM_ID=DEFF
904
905
906
EXTENT_ID=A
EXTENT_ID=B
EXTENT_ID=J
EXTENT_ID=K
EXTENT_ID=L
EXTENT_ID=O
EXTENT_ID=P
EXTENT_ID=Q
. . .
EXTENT_ID=Z
MULTIPLE MODIFY
907
ALBUM.CHECKPOINTS, STREAM_ID=QRST
908
ALBUM.DELTA, STREAM_ID=VCDE
909
ALBUM.DATA, STREAM_ID=RSTV
910
911
912
913
914
915
EXTENT_ID=B
EXTENT_ID=L
EXTENT_ID=R
EXTENT_ID=S
EXTENT_ID=Y
EXTENT_ID=Z

FIG. 9.