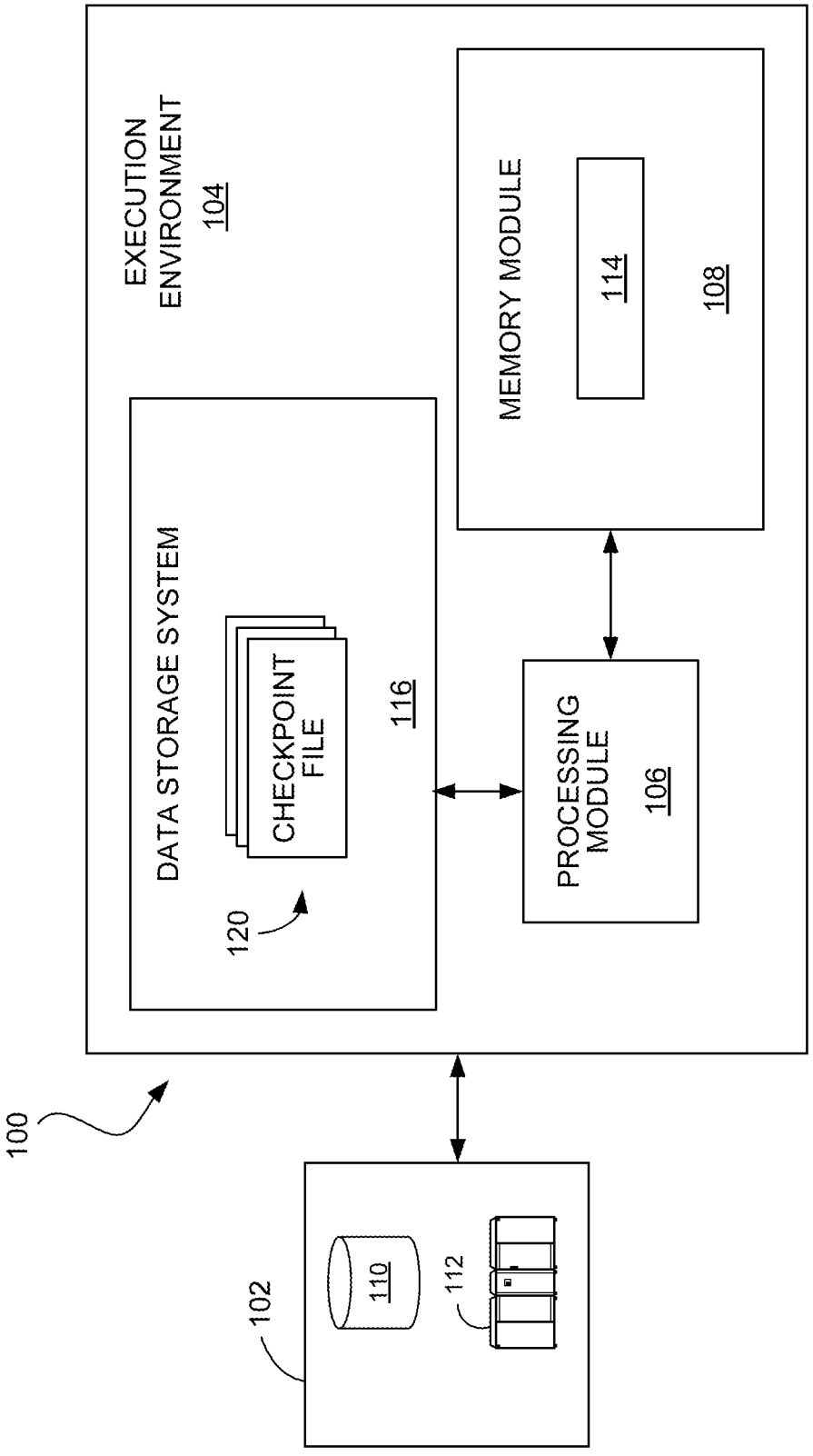

EXECUTION ENVIRONMENT
104
MEMORY MODULE
114
108
DATA STORAGE SYSTEM
CHECKPOINT FILE
116
120
PROCESSING MODULE
106
100
102
110
112

FIG. 1

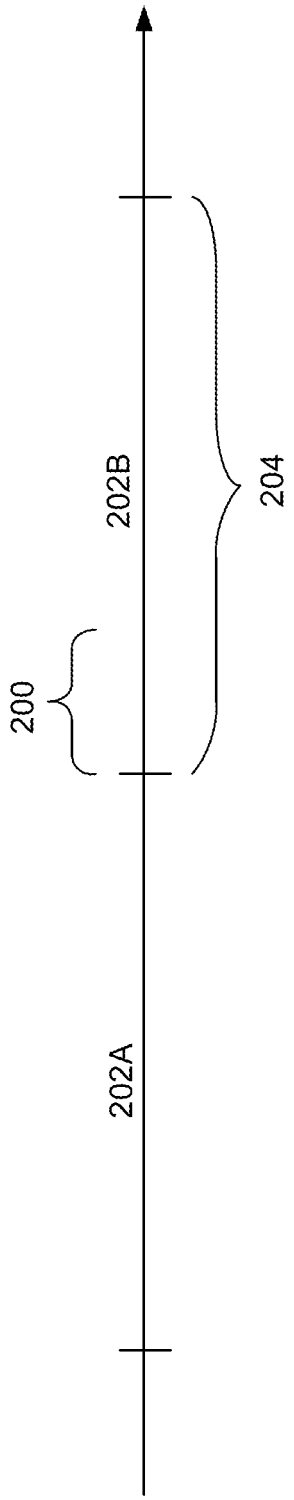


FIG. 2A

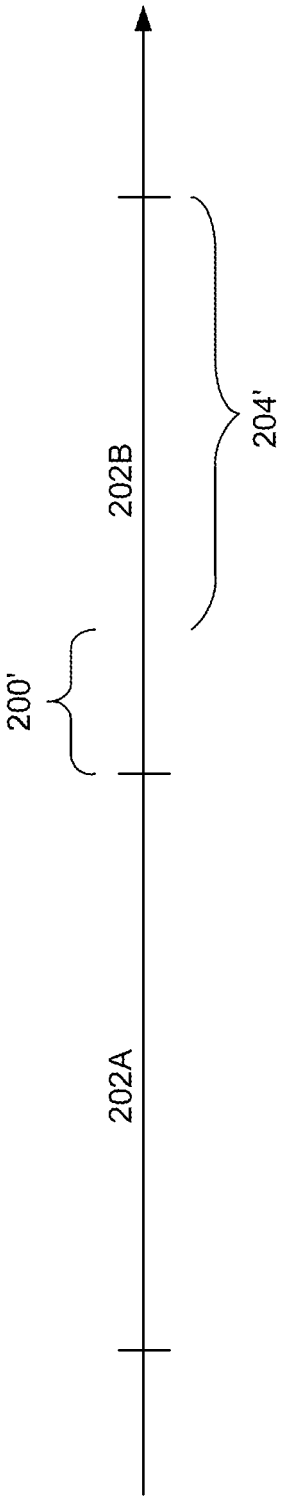


FIG. 2B

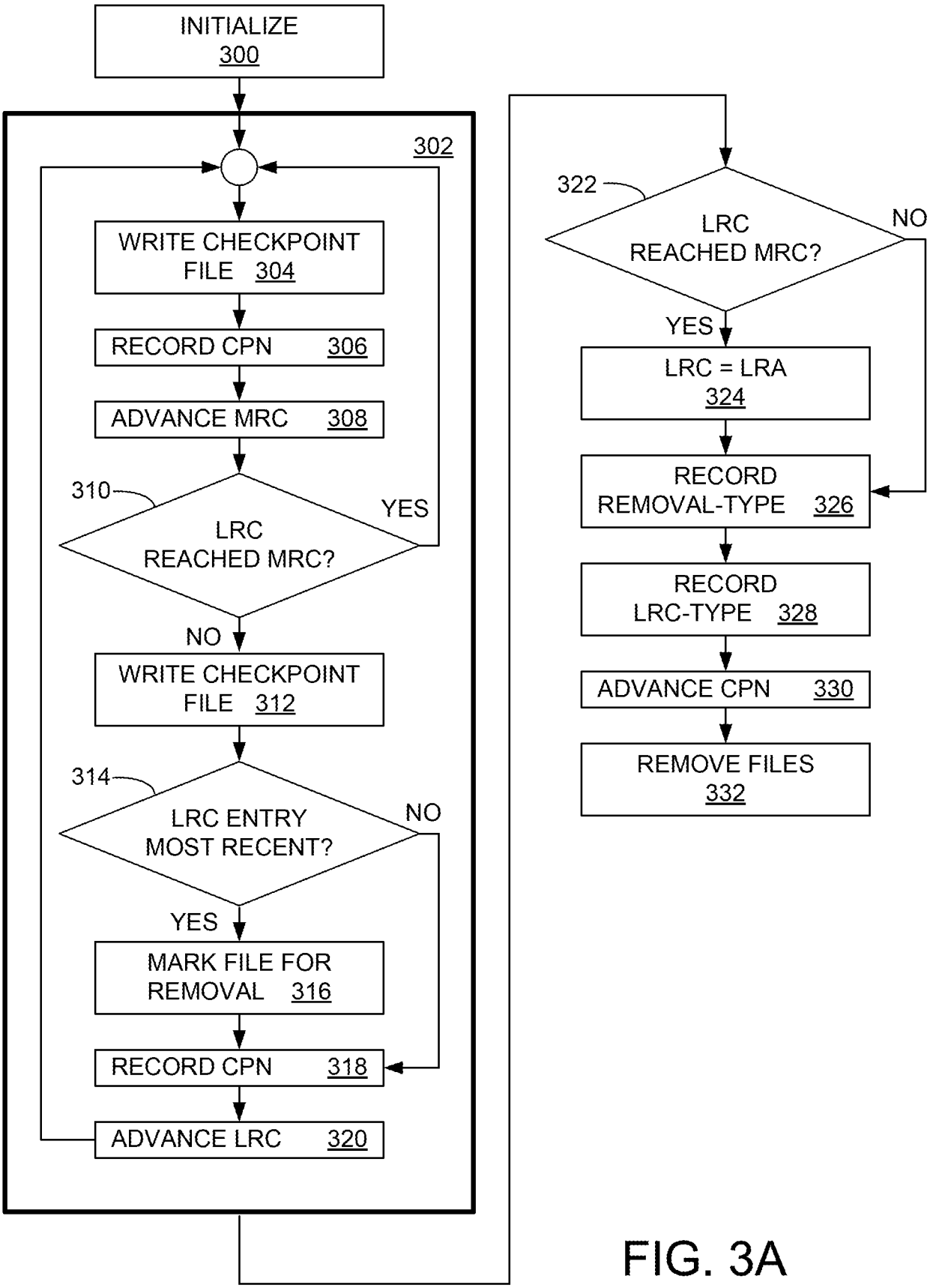

INITIALIZE
300
302
WRITE CHECKPOINT FILE 304
RECORD CPN 306
ADVANCE MRC 308
310
LRC REACHED MRC?
YES
NO
WRITE CHECKPOINT FILE 312
314
LRC ENTRY MOST RECENT?
NO
YES
MARK FILE FOR REMOVAL 316
RECORD CPN 318
ADVANCE LRC 320
322
LRC REACHED MRC?
NO
YES
LRC = LRA 324
RECORD REMOVAL-TYPE 326
RECORD LRC-TYPE 328
ADVANCE CPN 330
REMOVE FILES 332

FIG. 3A

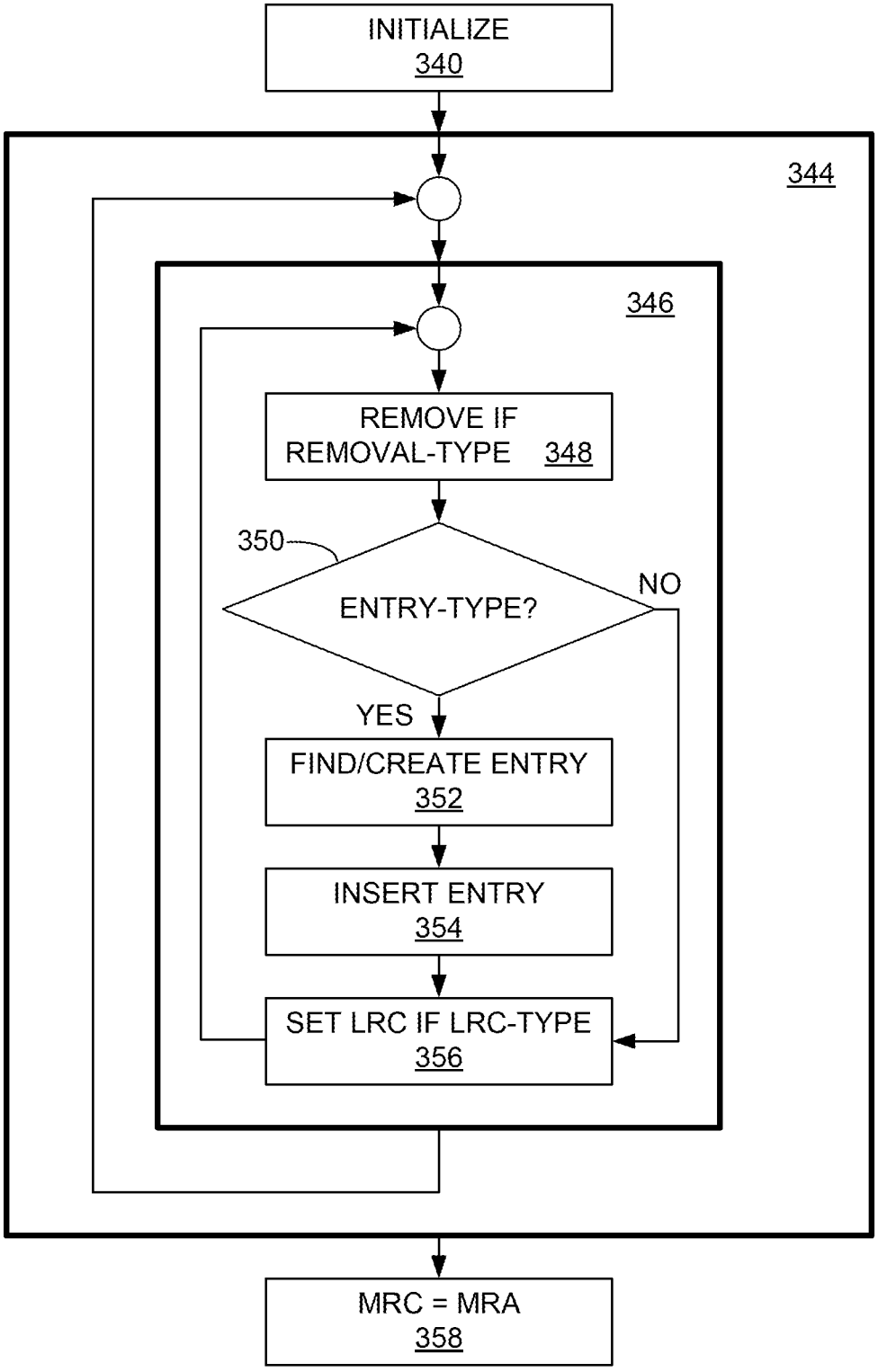

INITIALIZE
340
344
346
REMOVE IF
REMOVAL-TYPE 348
350
ENTRY-TYPE?
NO
YES
FIND/CREATE ENTRY
352
INSERT ENTRY
354
SET LRC IF LRC-TYPE
356
MRC = MRA
358

FIG. 3B

400

	Key	Data	CPN
MRA →	1220	A	
	1218	B	
	1217	C	
	1216	D	
MRC →	⋮	⋮	⋮
	1210	E	200
	1209	F	200
	1231	G	200
	⋮	⋮	⋮
	1232	H	194
	1002	Z	194
	1238	I	194
	1239	J	193
LRC →	1259	K	193
	1203	L	200
	1201	M	200
	⋮	⋮	⋮
LRA →	1244	N	198

402

Key
1245
1215

FIG. 4A

CHECKPOINT FILE 193

Type	Key	Data	New?
E	1259	K	T
E	1239	J	F
E	1238	Q	T
E	1232	S	F
E	1911	X	T
.	.	.	.
.	.	.	.
.	.	.	.
R	1110		
L	1237		

CHECKPOINT FILE 194

Type	Key	Data	New?
E	1238	I	T
E	1237	R	F
E	1232	T	T
E	1911	Y	F
E	1232	H	T
.	.	.	.
.	.	.	.
.	.	.	.
R	1710		
R	1810		
L	1211		

FIG. 4B

CHECKPOINT FILE 198

Type	Key	Data	New?
.	.	.	.
.	.	.	.
.	.	.	.
E	1244	N	F
.	.	.	.
.	.	.	.
.	.	.	.
L	1222		

CHECKPOINT FILE 199

Type	Key	Data	New?
.	.	.	.
.	.	.	.
.	.	.	.
R	1910		
R	1911		
L	1201		

CHECKPOINT FILE 200

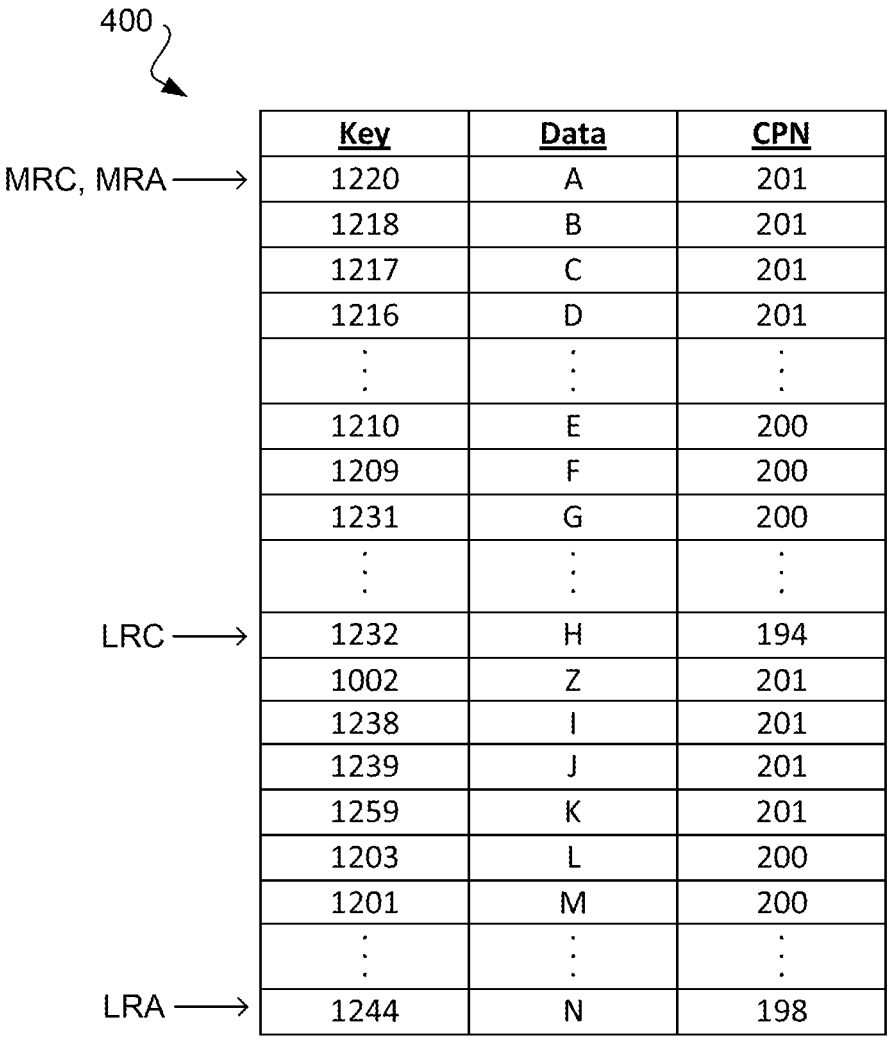
Type	Key	Data	New?
E	1231	G	T
E	1201	M	F
E	1209	F	T
E	1203	L	F
E	1210	E	T
.	.	.	.
.	.	.	.
.	.	.	.
R	1237		
L	1259		

FIG. 4C

CHECKPOINT FILE 201

Type	Key	Data	New?
E	1216	D	T
E	1259	K	F
E	1217	C	T
E	1239	J	F
E	1218	B	T
E	1238	I	F
E	1220	A	T
E	1002	Z	F
.	.	.	.
.	.	.	.
.	.	.	.
R	1245		
R	1915		
L	1232		

FIG. 4D


400
MRC, MRA
LRC
LRA
Key
Data
CPN
1220 A 201
1218 B 201
1217 C 201
1216 D 201
1210 E 200
1209 F 200
1231 G 200
1232 H 194
1002 Z 201
1238 I 201
1239 J 201
1259 K 201
1203 L 200
1201 M 200
1244 N 198

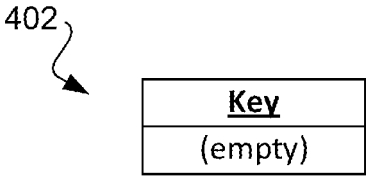

402
Key
(empty)

FIG. 4E

AFTER 194:

Key	Data	CPN
⋮	⋮	⋮
1232	H	194
1232	T	194
1238	I	194
1211	Y	194
1237	R	194

AFTER 198:

Key	Data	CPN
⋮	⋮	⋮
1232	H	194
1237	R	194
⋮	⋮	⋮
1244	N	198

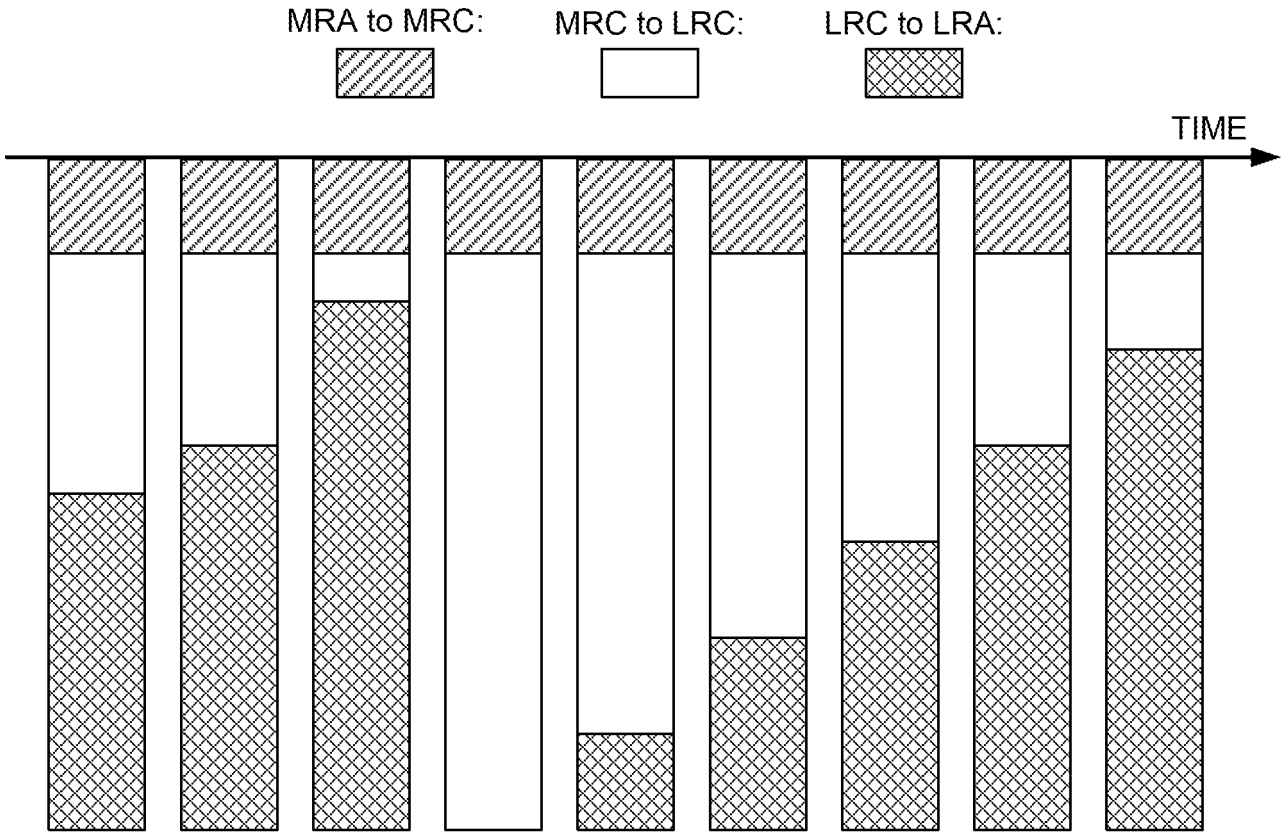
AFTER 199:

Key	Data	CPN
⋮	⋮	⋮
1232	H	194
1237	R	194
1238	I	194
⋮	⋮	⋮
1244	N	198

AFTER 200:

Key	Data	CPN
1210	E	200
1209	F	200
1231	G	200
⋮	⋮	⋮
1232	H	194
1238	I	194
1203	L	200
1201	M	200
⋮	⋮	⋮
1244	N	198

FIG. 4F



CURRENT CPN:

893	894	895	896	897	898	899	900	901

STORED ACTIVE CHECKPOINT FILES:

886	887	888	888	890	891	891	893	894
887	888	889	889	891	892	892	894	895
888	889	890	890	892	893	893	895	896
889	890	891	891	893	894	894	896	897
890	891	892	892	894	895	895	897	898
891	892	893	893	895	896	896	898	899
892	893	894	894	896	897	897	899	900
			895			898		

FIG. 5