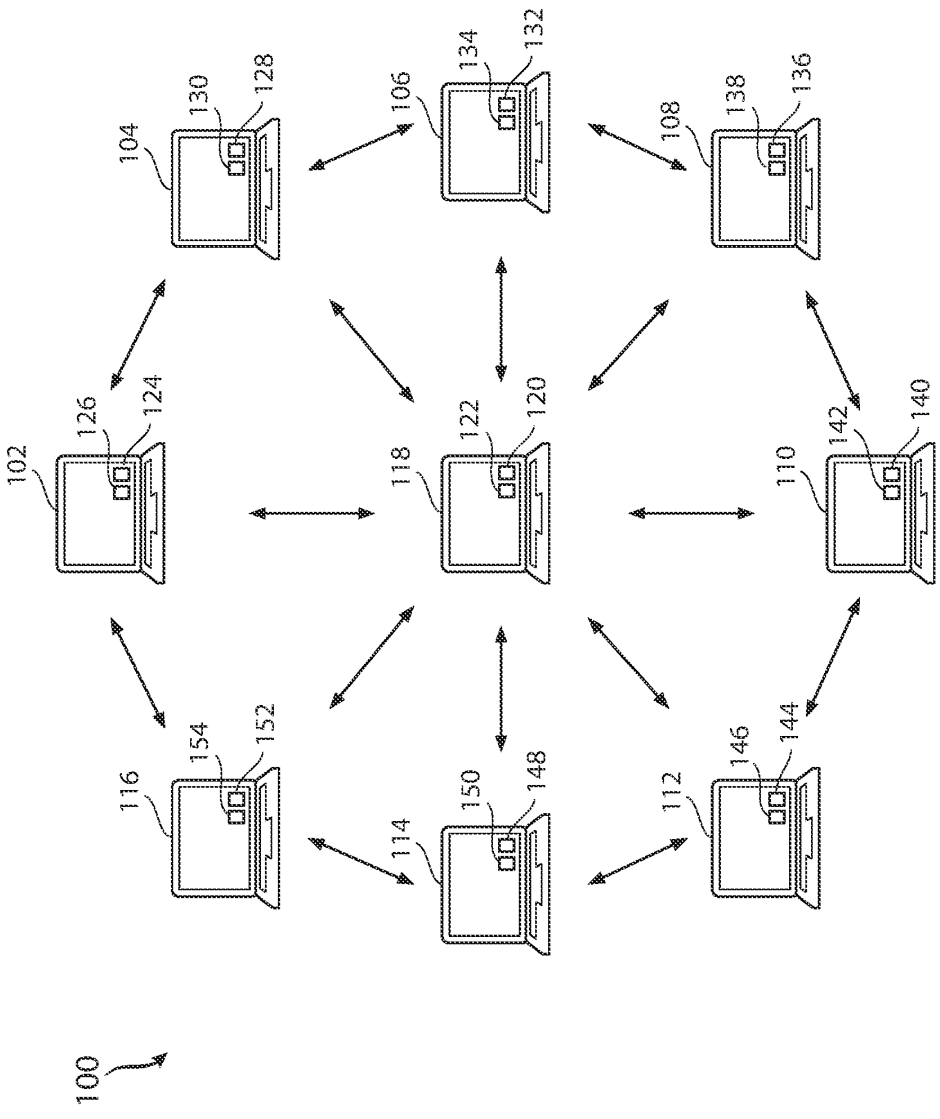

100
102
104
106
108
110
112
114
116
118
120
122
124
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128
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132
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136
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140
142
144
146
148
150
152
154

FIG. 1

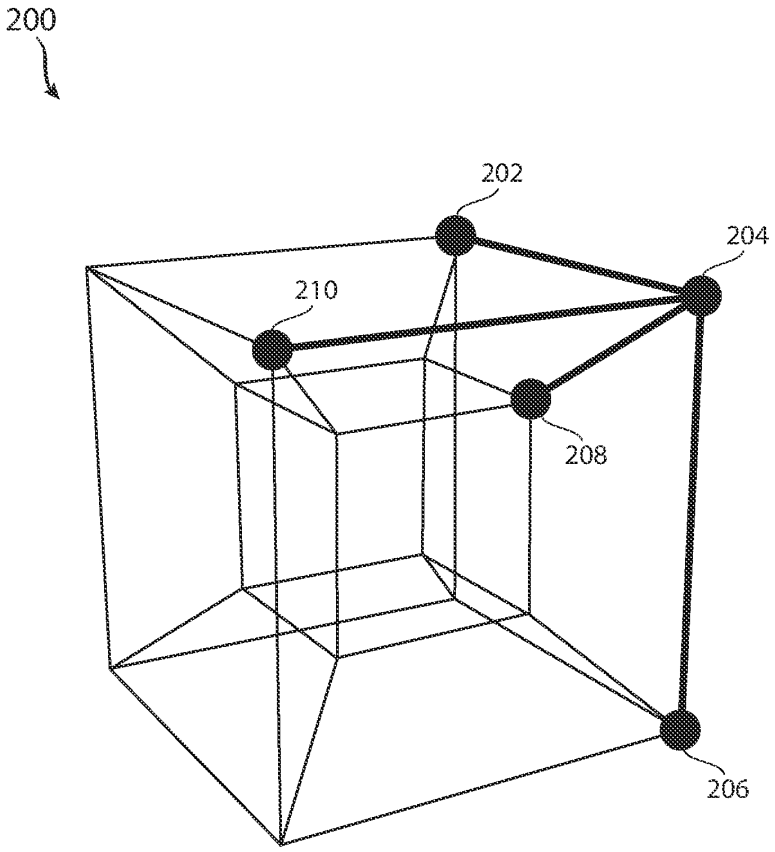


FIG. 2A

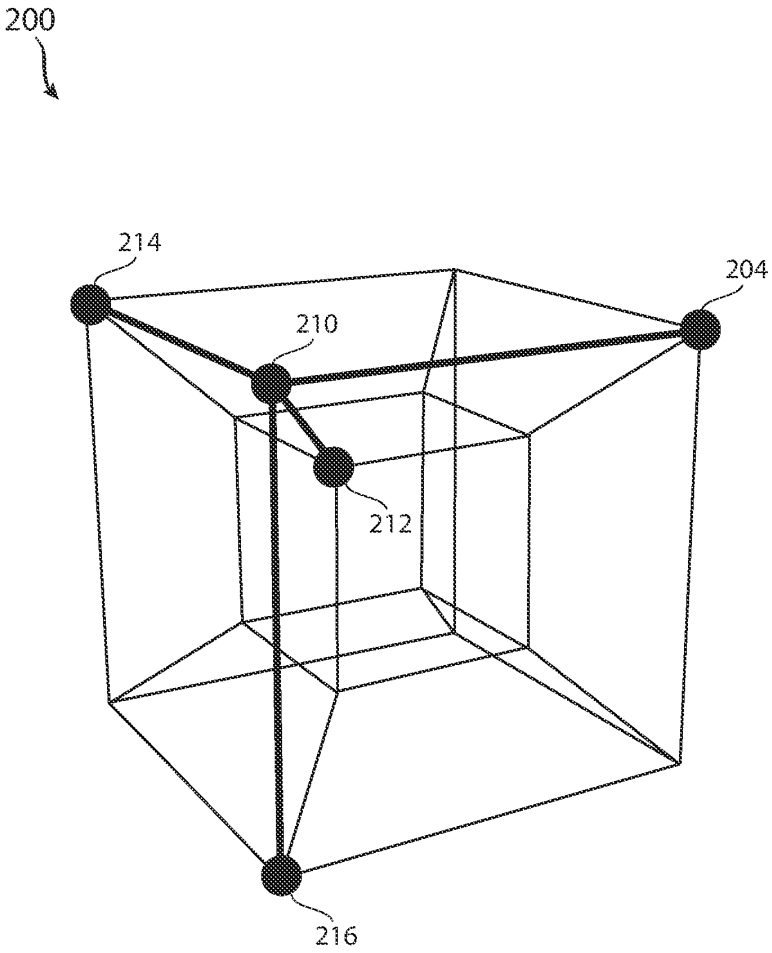


FIG. 2B

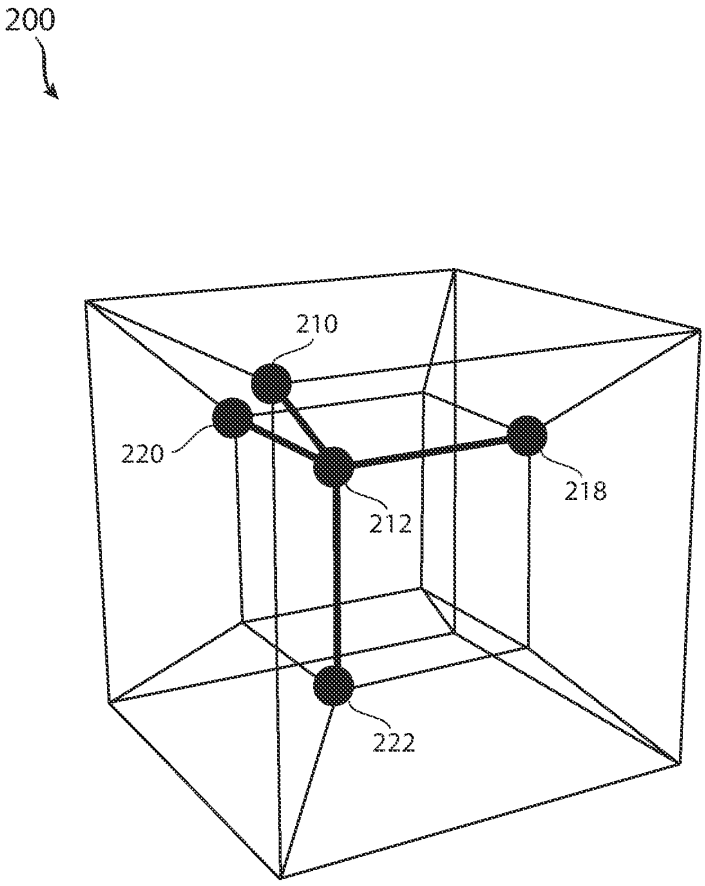


FIG. 2C

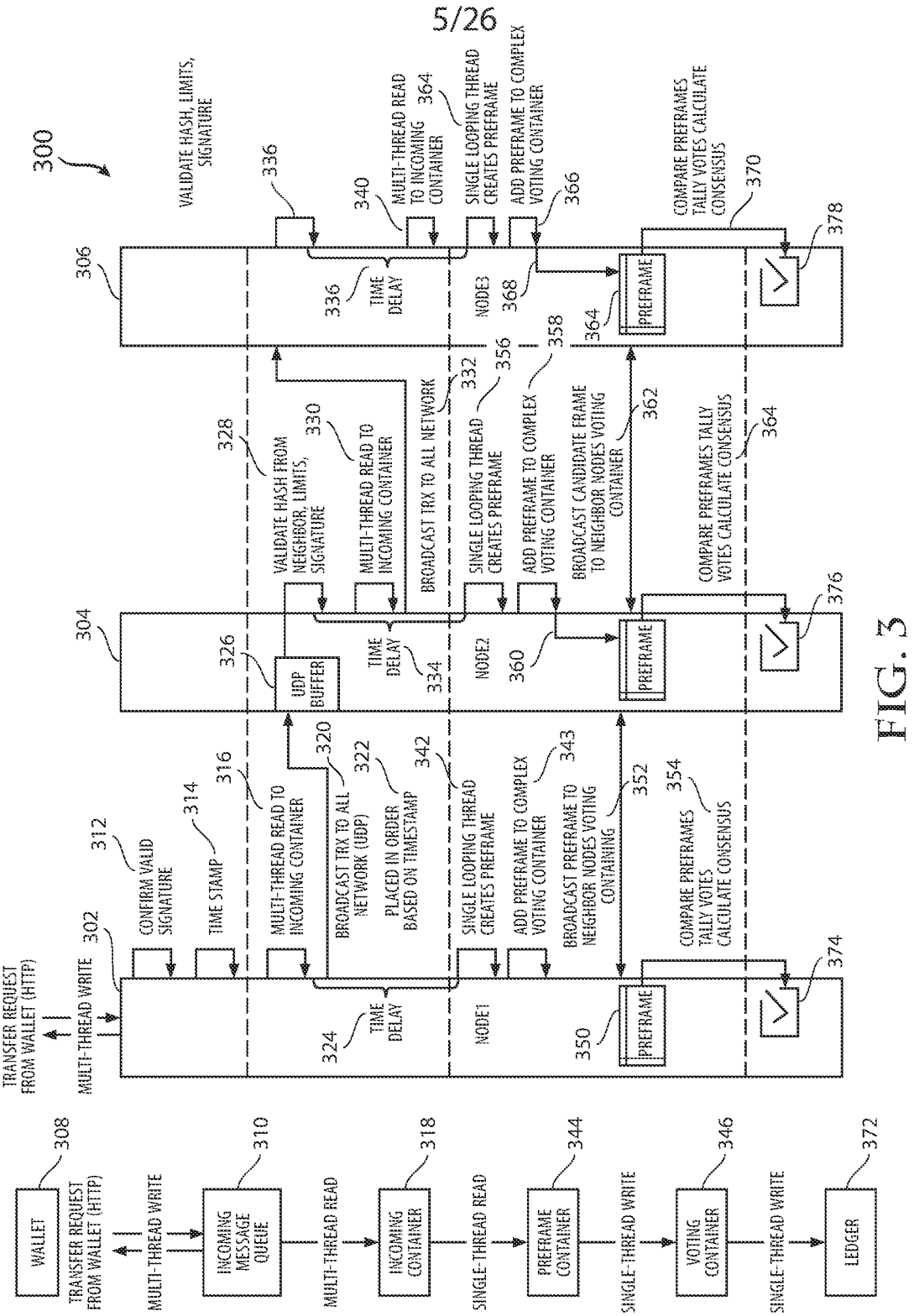

300
WALLET
308
TRANSFER REQUEST FROM WALLET (HTTP)
MULTI-THREAD WRITE
INCOMING MESSAGE QUEUE
310
MULTI-THREAD READ
INCOMING CONTAINER
318
SINGLE-THREAD READ
PREFRAME CONTAINER
344
SINGLE-THREAD WRITE
VOTING CONTAINER
346
SINGLE-THREAD WRITE
LEDGER
372
TRANSFER REQUEST FROM WALLET (HTTP)
MULTI-THREAD WRITE
302
CONFIRM VALID SIGNATURE
312
TIME STAMP
314
MULTI-THREAD READ TO INCOMING CONTAINER
316
BROADCAST TRX TO ALL NETWORK (UDP)
320
PLACED IN ORDER BASED ON TIMESTAMP
322
SINGLE LOOPING THREAD CREATES PREFRAME
342
ADD PREFRAME TO COMPLEX VOTING CONTAINER
343
BROADCAST PREFRAME TO NEIGHBOR NODES VOTING CONTAINING
352
COMPARE PREFRAMES TALLY VOTES CALCULATE CONSENSUS
354
NODE1
TIME DELAY
324
PREFRAME
350
374
UDP BUFFER
326
VALIDATE HASH FROM NEIGHBOR, LIMITS, SIGNATURE
328
MULTI-THREAD READ TO INCOMING CONTAINER
330
BROADCAST TRX TO ALL NETWORK
332
SINGLE LOOPING THREAD CREATES PREFRAME
356
ADD PREFRAME TO COMPLEX VOTING CONTAINER
358
BROADCAST CANDIDATE FRAME TO NEIGHBOR NODES VOTING CONTAINER
362
COMPARE PREFRAMES TALLY VOTES CALCULATE CONSENSUS
364
NODE2
TIME DELAY
334
PREFRAME
360
376
VALIDATE HASH, LIMITS, SIGNATURE
336
MULTI-THREAD READ TO INCOMING CONTAINER
340
SINGLE LOOPING THREAD CREATES PREFRAME
364
ADD PREFRAME TO COMPLEX VOTING CONTAINER
366
COMPARE PREFRAMES TALLY VOTES CALCULATE CONSENSUS
370
NODE3
TIME DELAY
336
PREFRAME
368
364
378
304
306

FIG. 3

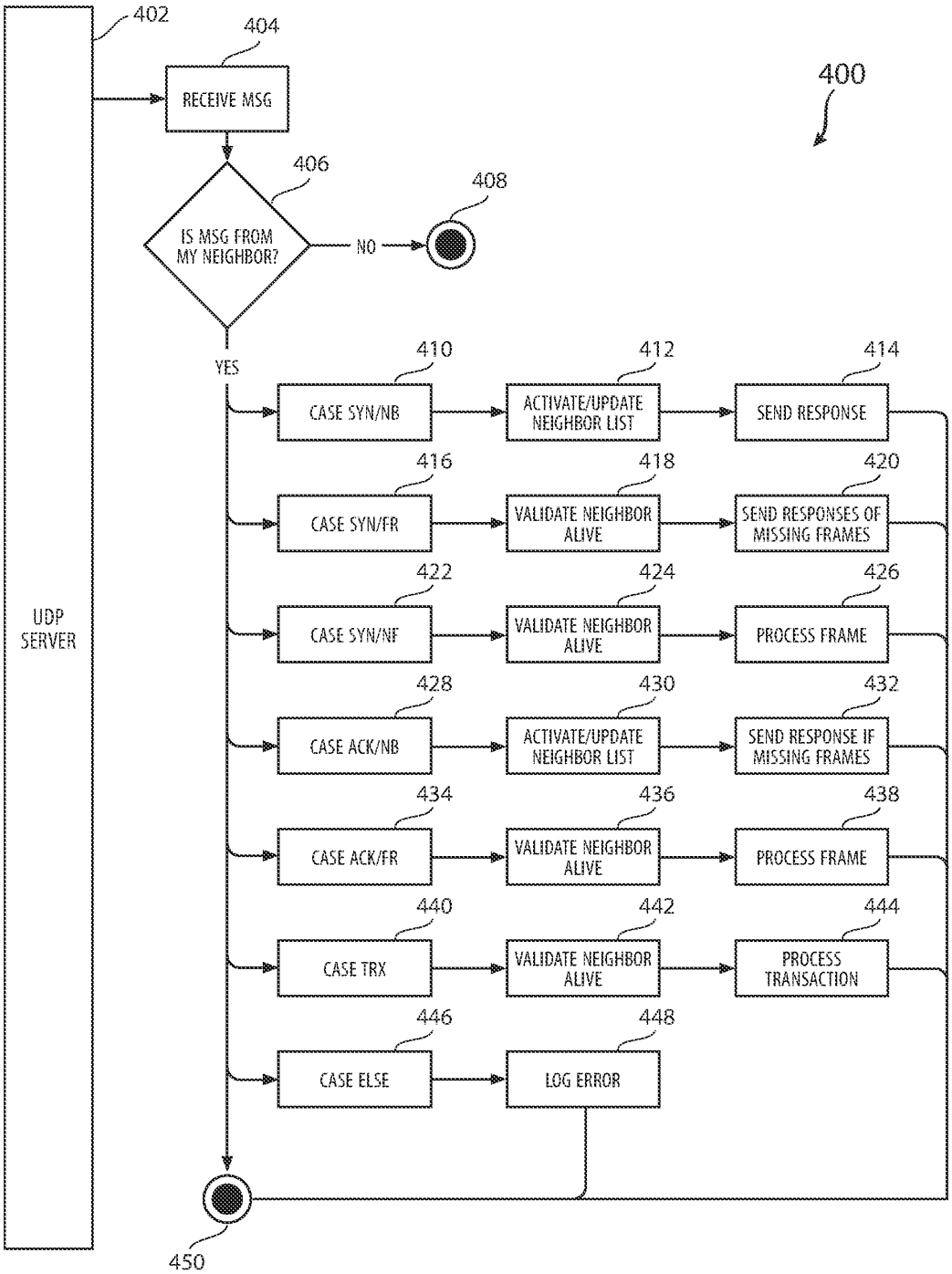

402
404
400
RECEIVE MSG
406
408
IS MSG FROM MY NEIGHBOR?
NO
YES
410
412
414
CASE SYN/NB
ACTIVATE/UPDATE NEIGHBOR LIST
SEND RESPONSE
416
418
420
CASE SYN/FR
VALIDATE NEIGHBOR ALIVE
SEND RESPONSES OF MISSING FRAMES
422
424
426
CASE SYN/NF
VALIDATE NEIGHBOR ALIVE
PROCESS FRAME
428
430
432
CASE ACK/NB
ACTIVATE/UPDATE NEIGHBOR LIST
SEND RESPONSE IF MISSING FRAMES
434
436
438
CASE ACK/FR
VALIDATE NEIGHBOR ALIVE
PROCESS FRAME
440
442
444
CASE TRX
VALIDATE NEIGHBOR ALIVE
PROCESS TRANSACTION
446
448
CASE ELSE
LOG ERROR
UDP SERVER
450

FIG. 4

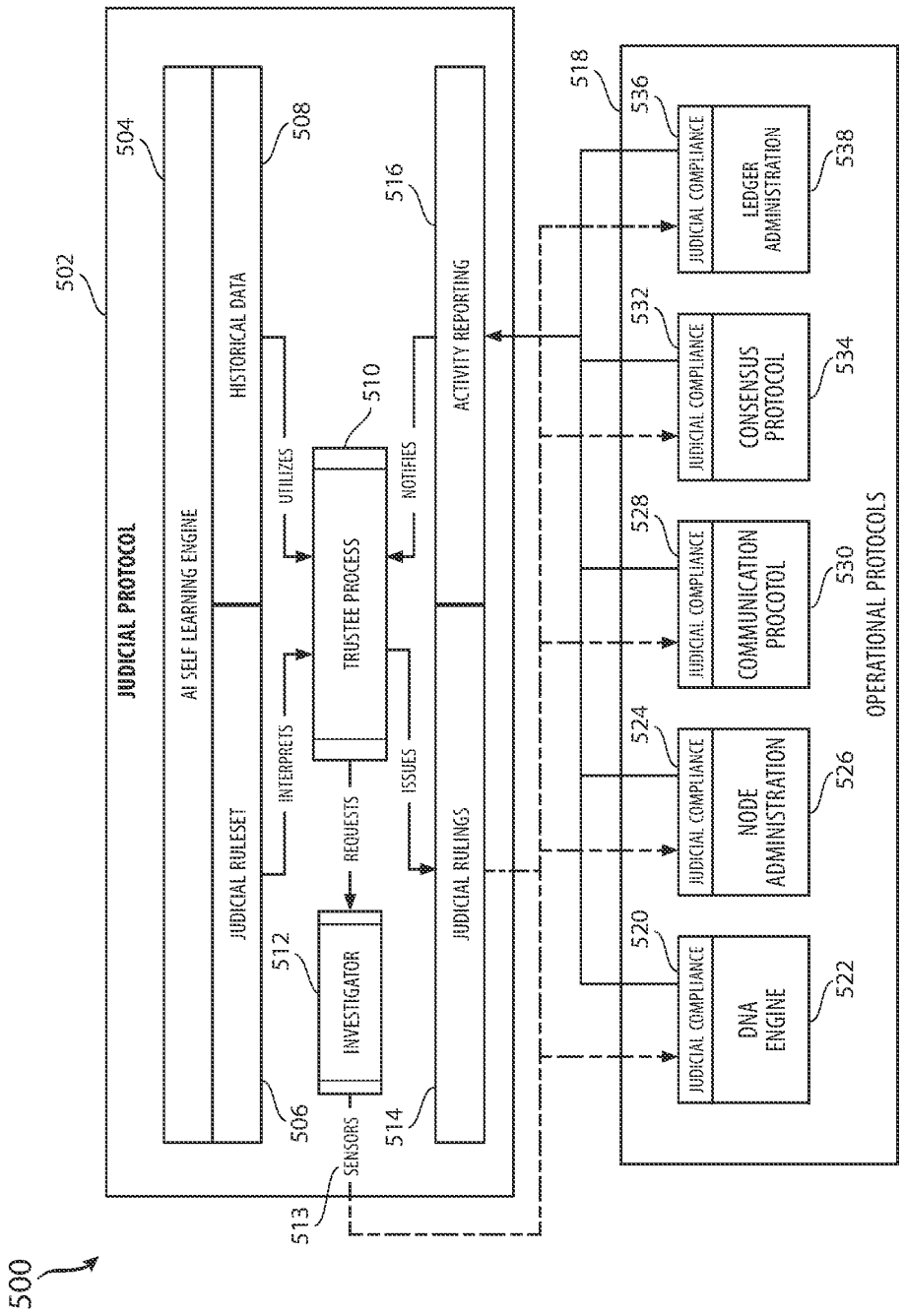

500
JUDICIAL PROTOCOL
502
AI SELF LEARNING ENGINE
504
JUDICIAL RULESET
506
HISTORICAL DATA
508
TRUSTEE PROCESS
510
INVESTIGATOR
512
SENSORS
513
JUDICIAL RULINGS
514
ACTIVITY REPORTING
516
INTERPRETS
REQUESTS
ISSUES
UTILIZES
NOTIFIES
OPERATIONAL PROTOCOLS
518
JUDICIAL COMPLIANCE
DNA ENGINE
520
522
JUDICIAL COMPLIANCE
NODE ADMINISTRATION
524
526
JUDICIAL COMPLIANCE
COMMUNICATION PROCOTOL
528
530
JUDICIAL COMPLIANCE
CONSENSUS PROTOCOL
532
534
JUDICIAL COMPLIANCE
LEDGER ADMINISTRATION
536
538

FIG. 5

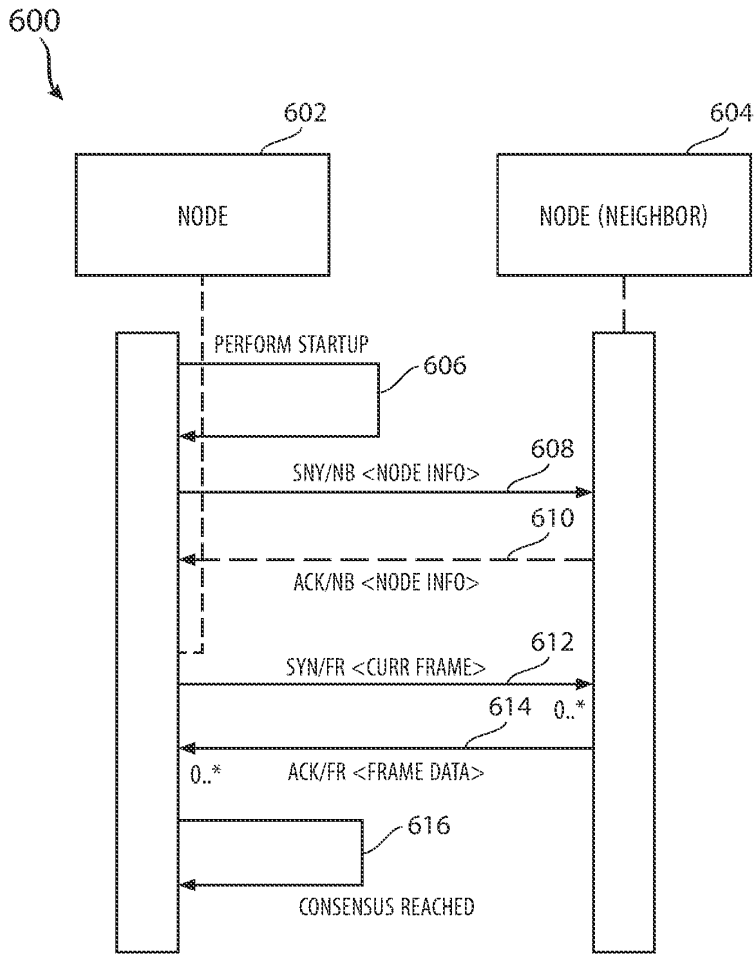

600
602
NODE
604
NODE (NEIGHBOR)
PERFORM STARTUP
606
608
SNY/NB <NODE INFO>
610
ACK/NB <NODE INFO>
612
SYN/FR <CURR FRAME>
614
0..*
0..*
ACK/FR <FRAME DATA>
616
CONSENSUS REACHED

FIG. 6A

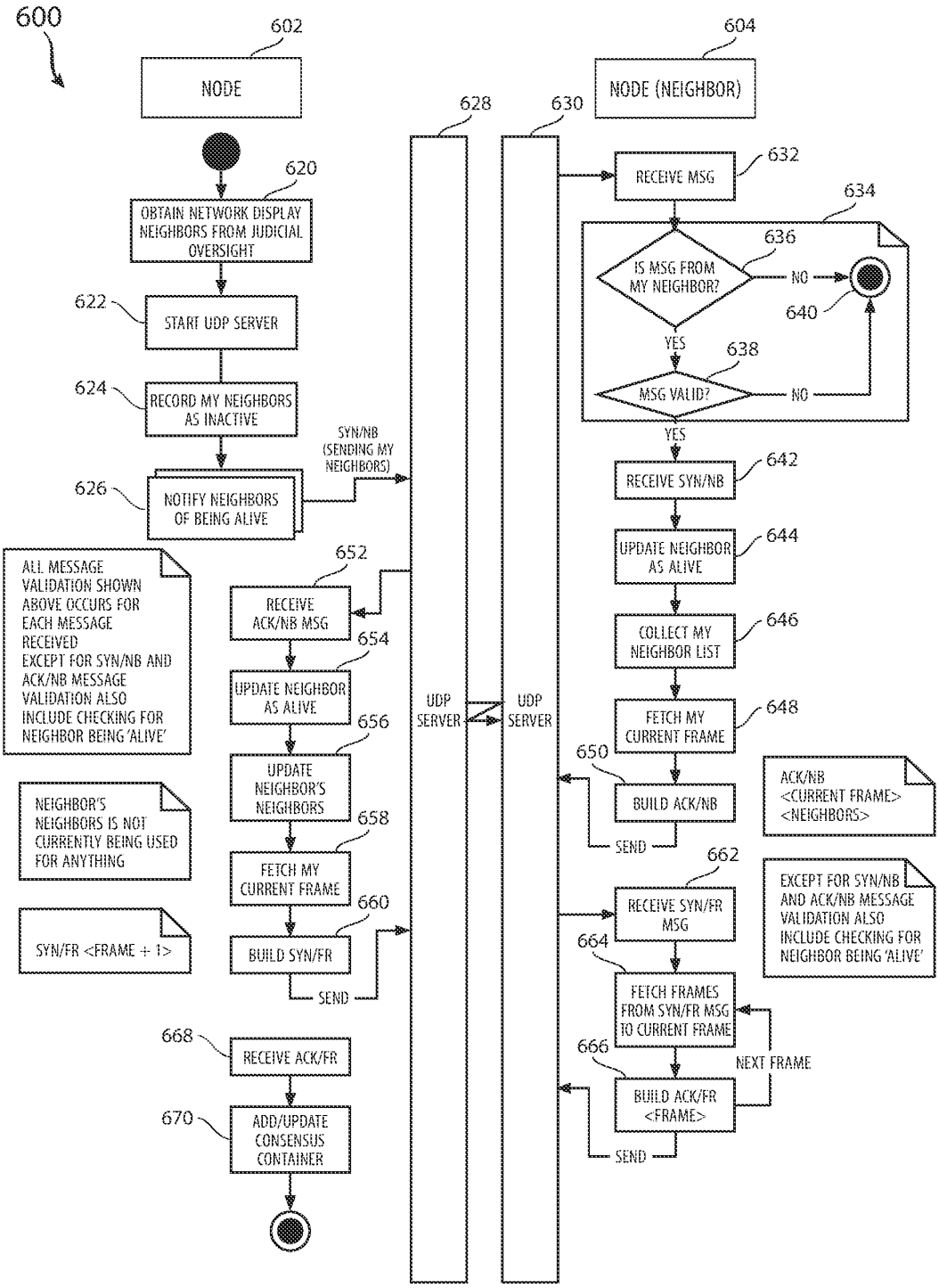

600
602
NODE
620
OBTAIN NETWORK DISPLAY NEIGHBORS FROM JUDICIAL OVERSIGHT
622
START UDP SERVER
624
RECORD MY NEIGHBORS AS INACTIVE
626
NOTIFY NEIGHBORS OF BEING ALIVE
SYN/NB (SENDING MY NEIGHBORS)
ALL MESSAGE VALIDATION SHOWN ABOVE OCCURS FOR EACH MESSAGE RECEIVED EXCEPT FOR SYN/NB AND ACK/NB MESSAGE VALIDATION ALSO INCLUDE CHECKING FOR NEIGHBOR BEING 'ALIVE'
652
RECEIVE ACK/NB MSG
654
UPDATE NEIGHBOR AS ALIVE
656
UPDATE NEIGHBOR'S NEIGHBORS
NEIGHBOR'S NEIGHBORS IS NOT CURRENTLY BEING USED FOR ANYTHING
658
FETCH MY CURRENT FRAME
660
BUILD SYN/FR
SYN/FR <FRAME + 1>
SEND
668
RECEIVE ACK/FR
670
ADD/UPDATE CONSENSUS CONTAINER
628
630
UDP SERVER
UDP SERVER
604
NODE (NEIGHBOR)
632
RECEIVE MSG
634
636
IS MSG FROM MY NEIGHBOR?
NO
640
YES
638
MSG VALID?
NO
YES
642
RECEIVE SYN/NB
644
UPDATE NEIGHBOR AS ALIVE
646
COLLECT MY NEIGHBOR LIST
648
FETCH MY CURRENT FRAME
650
BUILD ACK/NB
ACK/NB <CURRENT FRAME> <NEIGHBORS>
SEND
662
RECEIVE SYN/FR MSG
EXCEPT FOR SYN/NB AND ACK/NB MESSAGE VALIDATION ALSO INCLUDE CHECKING FOR NEIGHBOR BEING 'ALIVE'
664
FETCH FRAMES FROM SYN/FR MSG TO CURRENT FRAME
NEXT FRAME
666
BUILD ACK/FR <FRAME>
SEND

FIG. 6B

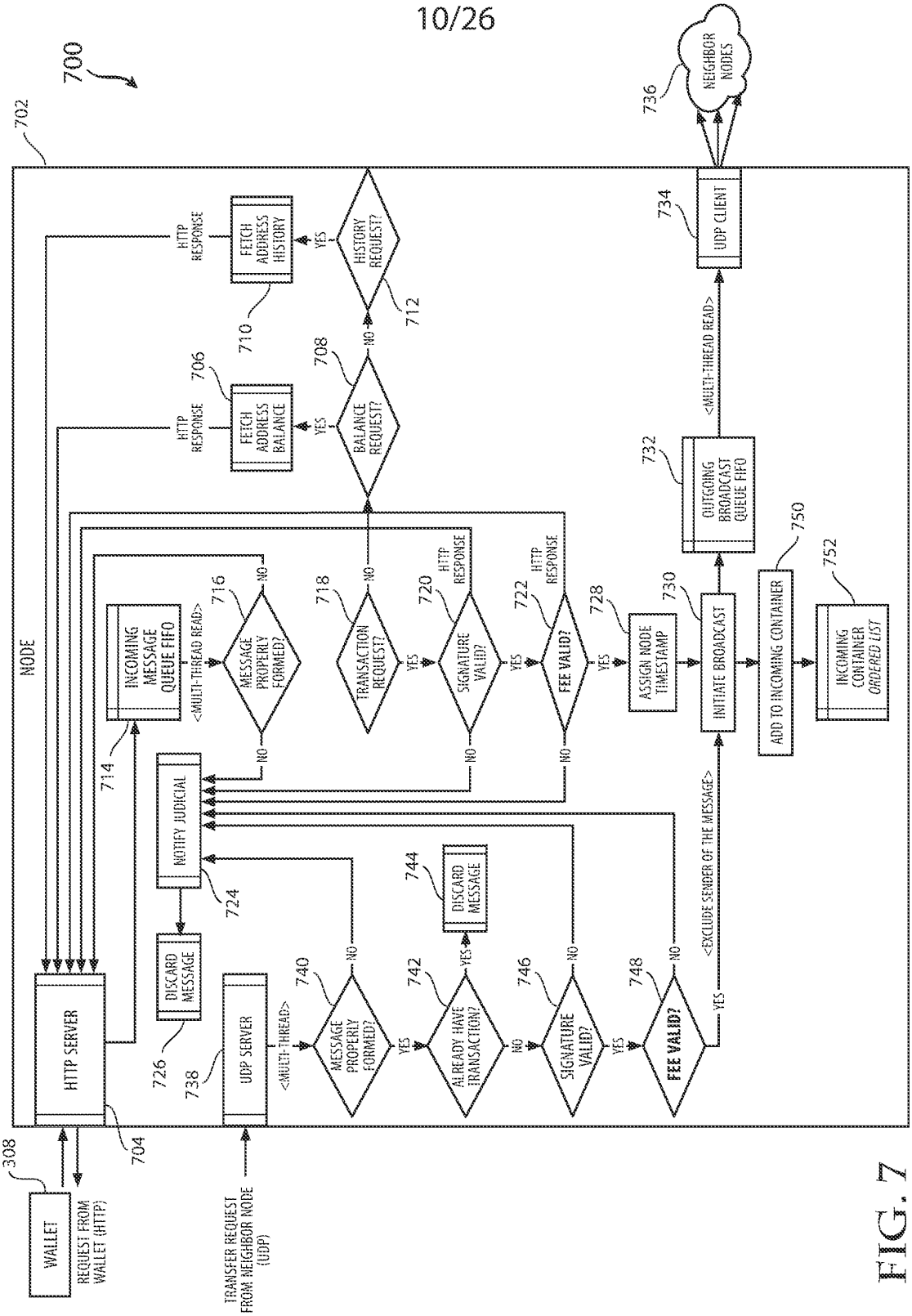

700
702
NODE
HTTP SERVER
704
UDP SERVER
738
WALLET
308
REQUEST FROM WALLET (HTTP)
TRANSFER REQUEST FROM NEIGHBOR NODE (UDP)
<MULTI-THREAD>
MESSAGE PROPERLY FORMED?
740
ALREADY HAVE TRANSACTION?
742
SIGNATURE VALID?
746
FEE VALID?
748
DISCARD MESSAGE
726
DISCARD MESSAGE
744
NOTIFY JUDICIAL
724
INCOMING MESSAGE QUEUE FIFO
714
<MULTI-THREAD READ>
MESSAGE PROPERLY FORMED?
716
TRANSACTION REQUEST?
718
SIGNATURE VALID?
720
HTTP RESPONSE
FEE VALID?
722
HTTP RESPONSE
ASSIGN NODE TIMESTAMP
728
INITIATE BROADCAST
730
ADD TO INCOMING CONTAINER
750
INCOMING CONTAINER ORDERED LIST
752
<EXCLUDE SENDER OF THE MESSAGE>
OUTGOING BROADCAST QUEUE FIFO
732
<MULTI-THREAD READ>
UDP CLIENT
734
NEIGHBOR NODES
736
HISTORY REQUEST?
712
FETCH ADDRESS HISTORY
710
HTTP RESPONSE
BALANCE REQUEST?
708
FETCH ADDRESS BALANCE
706
HTTP RESPONSE
YES
NO

FIG. 7

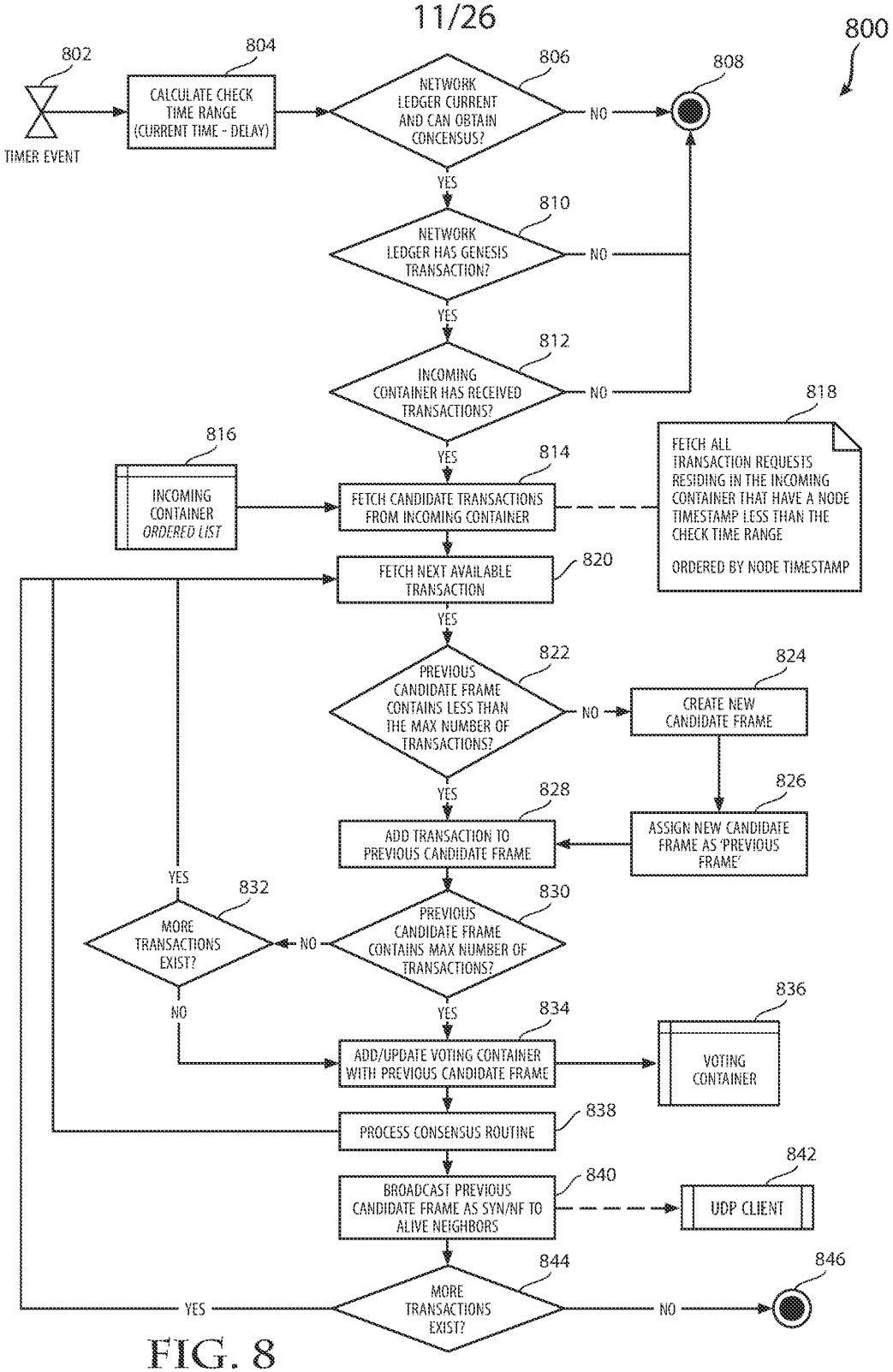

800
802
TIMER EVENT
804
CALCULATE CHECK TIME RANGE (CURRENT TIME - DELAY)
806
NETWORK LEDGER CURRENT AND CAN OBTAIN CONCENSUS?
NO
808
YES
810
NETWORK LEDGER HAS GENESIS TRANSACTION?
NO
YES
812
INCOMING CONTAINER HAS RECEIVED TRANSACTIONS?
NO
YES
818
FETCH ALL TRANSACTION REQUESTS RESIDING IN THE INCOMING CONTAINER THAT HAVE A NODE TIMESTAMP LESS THAN THE CHECK TIME RANGE
ORDERED BY NODE TIMESTAMP
816
INCOMING CONTAINER ORDERED LIST
814
FETCH CANDIDATE TRANSACTIONS FROM INCOMING CONTAINER
820
FETCH NEXT AVAILABLE TRANSACTION
YES
822
PREVIOUS CANDIDATE FRAME CONTAINS LESS THAN THE MAX NUMBER OF TRANSACTIONS?
NO
824
CREATE NEW CANDIDATE FRAME
YES
826
ASSIGN NEW CANDIDATE FRAME AS 'PREVIOUS FRAME'
828
ADD TRANSACTION TO PREVIOUS CANDIDATE FRAME
YES
832
MORE TRANSACTIONS EXIST?
NO
830
PREVIOUS CANDIDATE FRAME CONTAINS MAX NUMBER OF TRANSACTIONS?
NO
YES
836
VOTING CONTAINER
834
ADD/UPDATE VOTING CONTAINER WITH PREVIOUS CANDIDATE FRAME
838
PROCESS CONSENSUS ROUTINE
842
UDP CLIENT
840
BROADCAST PREVIOUS CANDIDATE FRAME AS SYN/NF TO ALIVE NEIGHBORS
844
MORE TRANSACTIONS EXIST?
YES
NO
846

FIG. 8

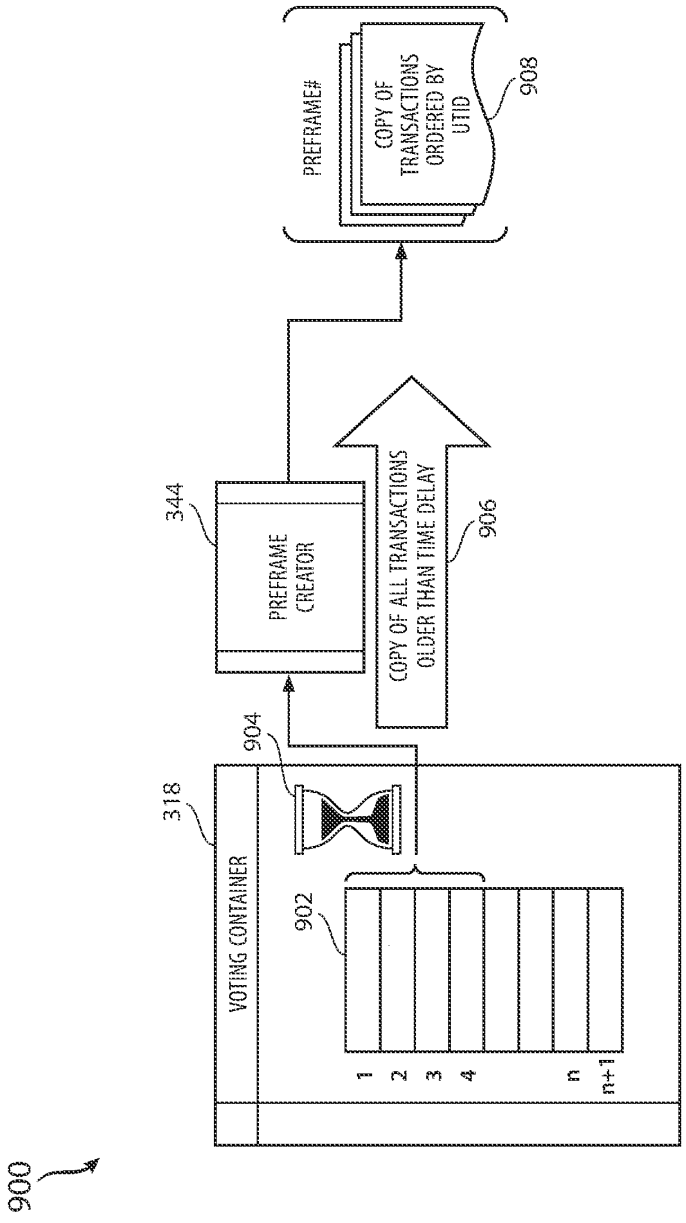

900
VOTING CONTAINER
318
904
902
1
2
3
4
n
n+1
PREFRAME CREATOR
344
COPY OF ALL TRANSACTIONS OLDER THAN TIME DELAY
906
PREFRAME#
COPY OF TRANSACTIONS ORDERED BY UTID
908

FIG. 9

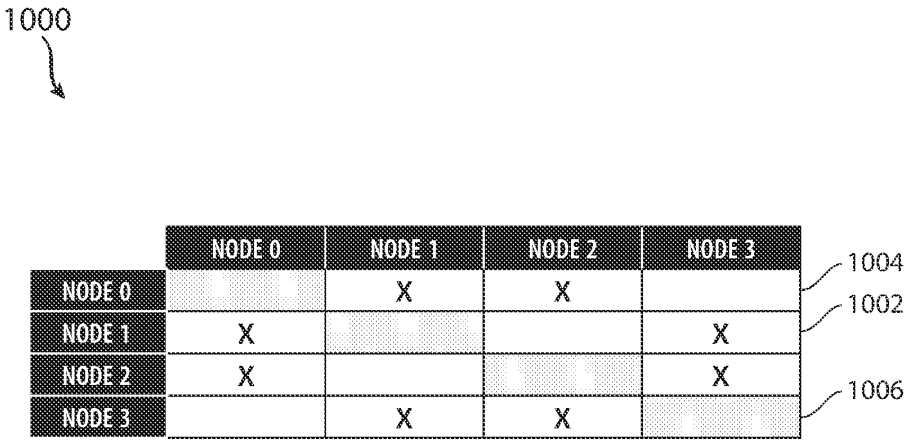

1000
NODE 0
NODE 1
NODE 2
NODE 3
NODE 0
X
X
NODE 1
X
X
NODE 2
X
X
NODE 3
X
X
1004
1002
1006

FIG. 10A

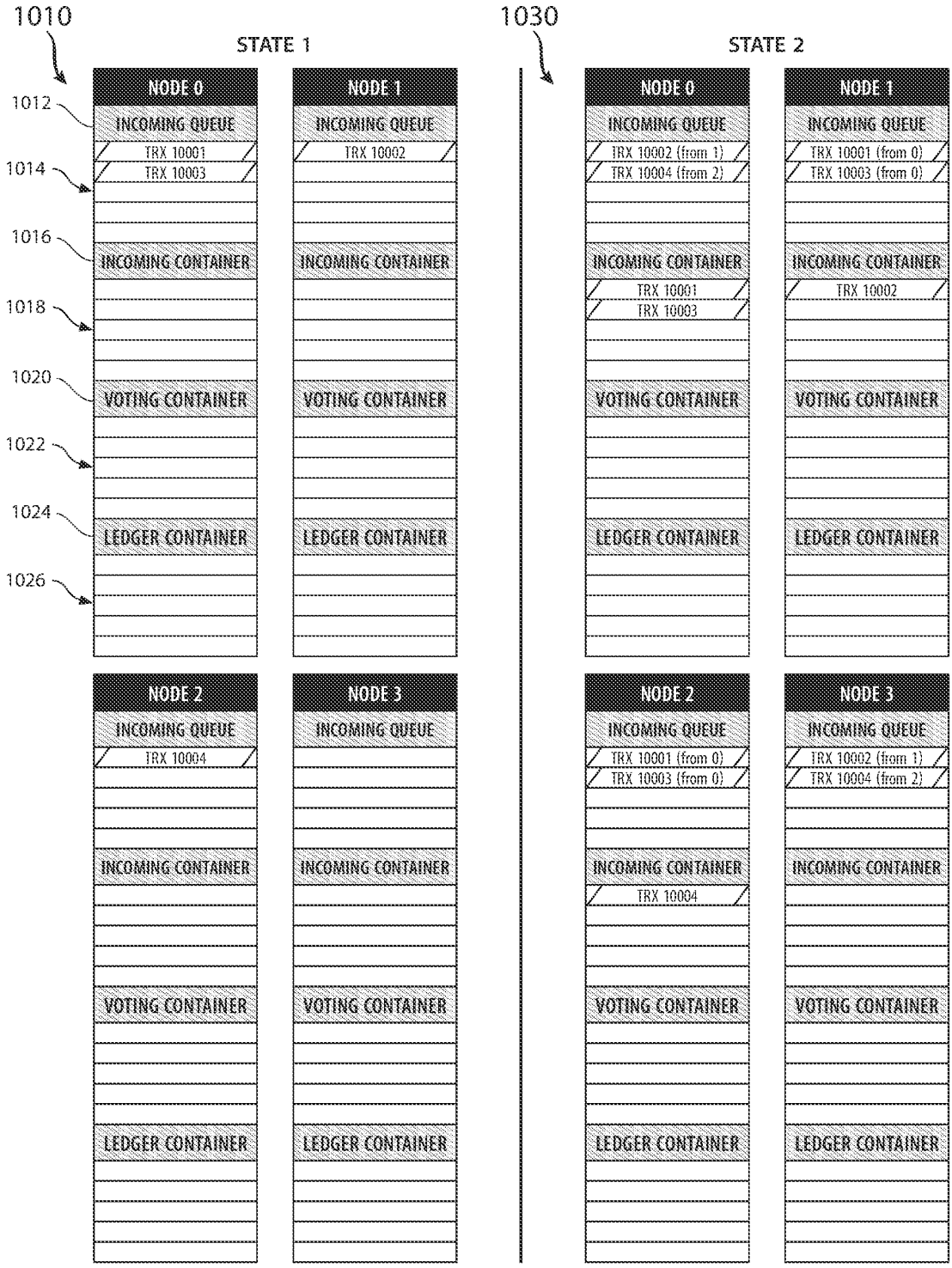

1010
STATE 1
1030
STATE 2
1012
1014
1016
1018
1020
1022
1024
1026
NODE 0
INCOMING QUEUE
TRX 10001
TRX 10003
INCOMING CONTAINER
VOTING CONTAINER
LEDGER CONTAINER
NODE 1
INCOMING QUEUE
TRX 10002
INCOMING CONTAINER
VOTING CONTAINER
LEDGER CONTAINER
NODE 0
INCOMING QUEUE
TRX 10002 (from 1)
TRX 10004 (from 2)
INCOMING CONTAINER
TRX 10001
TRX 10003
VOTING CONTAINER
LEDGER CONTAINER
NODE 1
INCOMING QUEUE
TRX 10001 (from 0)
TRX 10003 (from 0)
INCOMING CONTAINER
TRX 10002
VOTING CONTAINER
LEDGER CONTAINER
NODE 2
INCOMING QUEUE
TRX 10004
INCOMING CONTAINER
VOTING CONTAINER
LEDGER CONTAINER
NODE 3
INCOMING QUEUE
INCOMING CONTAINER
VOTING CONTAINER
LEDGER CONTAINER
NODE 2
INCOMING QUEUE
TRX 10001 (from 0)
TRX 10003 (from 0)
INCOMING CONTAINER
TRX 10004
VOTING CONTAINER
LEDGER CONTAINER
NODE 3
INCOMING QUEUE
TRX 10002 (from 1)
TRX 10004 (from 2)
INCOMING CONTAINER
VOTING CONTAINER
LEDGER CONTAINER

FIG. 10B

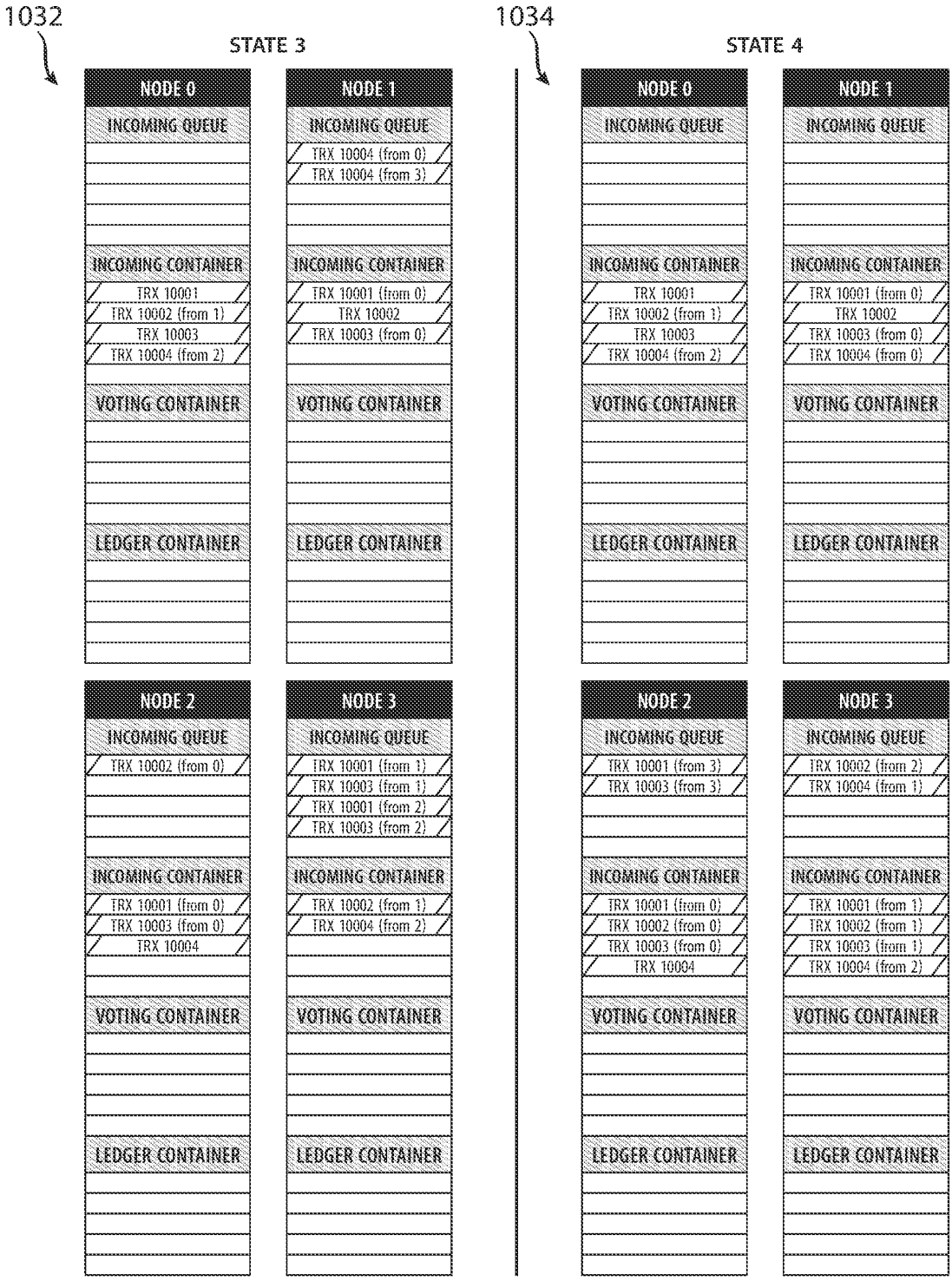

1032
STATE 3
NODE 0
INCOMING QUEUE
INCOMING CONTAINER
TRX 10001
TRX 10002 (from 1)
TRX 10003
TRX 10004 (from 2)
VOTING CONTAINER
LEDGER CONTAINER
NODE 1
INCOMING QUEUE
TRX 10004 (from 0)
TRX 10004 (from 3)
INCOMING CONTAINER
TRX 10001 (from 0)
TRX 10002
TRX 10003 (from 0)
VOTING CONTAINER
LEDGER CONTAINER
NODE 2
INCOMING QUEUE
TRX 10002 (from 0)
INCOMING CONTAINER
TRX 10001 (from 0)
TRX 10003 (from 0)
TRX 10004
VOTING CONTAINER
LEDGER CONTAINER
NODE 3
INCOMING QUEUE
TRX 10001 (from 1)
TRX 10003 (from 1)
TRX 10001 (from 2)
TRX 10003 (from 2)
INCOMING CONTAINER
TRX 10002 (from 1)
TRX 10004 (from 2)
VOTING CONTAINER
LEDGER CONTAINER
1034
STATE 4
NODE 0
INCOMING QUEUE
INCOMING CONTAINER
TRX 10001
TRX 10002 (from 1)
TRX 10003
TRX 10004 (from 2)
VOTING CONTAINER
LEDGER CONTAINER
NODE 1
INCOMING QUEUE
INCOMING CONTAINER
TRX 10001 (from 0)
TRX 10002
TRX 10003 (from 0)
TRX 10004 (from 0)
VOTING CONTAINER
LEDGER CONTAINER
NODE 2
INCOMING QUEUE
TRX 10001 (from 3)
TRX 10003 (from 3)
INCOMING CONTAINER
TRX 10001 (from 0)
TRX 10002 (from 0)
TRX 10003 (from 0)
TRX 10004
VOTING CONTAINER
LEDGER CONTAINER
NODE 3
INCOMING QUEUE
TRX 10002 (from 2)
TRX 10004 (from 1)
INCOMING CONTAINER
TRX 10001 (from 1)
TRX 10002 (from 1)
TRX 10003 (from 1)
TRX 10004 (from 2)
VOTING CONTAINER
LEDGER CONTAINER

FIG. 10C

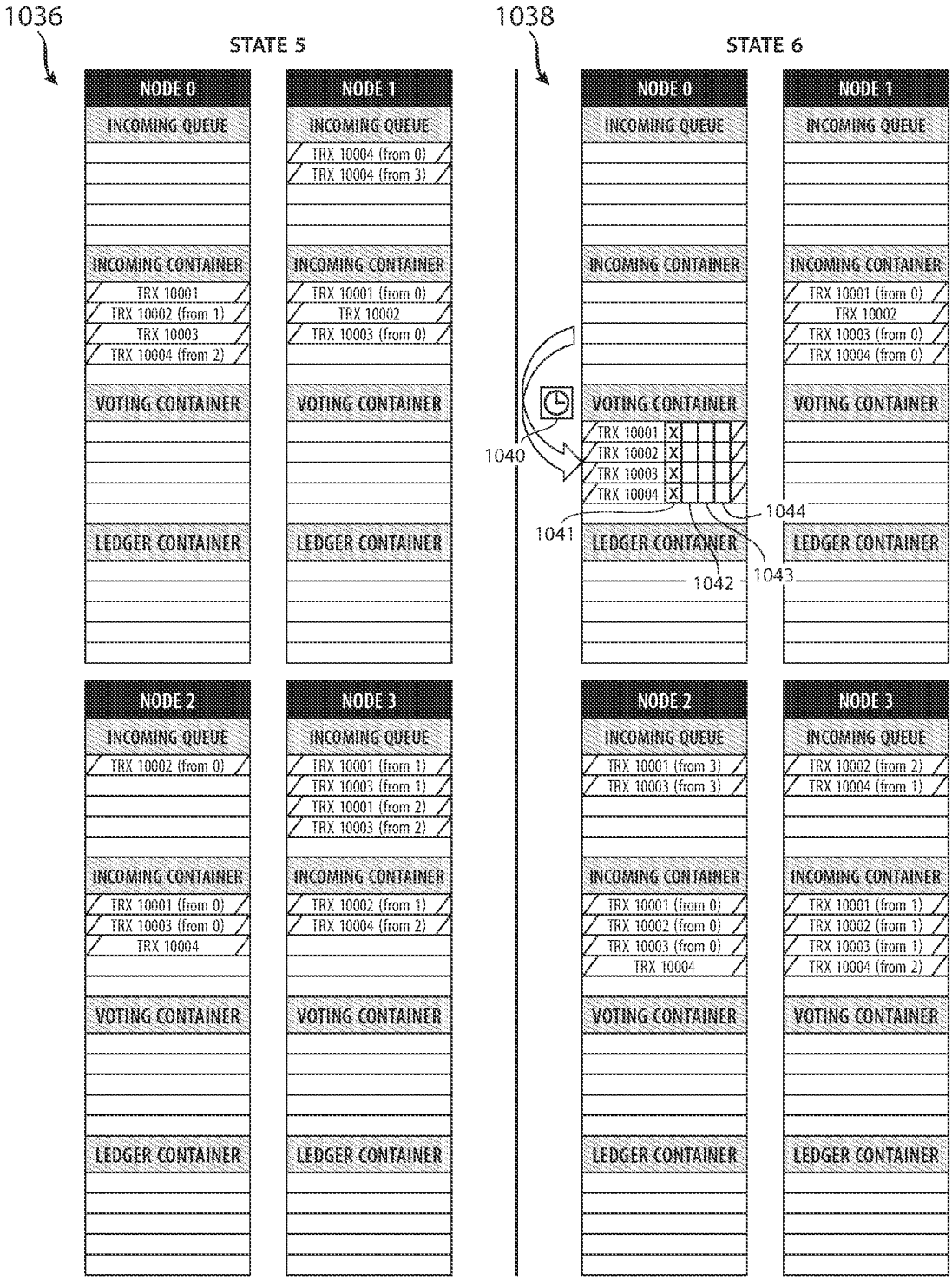

1036
STATE 5
1038
STATE 6
NODE 0
INCOMING QUEUE
INCOMING CONTAINER
TRX 10001
TRX 10002 (from 1)
TRX 10003
TRX 10004 (from 2)
VOTING CONTAINER
LEDGER CONTAINER
NODE 1
INCOMING QUEUE
TRX 10004 (from 0)
TRX 10004 (from 3)
INCOMING CONTAINER
TRX 10001 (from 0)
TRX 10002
TRX 10003 (from 0)
VOTING CONTAINER
LEDGER CONTAINER
NODE 0
INCOMING QUEUE
INCOMING CONTAINER
VOTING CONTAINER
TRX 10001 X
TRX 10002 X
TRX 10003 X
TRX 10004 X
LEDGER CONTAINER
NODE 1
INCOMING QUEUE
INCOMING CONTAINER
TRX 10001 (from 0)
TRX 10002
TRX 10003 (from 0)
TRX 10004 (from 0)
VOTING CONTAINER
LEDGER CONTAINER
1040
1041
1042
1043
1044
NODE 2
INCOMING QUEUE
TRX 10002 (from 0)
INCOMING CONTAINER
TRX 10001 (from 0)
TRX 10003 (from 0)
TRX 10004
VOTING CONTAINER
LEDGER CONTAINER
NODE 3
INCOMING QUEUE
TRX 10001 (from 1)
TRX 10003 (from 1)
TRX 10001 (from 2)
TRX 10003 (from 2)
INCOMING CONTAINER
TRX 10002 (from 1)
TRX 10004 (from 2)
VOTING CONTAINER
LEDGER CONTAINER
NODE 2
INCOMING QUEUE
TRX 10001 (from 3)
TRX 10003 (from 3)
INCOMING CONTAINER
TRX 10001 (from 0)
TRX 10002 (from 0)
TRX 10003 (from 0)
TRX 10004
VOTING CONTAINER
LEDGER CONTAINER
NODE 3
INCOMING QUEUE
TRX 10002 (from 2)
TRX 10004 (from 1)
INCOMING CONTAINER
TRX 10001 (from 1)
TRX 10002 (from 1)
TRX 10003 (from 1)
TRX 10004 (from 2)
VOTING CONTAINER
LEDGER CONTAINER

FIG. 10D

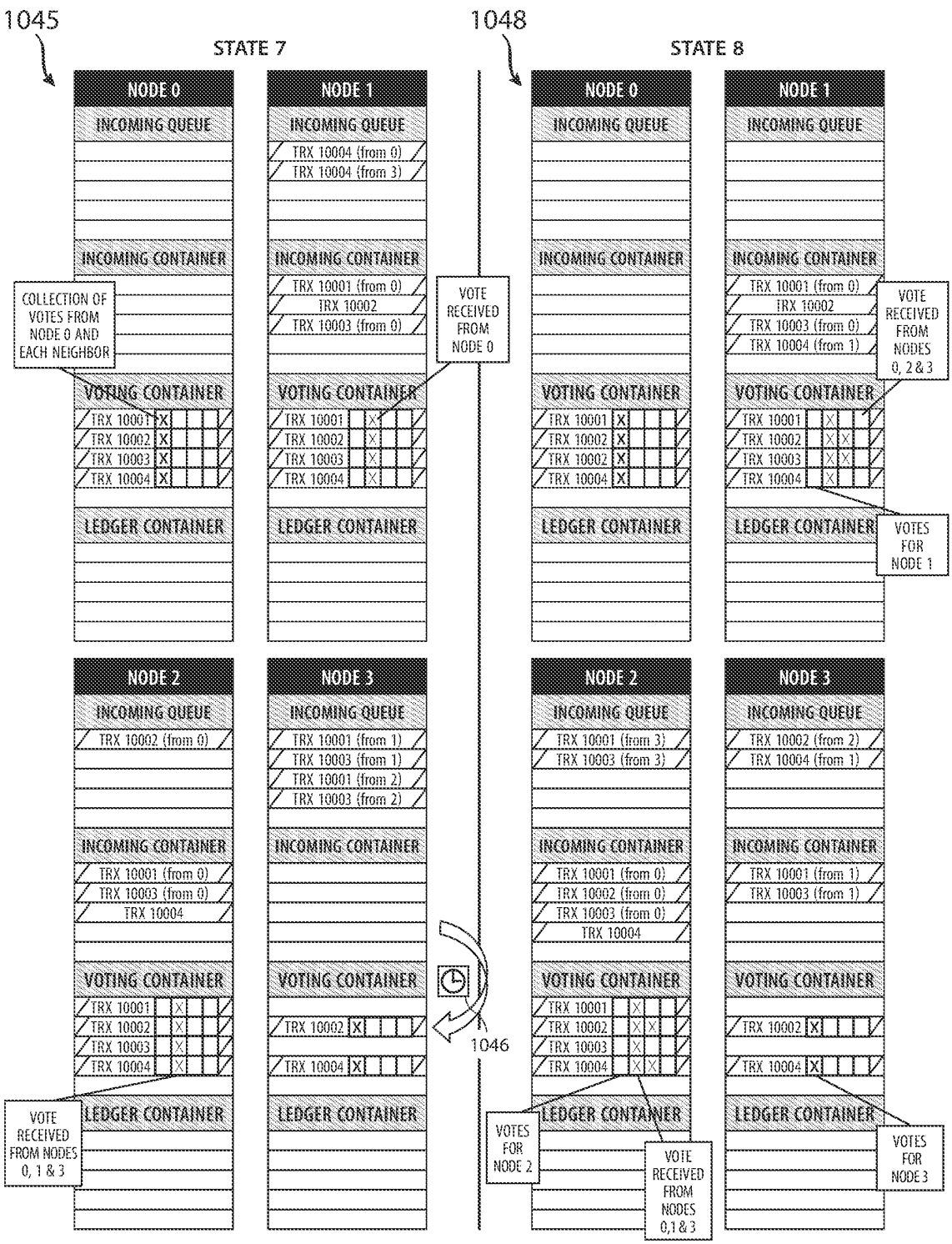

1045
STATE 7
1048
STATE 8
NODE 0
INCOMING QUEUE
INCOMING CONTAINER
VOTING CONTAINER
LEDGER CONTAINER
NODE 1
NODE 2
NODE 3
COLLECTION OF VOTES FROM NODE 0 AND EACH NEIGHBOR
VOTE RECEIVED FROM NODE 0
VOTE RECEIVED FROM NODES 0, 2 & 3
VOTES FOR NODE 1
VOTE RECEIVED FROM NODES 0, 1 & 3
VOTES FOR NODE 2
VOTE RECEIVED FROM NODES 0,1 & 3
VOTES FOR NODE 3
1046

FIG. 10E

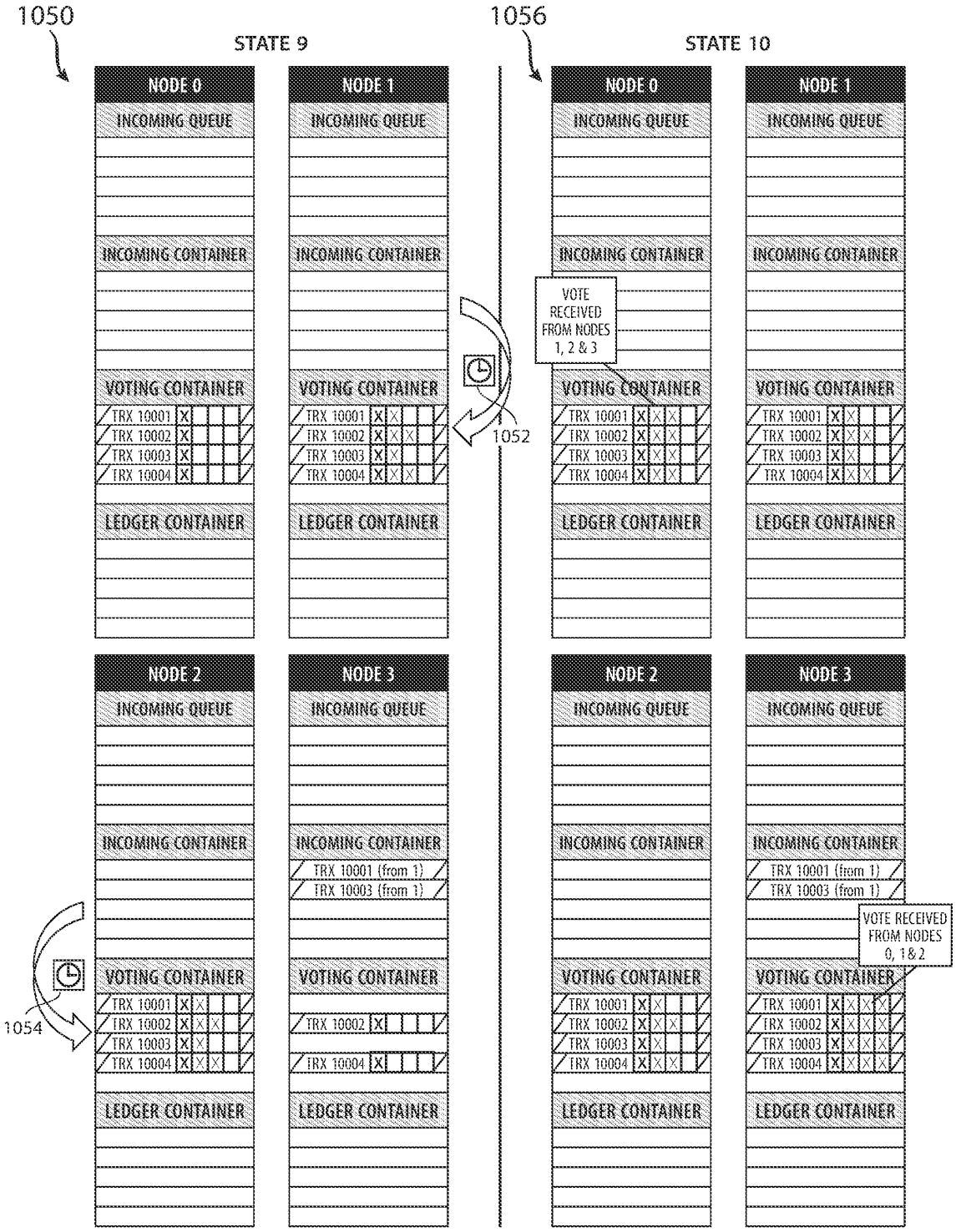

1050
1056
STATE 9
STATE 10
NODE 0
NODE 1
NODE 2
NODE 3
INCOMING QUEUE
INCOMING CONTAINER
VOTING CONTAINER
LEDGER CONTAINER
TRX 10001
TRX 10002
TRX 10003
TRX 10004
TRX 10001 (from 1)
TRX 10003 (from 1)
VOTE RECEIVED FROM NODES 1, 2 & 3
VOTE RECEIVED FROM NODES 0, 1 & 2
1052
1054

FIG. 10F

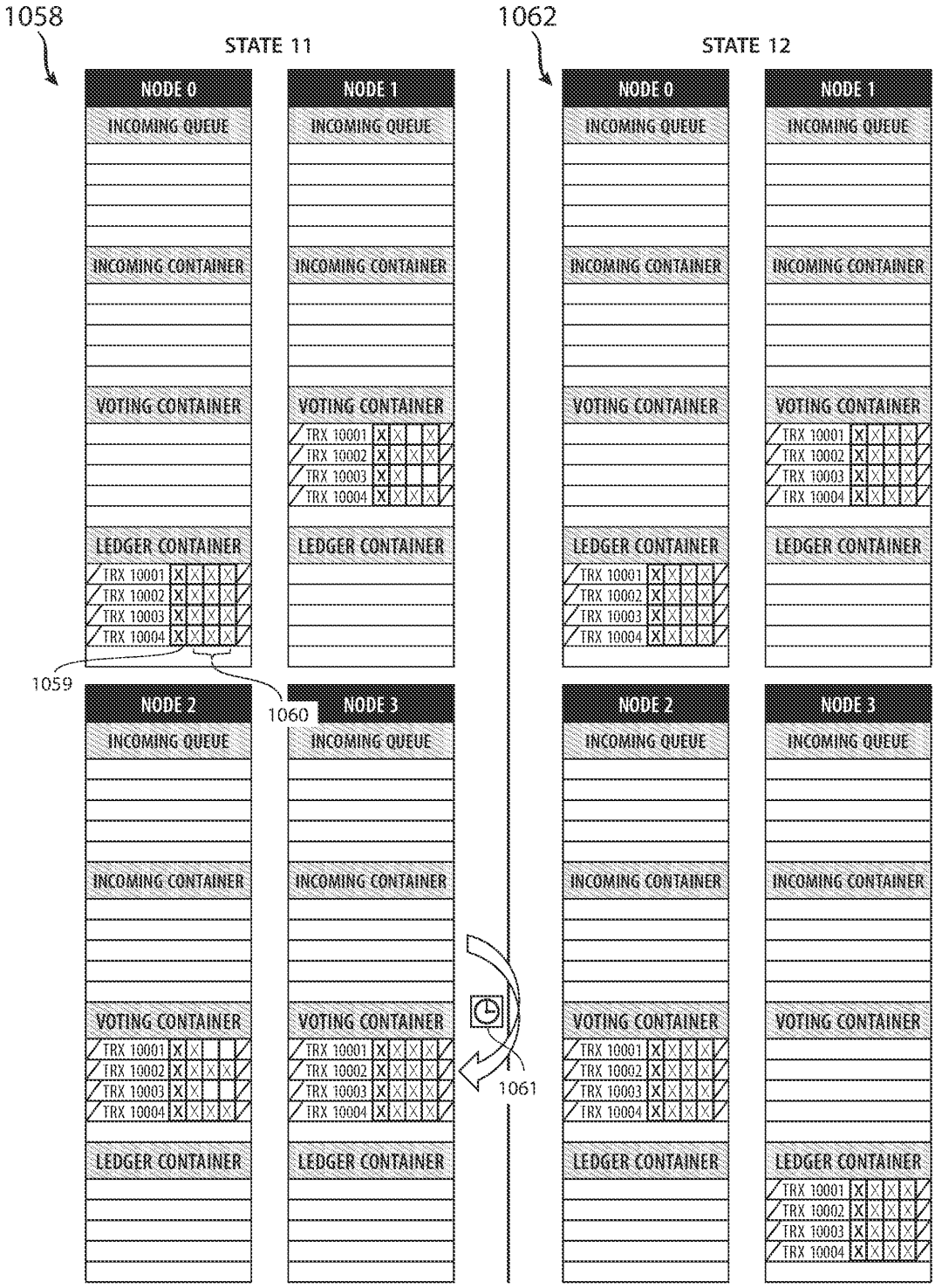

1058
STATE 11
1062
STATE 12
NODE 0
NODE 1
NODE 2
NODE 3
INCOMING QUEUE
INCOMING CONTAINER
VOTING CONTAINER
LEDGER CONTAINER
TRX 10001
TRX 10002
TRX 10003
TRX 10004
1059
1060
1061

FIG. 10G

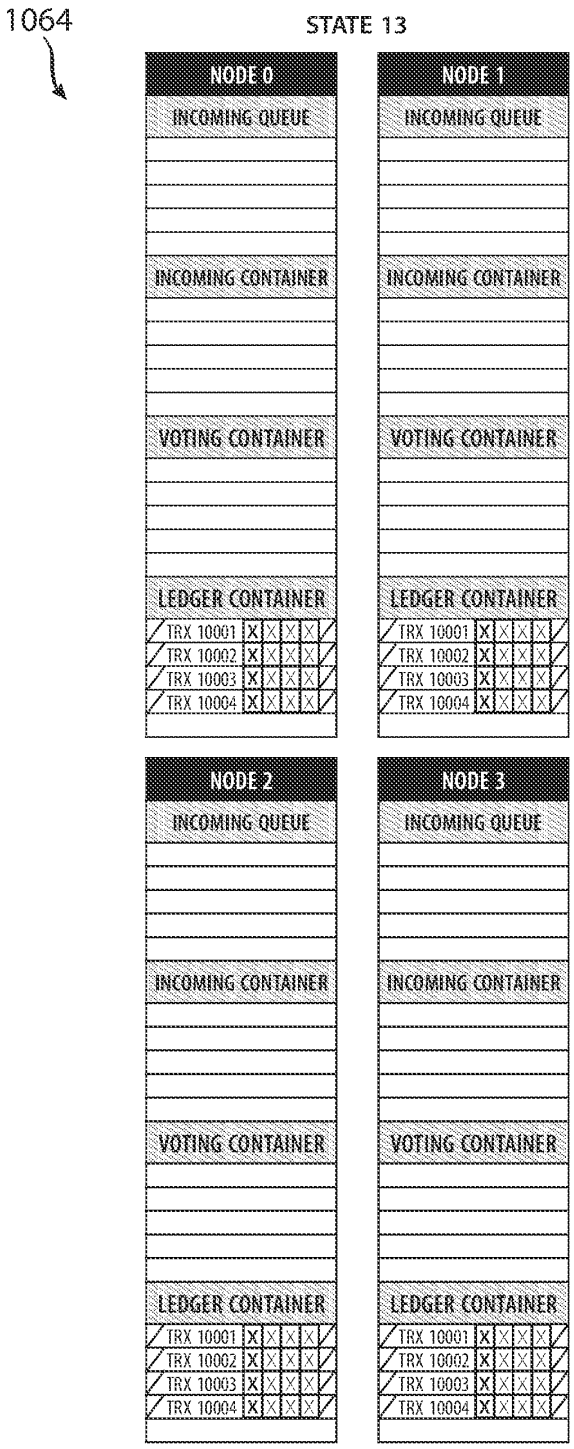

1064
STATE 13
NODE 0
INCOMING QUEUE
INCOMING CONTAINER
VOTING CONTAINER
LEDGER CONTAINER
TRX 10001 X X X X
TRX 10002 X X X X
TRX 10003 X X X X
TRX 10004 X X X X
NODE 1
INCOMING QUEUE
INCOMING CONTAINER
VOTING CONTAINER
LEDGER CONTAINER
TRX 10001 X X X X
TRX 10002 X X X X
TRX 10003 X X X X
TRX 10004 X X X X
NODE 2
INCOMING QUEUE
INCOMING CONTAINER
VOTING CONTAINER
LEDGER CONTAINER
TRX 10001 X X X X
TRX 10002 X X X X
TRX 10003 X X X X
TRX 10004 X X X X
NODE 3
INCOMING QUEUE
INCOMING CONTAINER
VOTING CONTAINER
LEDGER CONTAINER
TRX 10001 X X X X
TRX 10002 X X X X
TRX 10003 X X X X
TRX 10004 X X X X

FIG. 10H

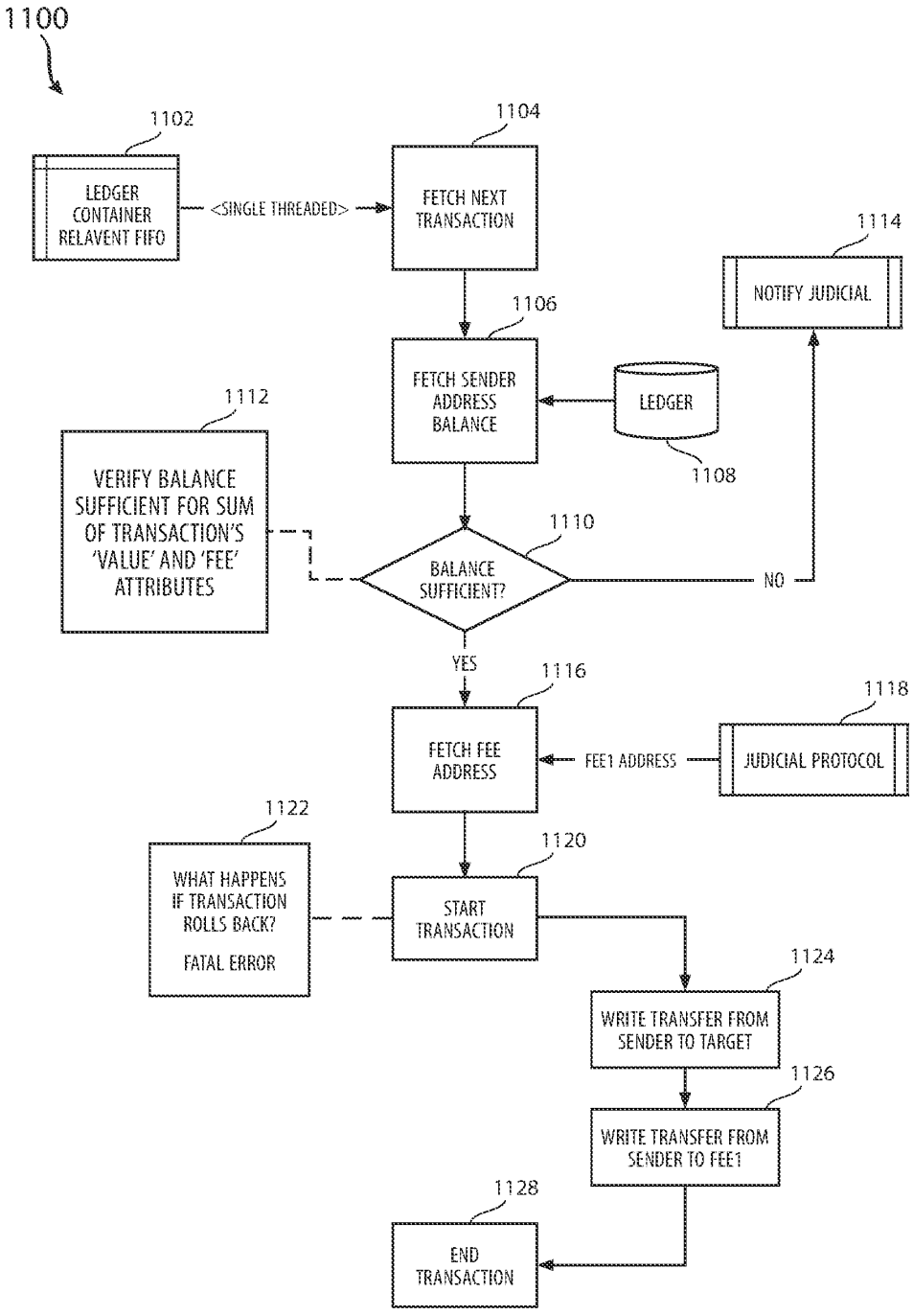

1100
1102
LEDGER CONTAINER RELAVENT FIFO
<SINGLE THREADED>
1104
FETCH NEXT TRANSACTION
1114
NOTIFY JUDICIAL
1106
FETCH SENDER ADDRESS BALANCE
LEDGER
1108
1112
VERIFY BALANCE SUFFICIENT FOR SUM OF TRANSACTION'S 'VALUE' AND 'FEE' ATTRIBUTES
1110
BALANCE SUFFICIENT?
NO
YES
1116
FETCH FEE ADDRESS
FEE1 ADDRESS
1118
JUDICIAL PROTOCOL
1122
WHAT HAPPENS IF TRANSACTION ROLLS BACK?
FATAL ERROR
1120
START TRANSACTION
1124
WRITE TRANSFER FROM SENDER TO TARGET
1126
WRITE TRANSFER FROM SENDER TO FEE1
1128
END TRANSACTION

FIG. 11

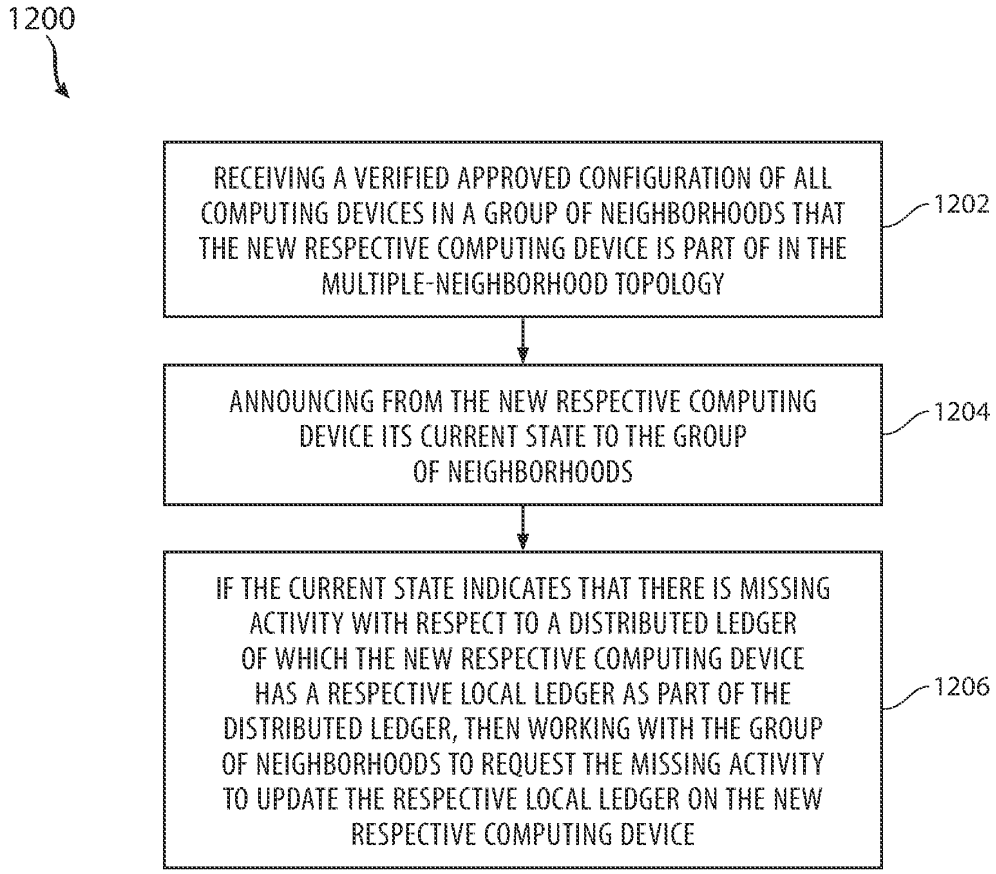

1200
RECEIVING A VERIFIED APPROVED CONFIGURATION OF ALL COMPUTING DEVICES IN A GROUP OF NEIGHBORHOODS THAT THE NEW RESPECTIVE COMPUTING DEVICE IS PART OF IN THE MULTIPLE-NEIGHBORHOOD TOPOLOGY
1202
ANNOUNCING FROM THE NEW RESPECTIVE COMPUTING DEVICE ITS CURRENT STATE TO THE GROUP OF NEIGHBORHOODS
1204
IF THE CURRENT STATE INDICATES THAT THERE IS MISSING ACTIVITY WITH RESPECT TO A DISTRIBUTED LEDGER OF WHICH THE NEW RESPECTIVE COMPUTING DEVICE HAS A RESPECTIVE LOCAL LEDGER AS PART OF THE DISTRIBUTED LEDGER, THEN WORKING WITH THE GROUP OF NEIGHBORHOODS TO REQUEST THE MISSING ACTIVITY TO UPDATE THE RESPECTIVE LOCAL LEDGER ON THE NEW RESPECTIVE COMPUTING DEVICE
1206

FIG. 12

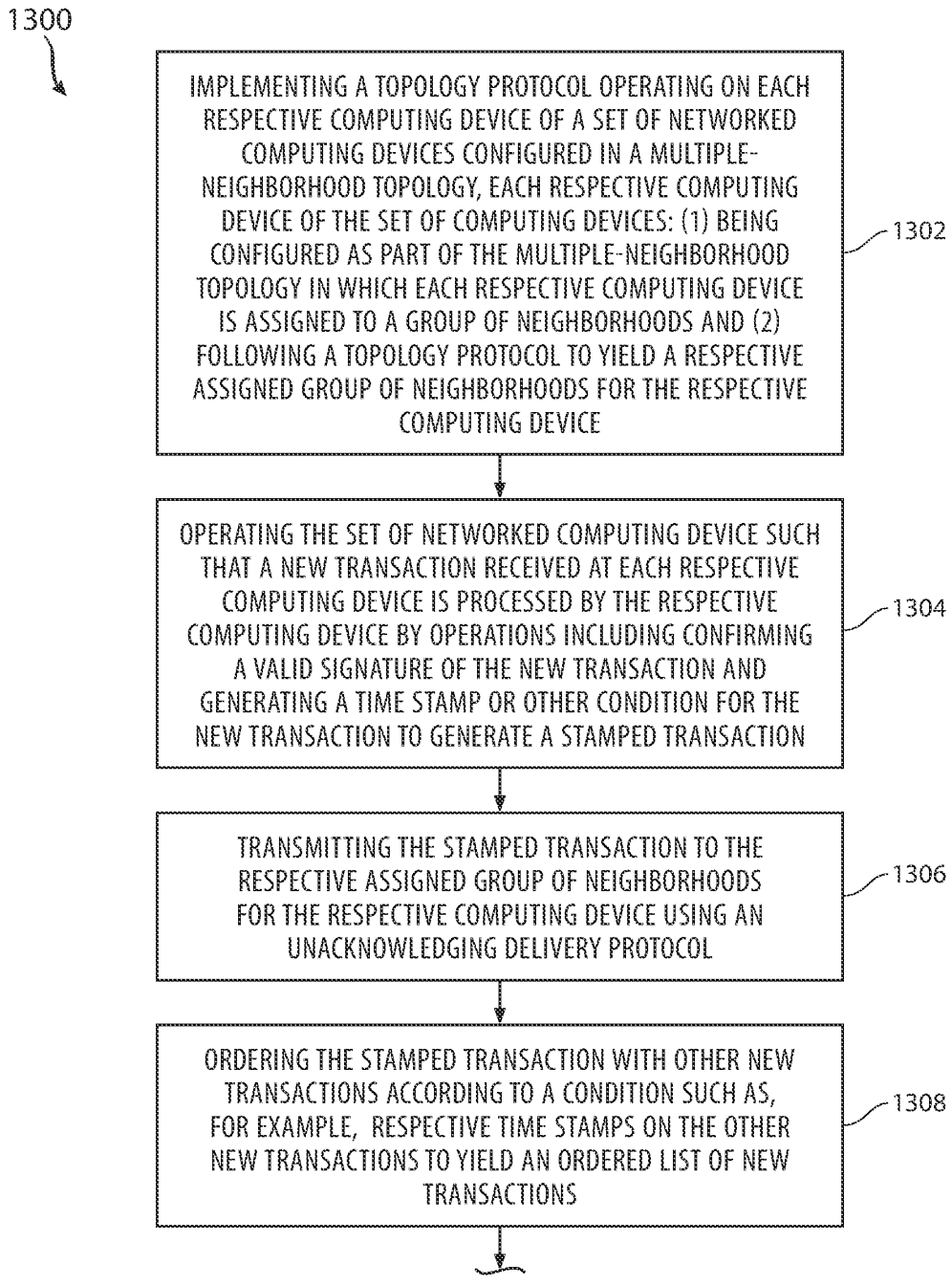

1300
IMPLEMENTING A TOPOLOGY PROTOCOL OPERATING ON EACH RESPECTIVE COMPUTING DEVICE OF A SET OF NETWORKED COMPUTING DEVICES CONFIGURED IN A MULTIPLE-NEIGHBORHOOD TOPOLOGY, EACH RESPECTIVE COMPUTING DEVICE OF THE SET OF COMPUTING DEVICES: (1) BEING CONFIGURED AS PART OF THE MULTIPLE-NEIGHBORHOOD TOPOLOGY IN WHICH EACH RESPECTIVE COMPUTING DEVICE IS ASSIGNED TO A GROUP OF NEIGHBORHOODS AND (2) FOLLOWING A TOPOLOGY PROTOCOL TO YIELD A RESPECTIVE ASSIGNED GROUP OF NEIGHBORHOODS FOR THE RESPECTIVE COMPUTING DEVICE
1302
OPERATING THE SET OF NETWORKED COMPUTING DEVICE SUCH THAT A NEW TRANSACTION RECEIVED AT EACH RESPECTIVE COMPUTING DEVICE IS PROCESSED BY THE RESPECTIVE COMPUTING DEVICE BY OPERATIONS INCLUDING CONFIRMING A VALID SIGNATURE OF THE NEW TRANSACTION AND GENERATING A TIME STAMP OR OTHER CONDITION FOR THE NEW TRANSACTION TO GENERATE A STAMPED TRANSACTION
1304
TRANSMITTING THE STAMPED TRANSACTION TO THE RESPECTIVE ASSIGNED GROUP OF NEIGHBORHOODS FOR THE RESPECTIVE COMPUTING DEVICE USING AN UNACKNOWLEDGING DELIVERY PROTOCOL
1306
ORDERING THE STAMPED TRANSACTION WITH OTHER NEW TRANSACTIONS ACCORDING TO A CONDITION SUCH AS, FOR EXAMPLE, RESPECTIVE TIME STAMPS ON THE OTHER NEW TRANSACTIONS TO YIELD AN ORDERED LIST OF NEW TRANSACTIONS
1308

FIG. 13

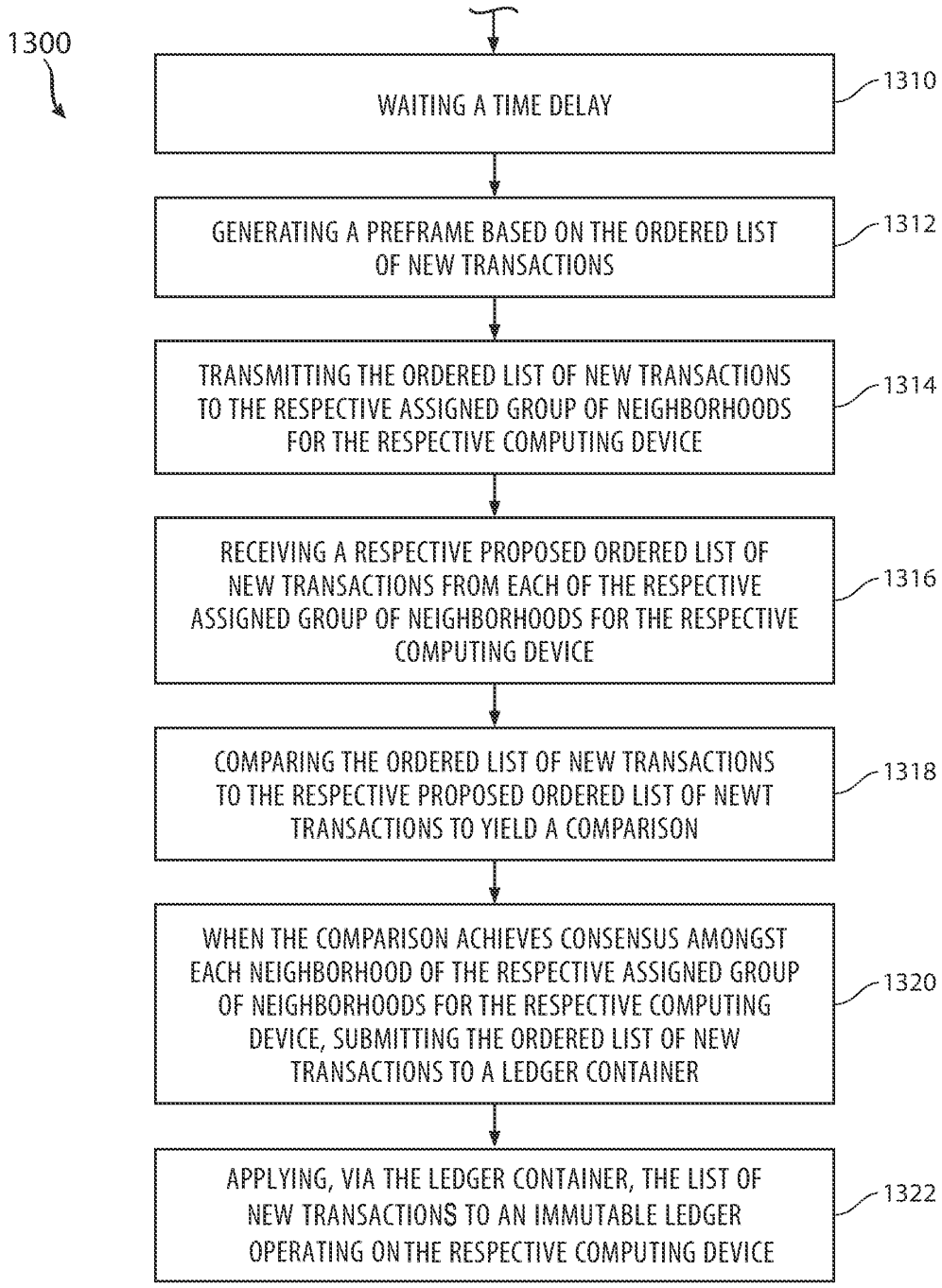


FIG. 13 *(Continued)*

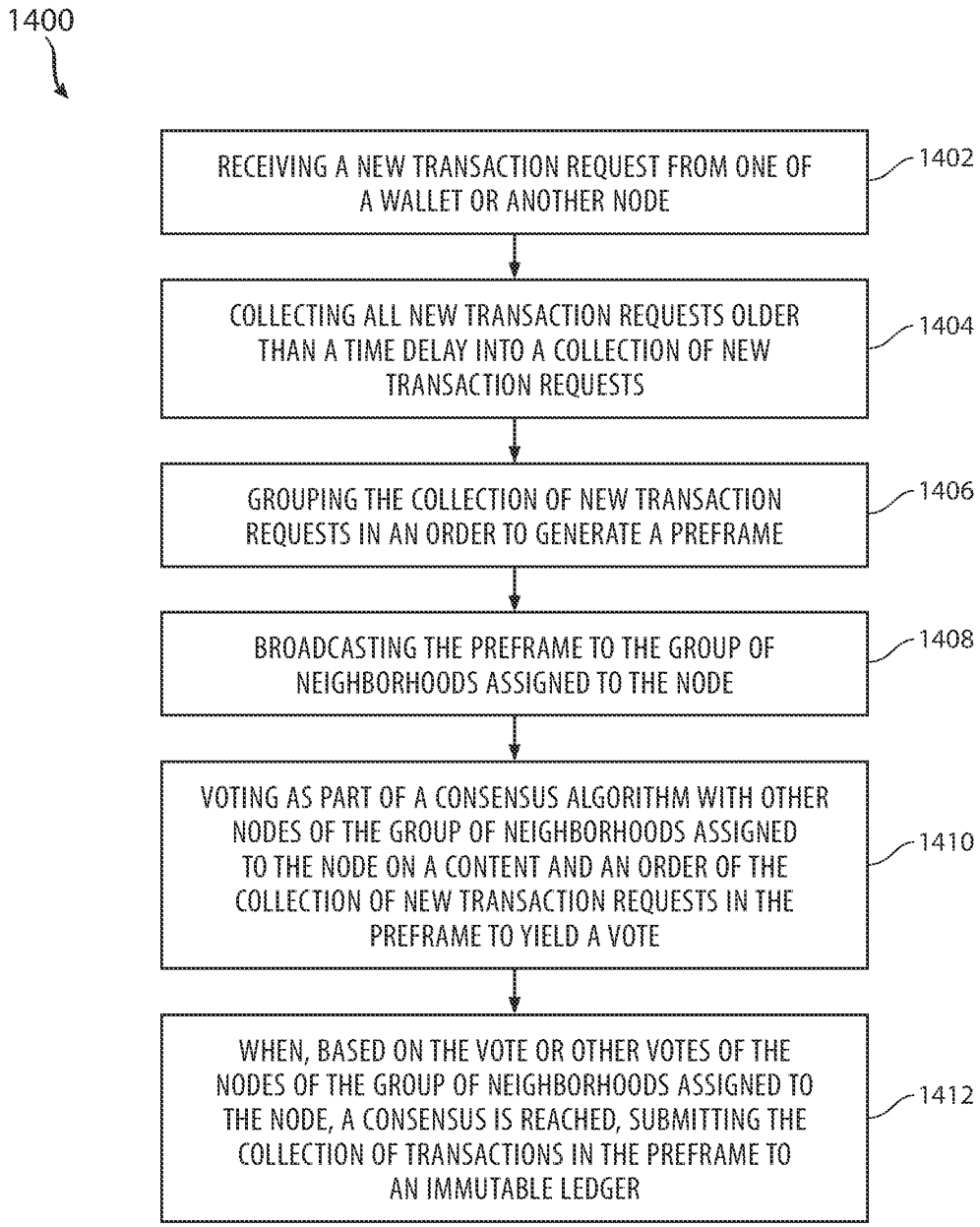

1400
RECEIVING A NEW TRANSACTION REQUEST FROM ONE OF A WALLET OR ANOTHER NODE
1402
COLLECTING ALL NEW TRANSACTION REQUESTS OLDER THAN A TIME DELAY INTO A COLLECTION OF NEW TRANSACTION REQUESTS
1404
GROUPING THE COLLECTION OF NEW TRANSACTION REQUESTS IN AN ORDER TO GENERATE A PREFRAME
1406
BROADCASTING THE PREFRAME TO THE GROUP OF NEIGHBORHOODS ASSIGNED TO THE NODE
1408
VOTING AS PART OF A CONSENSUS ALGORITHM WITH OTHER NODES OF THE GROUP OF NEIGHBORHOODS ASSIGNED TO THE NODE ON A CONTENT AND AN ORDER OF THE COLLECTION OF NEW TRANSACTION REQUESTS IN THE PREFRAME TO YIELD A VOTE
1410
WHEN, BASED ON THE VOTE OR OTHER VOTES OF THE NODES OF THE GROUP OF NEIGHBORHOODS ASSIGNED TO THE NODE, A CONSENSUS IS REACHED, SUBMITTING THE COLLECTION OF TRANSACTIONS IN THE PREFRAME TO AN IMMUTABLE LEDGER
1412

FIG. 14

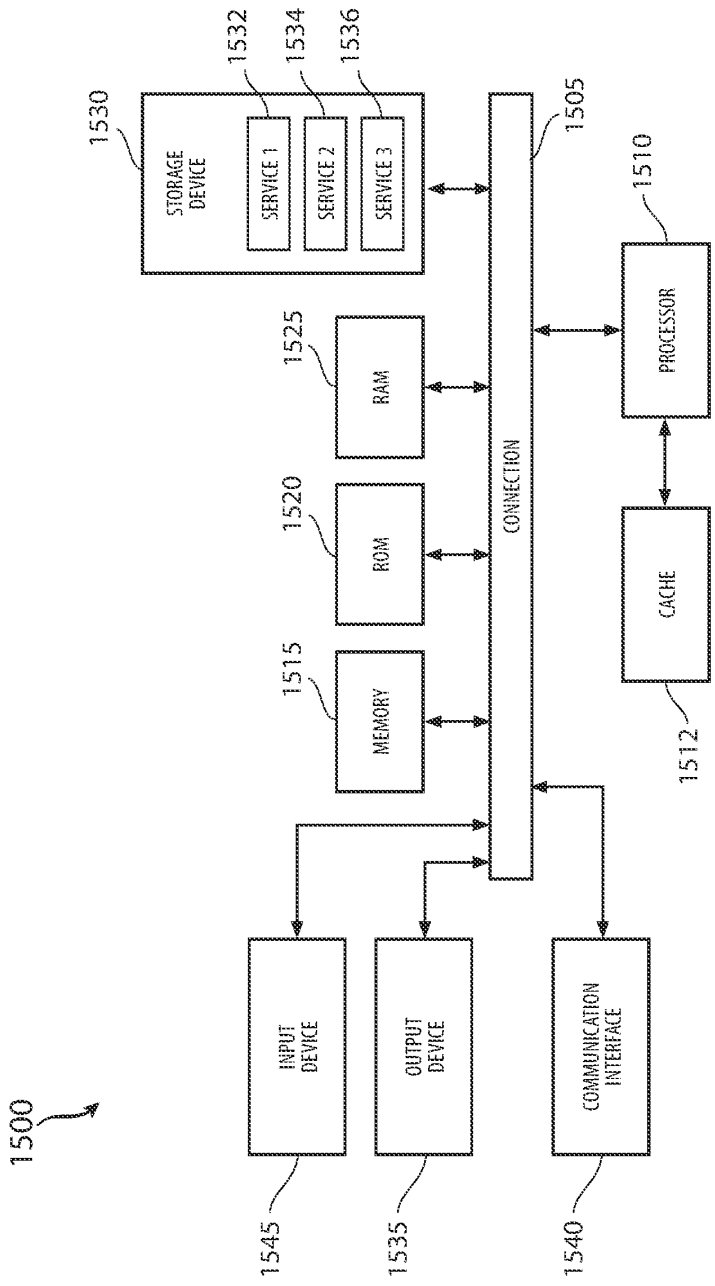

1500
1530
STORAGE DEVICE
1532
SERVICE 1
1534
SERVICE 2
1536
SERVICE 3
1505
CONNECTION
1510
PROCESSOR
1525
RAM
1520
ROM
1515
MEMORY
CACHE
1512
INPUT DEVICE
1545
OUTPUT DEVICE
1535
COMMUNICATION INTERFACE
1540

FIG. 15