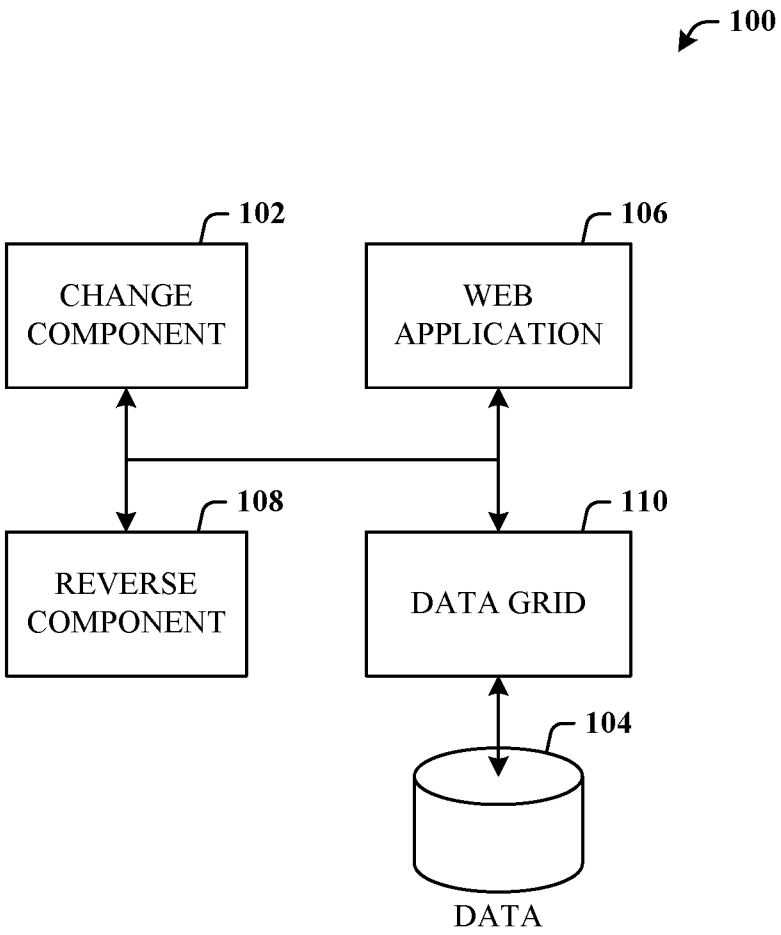

100
102
CHANGE COMPONENT
106
WEB APPLICATION
108
REVERSE COMPONENT
110
DATA GRID
104
DATA

FIG. 1

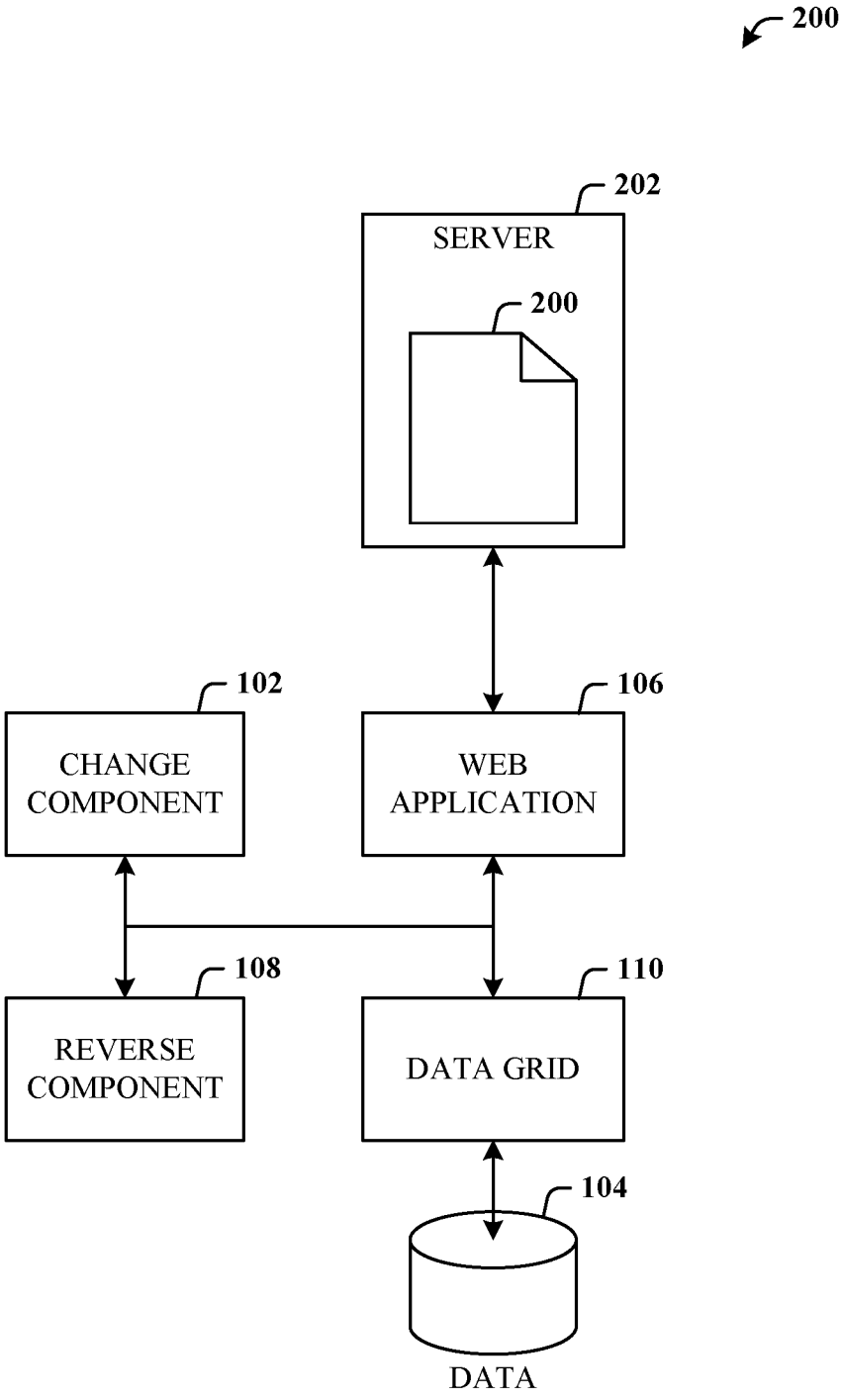

200
202
SERVER
200
102
106
CHANGE COMPONENT
WEB APPLICATION
108
110
REVERSE COMPONENT
DATA GRID
104
DATA

FIG. 2

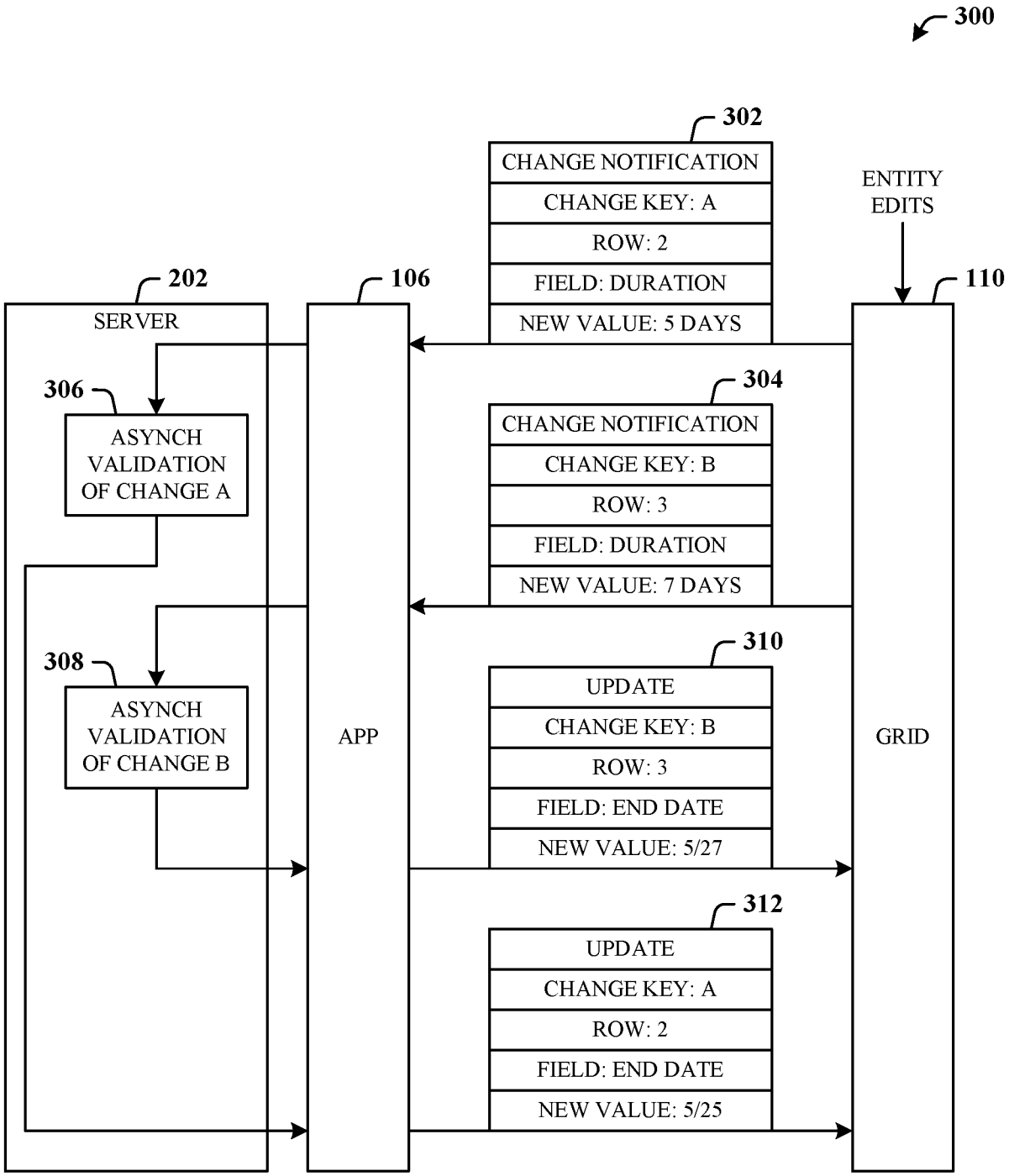
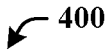

300
302
CHANGE NOTIFICATION
CHANGE KEY: A
ROW: 2
FIELD: DURATION
NEW VALUE: 5 DAYS
ENTITY EDITS
202
SERVER
106
APP
110
GRID
306
ASYNCH VALIDATION OF CHANGE A
304
CHANGE NOTIFICATION
CHANGE KEY: B
ROW: 3
FIELD: DURATION
NEW VALUE: 7 DAYS
308
ASYNCH VALIDATION OF CHANGE B
310
UPDATE
CHANGE KEY: B
ROW: 3
FIELD: END DATE
NEW VALUE: 5/27
312
UPDATE
CHANGE KEY: A
ROW: 2
FIELD: END DATE
NEW VALUE: 5/25

FIG. 3



402

CHANGE NOTIFICATION	
CHANGE KEY: A	
ROW: 2	ROW: 2
FIELD: DURATION	FIELD: END DATE
NEW VALUE: 5 DAYS	NEW VALUE: 5/25

404

CHANGE NOTIFICATION	
CHANGE KEY: B	
ROW: 3	ROW: 3
FIELD: DURATION	FIELD: END DATE
NEW VALUE: 7 DAYS	NEW VALUE: 5/27

FIG. 4

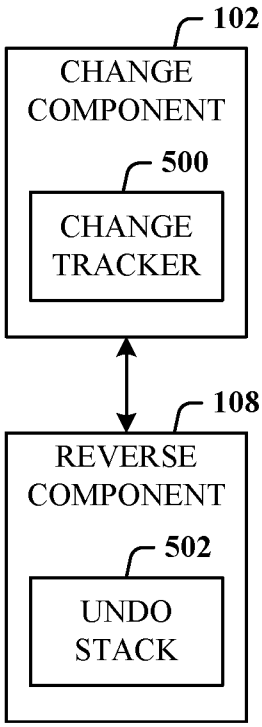

102
CHANGE COMPONENT
500
CHANGE TRACKER
108
REVERSE COMPONENT
502
UNDO STACK

FIG. 5

STATE OF GRID

600

	TASK NAME	START	FINISH	DURATION
1	SEND THE FENCE	MON 5/21/XX	MON 5/21/XX	1 DAY
2	PAINT THE FENCE	MON 5/21/XX	MON 5/21/XX	1 DAY
3	CLEAN-UP TOOLS	MON 5/21/XX	MON 5/21/XX	1 DAY

602

STATE OF UNDO STACK

604

STATE OF CHANGE TRACKER

606

STATE OF GRID

	TASK NAME	START	FINISH	DURATION
1	SEND THE FENCE	MON 5/21/XX	MON 5/21/XX	1 DAY
2	PAINT THE FENCE	MON 5/21/XX	TUE 5/22/XX	2 DAYS
3	CLEAN-UP TOOLS	MON 5/21/XX	MON 5/21/XX	1 DAY

608

STATE OF UNDO STACK

EXECUTE:
UPDATECELL{{2,DURATION},2}
UNDO:
UPDATECELL{{2,DURATION},1}

EXECUTE:
UPDATECELL{{2,FINISH},5/23}
UNDO:
UPDATECELL{{2,FINISH},5/22}

610

STATE OF CHANGE TRACKER

{2,DURATION}-> 2
{2,FINISH}->5/23

FIG. 6

STATE OF GRID

612

	TASK NAME	START	DURATION
1	SEND THE FENCE	MON 5/21/XX	1 DAY
2	PAINT THE FENCE	MON 5/21/XX	2 DAYS
3	CLEAN-UP TOOLS	MON 5/21/XX	1 DAY

STATE OF UNDO STACK

614

EXECUTE:
HIDECOLUMN{FINISH}
UNDO:
SHOWCOLUMN{FINISH}

EXECUTE:
UPDATECELL{{2,DURATION},2}
UNDO:
UPDATECELL{{2,DURATION},1}

EXECUTE:
UPDATECELL{{2,FINISH},5/23}
UNDO:
UPDATECELL{{2,FINISH},5/22}

STATE OF CHANGE TRACKER

{2,DURATION}-> 2
{2,FINISH}->5/23

610

7/14

616

STATE OF GRID

	TASK NAME	START	DURATION
1	SEND THE FENCE	MON 5/21/XX	1 DAY
2	PAINT THE FENCE	MON 5/21/XX	2 DAYS
3	CLEAN-UP TOOLS	MON 5/21/XX	1 DAY

STATE OF UNDO STACK

EXECUTE:
HIDECOLUMN{FINISH}
UNDO:
SHOWCOLUMN{FINISH}

EXECUTE:
UPDATECELL{{2,DURATION},2}
UNDO:
UPDATECELL{{2,DURATION},1}

EXECUTE:
UPDATECELL{{2,FINISH},5/23}
UNDO:
UPDATECELL{{2,FINISH},5/22}

STATE OF CHANGE TRACKER

FIG. 7

STATE OF GRID 618

	TASK NAME	START	DURATION
1	SEND THE FENCE	MON 5/21/XX	1 DAY
2	PAINT THE FENCE	MON 5/21/XX	2 DAYS
3	CLEAN-UP PROJECT	MON 5/21/XX	1 DAY

STATE OF UNDO STACK 620

EXECUTE:
UPDATECELL{{3,NAME},'...CT}
UNDO:
UPDATECELL{{3,NAME},'...OLS}

EXECUTE:
HIDECOLUMN{FINISH}
UNDO:
SHOWCOLUMN{FINISH}

EXECUTE:
UPDATECELL{{2,DURATION},2}
UNDO:
UPDATECELL{{2,DURATION},1}

EXECUTE:
UPDATECELL{{2,FINISH},5/23}
UNDO:
UPDATECELL{{2,FINISH},5/22}

STATE OF CHANGE TRACKER 622

{3,NAME}-> 'CLEAN-UP PROJECT'

FIG. 8

624

626

STATE OF GRID

STATE OF UNDO STACK

STATE OF CHANGE TRACKER

	TASK NAME	START	DURATION
1	SEND THE FENCE	MON 5/21/XX	1 DAY
2	PAINT THE FENCE	MON 5/21/XX	2 DAYS
3	CLEAN-UP TOOLS	MON 5/21/XX	1 DAY

EXECUTE:
HIDECOLUMN{FINISH}
UNDO:
SHOWCOLUMN{FINISH}

EXECUTE:
UPDATECELL{{2,DURATION},2}
UNDO:
UPDATECELL{{2,DURATION},1}

EXECUTE:
UPDATECELL{{2,FINISH},5/23}
UNDO:
UPDATECELL{{2,FINISH},5/22}

628

630

632

STATE OF GRID

STATE OF UNDO STACK

STATE OF CHANGE TRACKER

	TASK NAME	START	FINISH	DURATION
1	SEND THE FENCE	MON 5/21/XX	MON 5/21/XX	1 DAY
2	PAINT THE FENCE	MON 5/21/XX	MON 5/21/XX	1 DAY
3	CLEAN-UP TOOLS	MON 5/21/XX	MON 5/21/XX	1 DAY

{2,DURATION}-> 1
{2,FINISH}->5/22

FIG. 9

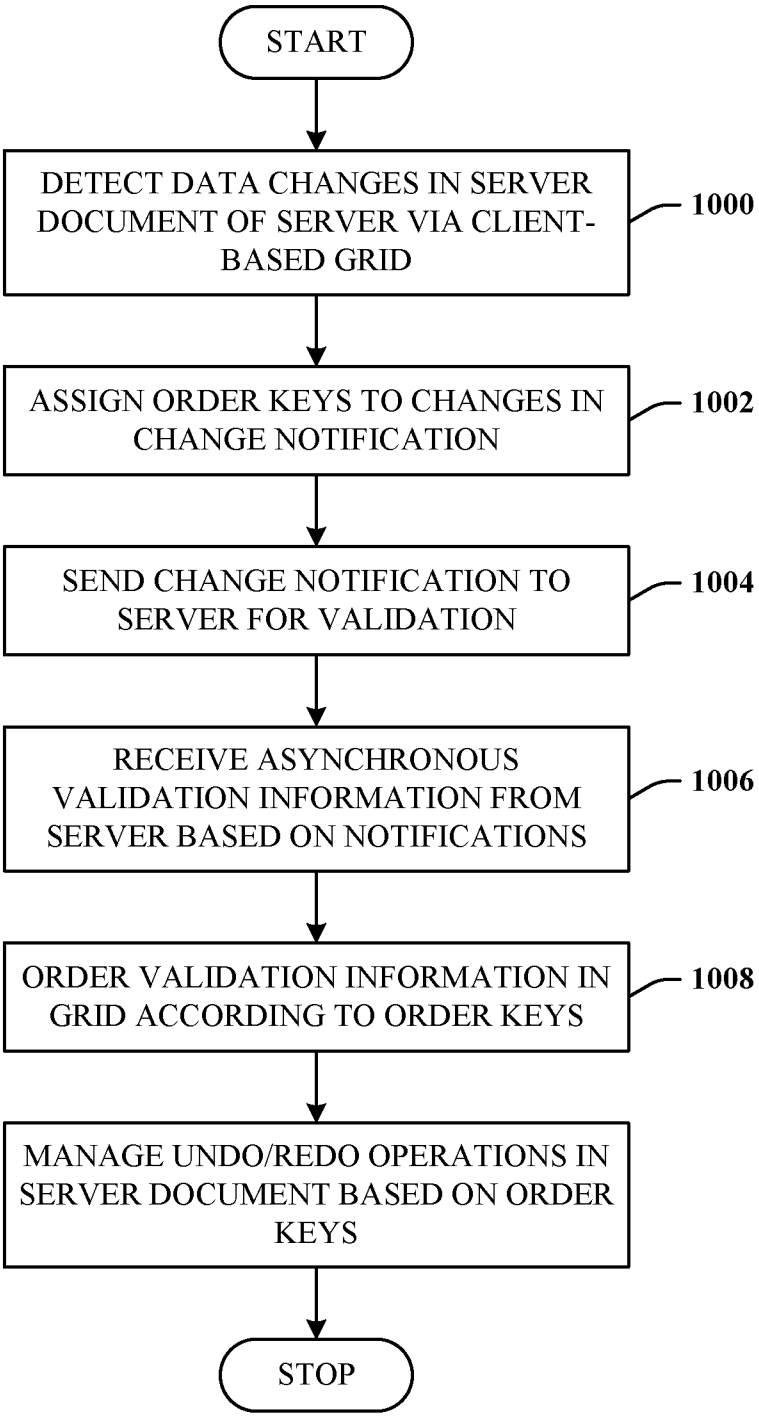

START
DETECT DATA CHANGES IN SERVER DOCUMENT OF SERVER VIA CLIENT-BASED GRID
1000
ASSIGN ORDER KEYS TO CHANGES IN CHANGE NOTIFICATION
1002
SEND CHANGE NOTIFICATION TO SERVER FOR VALIDATION
1004
RECEIVE ASYNCHRONOUS VALIDATION INFORMATION FROM SERVER BASED ON NOTIFICATIONS
1006
ORDER VALIDATION INFORMATION IN GRID ACCORDING TO ORDER KEYS
1008
MANAGE UNDO/REDO OPERATIONS IN SERVER DOCUMENT BASED ON ORDER KEYS
STOP

FIG. 10

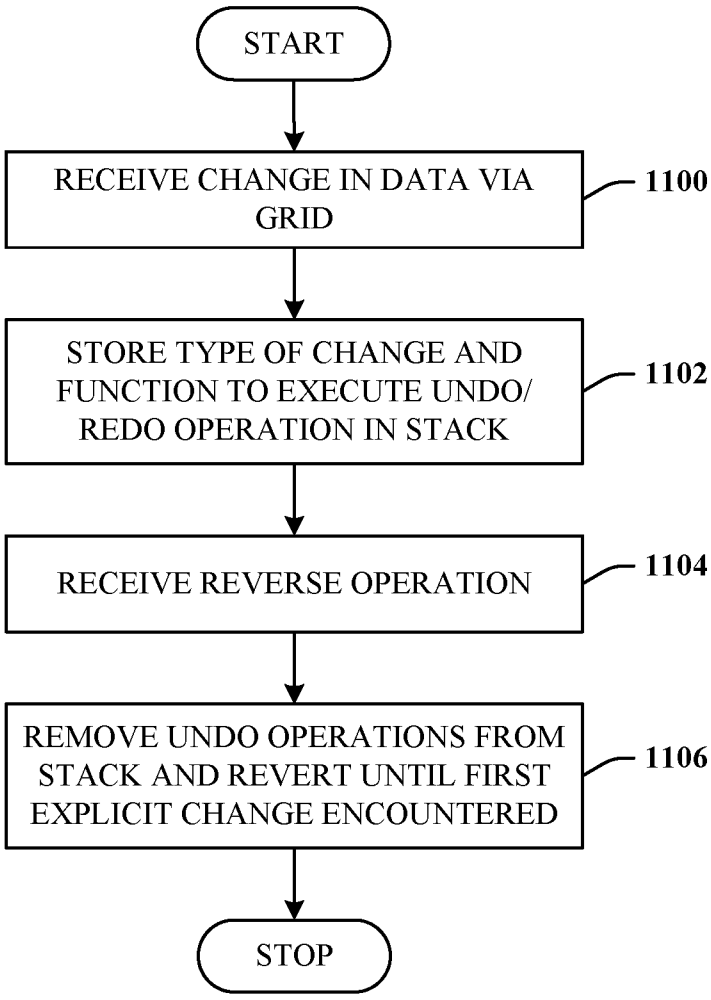

START
RECEIVE CHANGE IN DATA VIA GRID
1100
STORE TYPE OF CHANGE AND FUNCTION TO EXECUTE UNDO/ REDO OPERATION IN STACK
1102
RECEIVE REVERSE OPERATION
1104
REMOVE UNDO OPERATIONS FROM STACK AND REVERT UNTIL FIRST EXPLICIT CHANGE ENCOUNTERED
1106
STOP

FIG. 11

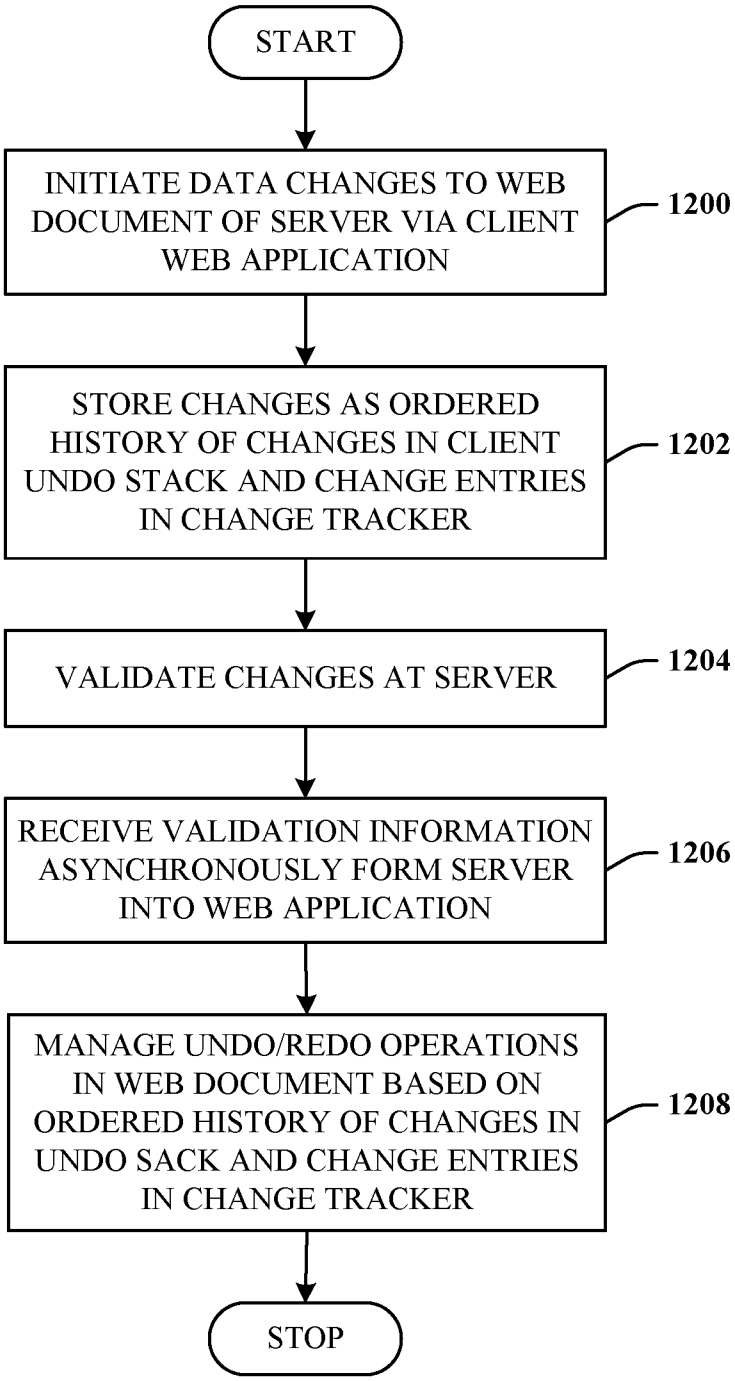

START
INITIATE DATA CHANGES TO WEB DOCUMENT OF SERVER VIA CLIENT WEB APPLICATION
1200
STORE CHANGES AS ORDERED HISTORY OF CHANGES IN CLIENT UNDO STACK AND CHANGE ENTRIES IN CHANGE TRACKER
1202
VALIDATE CHANGES AT SERVER
1204
RECEIVE VALIDATION INFORMATION ASYNCHRONOUSLY FORM SERVER INTO WEB APPLICATION
1206
MANAGE UNDO/REDO OPERATIONS IN WEB DOCUMENT BASED ON ORDERED HISTORY OF CHANGES IN UNDO SACK AND CHANGE ENTRIES IN CHANGE TRACKER
1208
STOP

FIG. 12

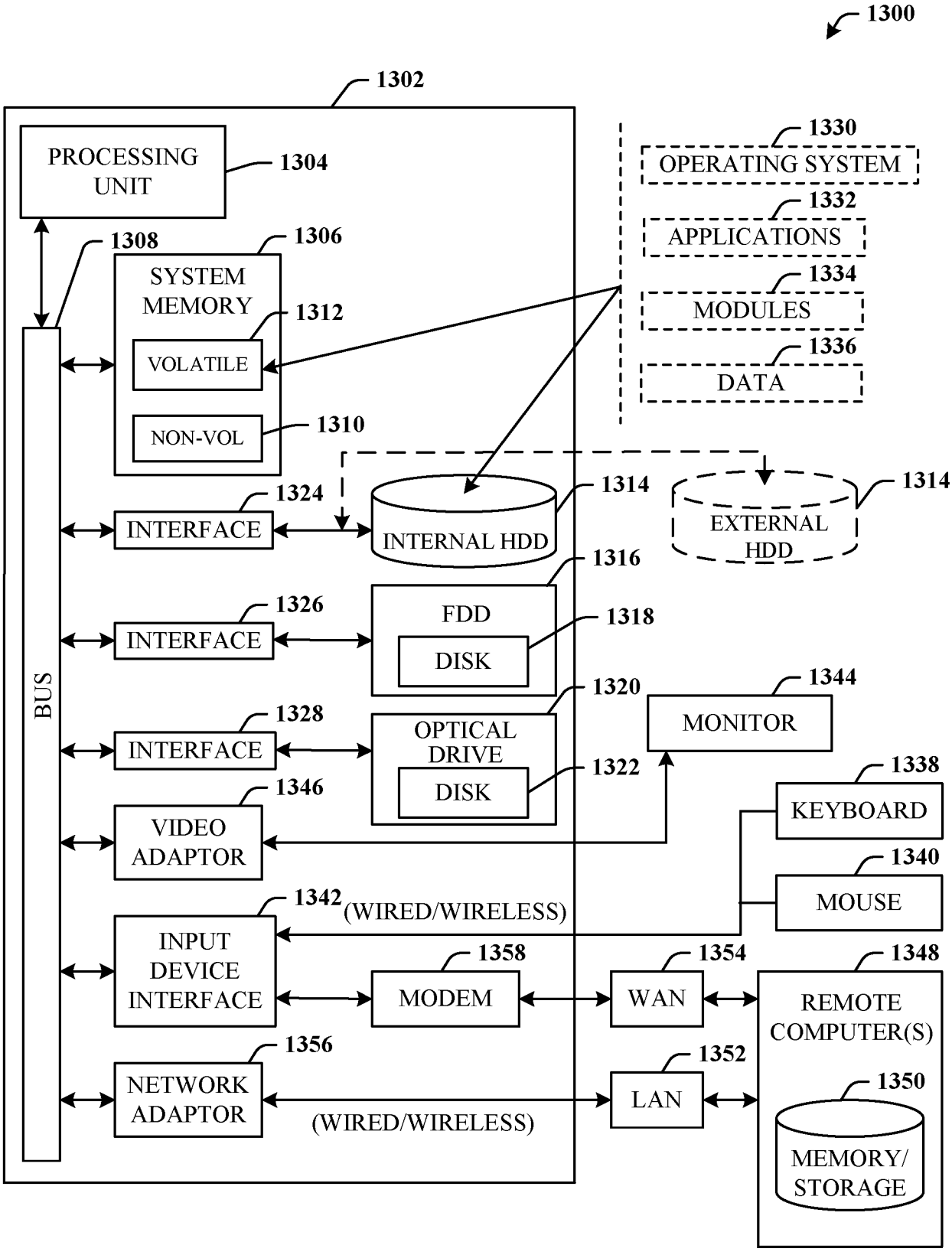

1300
1302
PROCESSING UNIT
1304
1308
1306
SYSTEM MEMORY
1312
VOLATILE
NON-VOL
1310
BUS
1330
OPERATING SYSTEM
1332
APPLICATIONS
1334
MODULES
1336
DATA
1324
INTERFACE
1314
INTERNAL HDD
1314
EXTERNAL HDD
1316
1326
INTERFACE
FDD
1318
DISK
1328
INTERFACE
1320
OPTICAL DRIVE
1322
DISK
1344
MONITOR
1346
VIDEO ADAPTOR
1338
KEYBOARD
1340
MOUSE
1342
(WIRED/WIRELESS)
INPUT DEVICE INTERFACE
1358
MODEM
1354
WAN
1348
REMOTE COMPUTER(S)
1356
NETWORK ADAPTOR
1352
LAN
1350
MEMORY/ STORAGE
(WIRED/WIRELESS)

FIG. 13

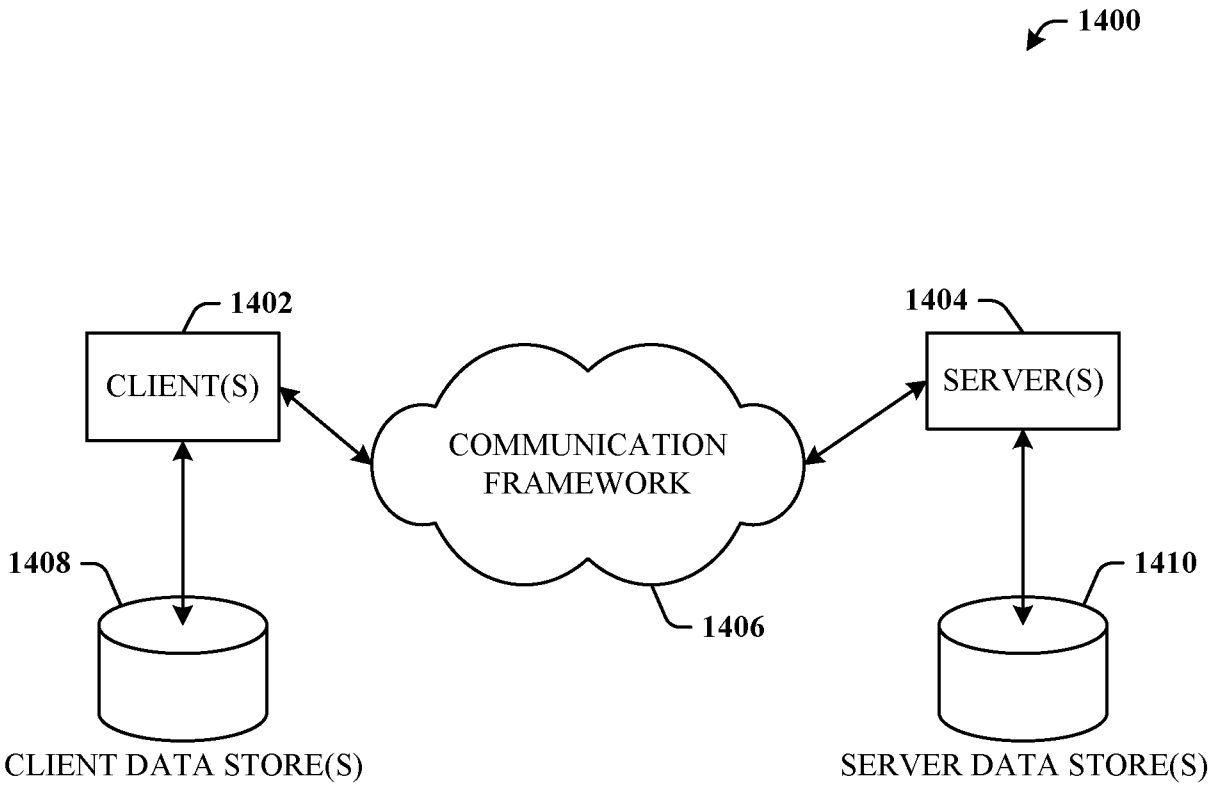

1400
1402
CLIENT(S)
1404
SERVER(S)
COMMUNICATION FRAMEWORK
1406
1408
CLIENT DATA STORE(S)
1410
SERVER DATA STORE(S)

FIG. 14