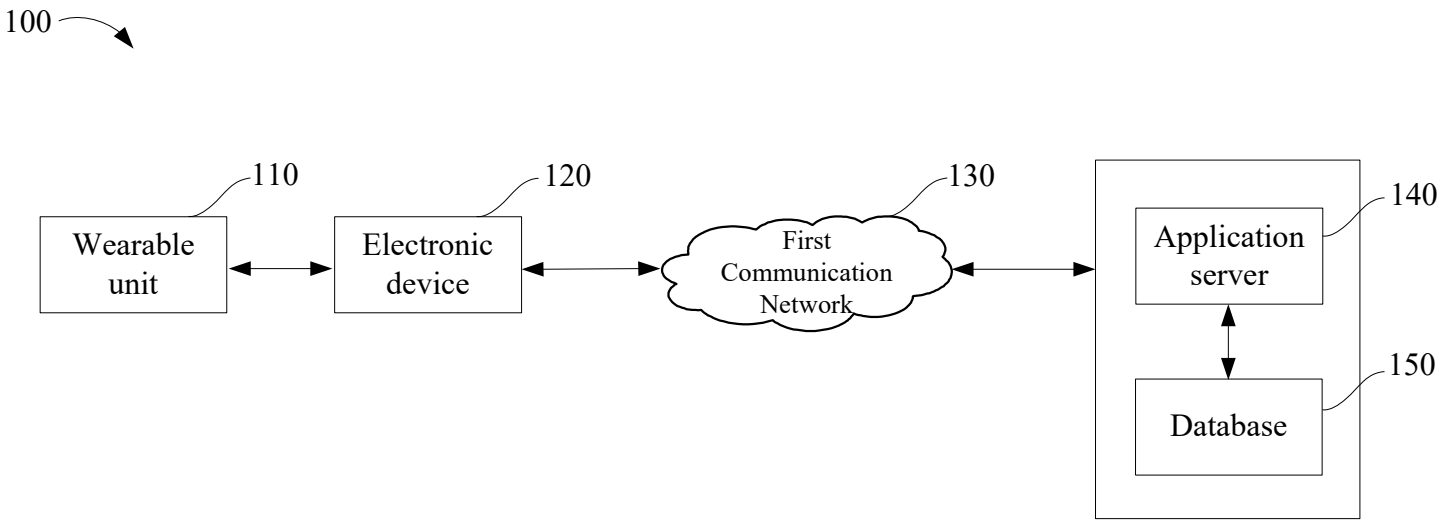

100
110
Wearable unit
120
Electronic device
130
First Communication Network
140
Application server
150
Database

FIG. 1

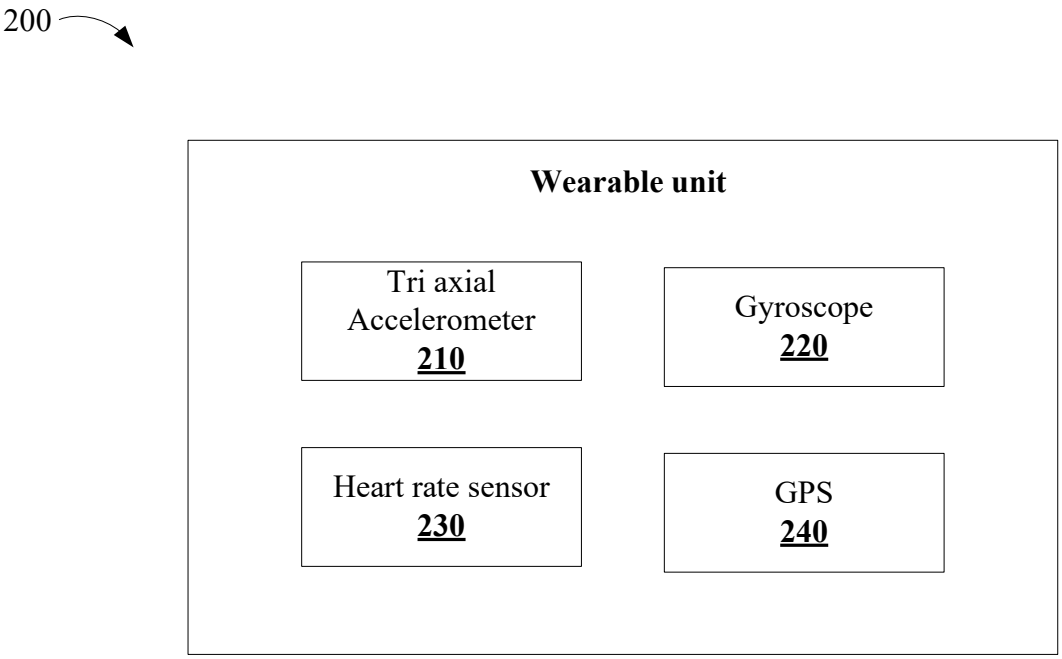

200
Wearable unit
Tri axial Accelerometer
210
Gyroscope
220
Heart rate sensor
230
GPS
240

FIG. 2

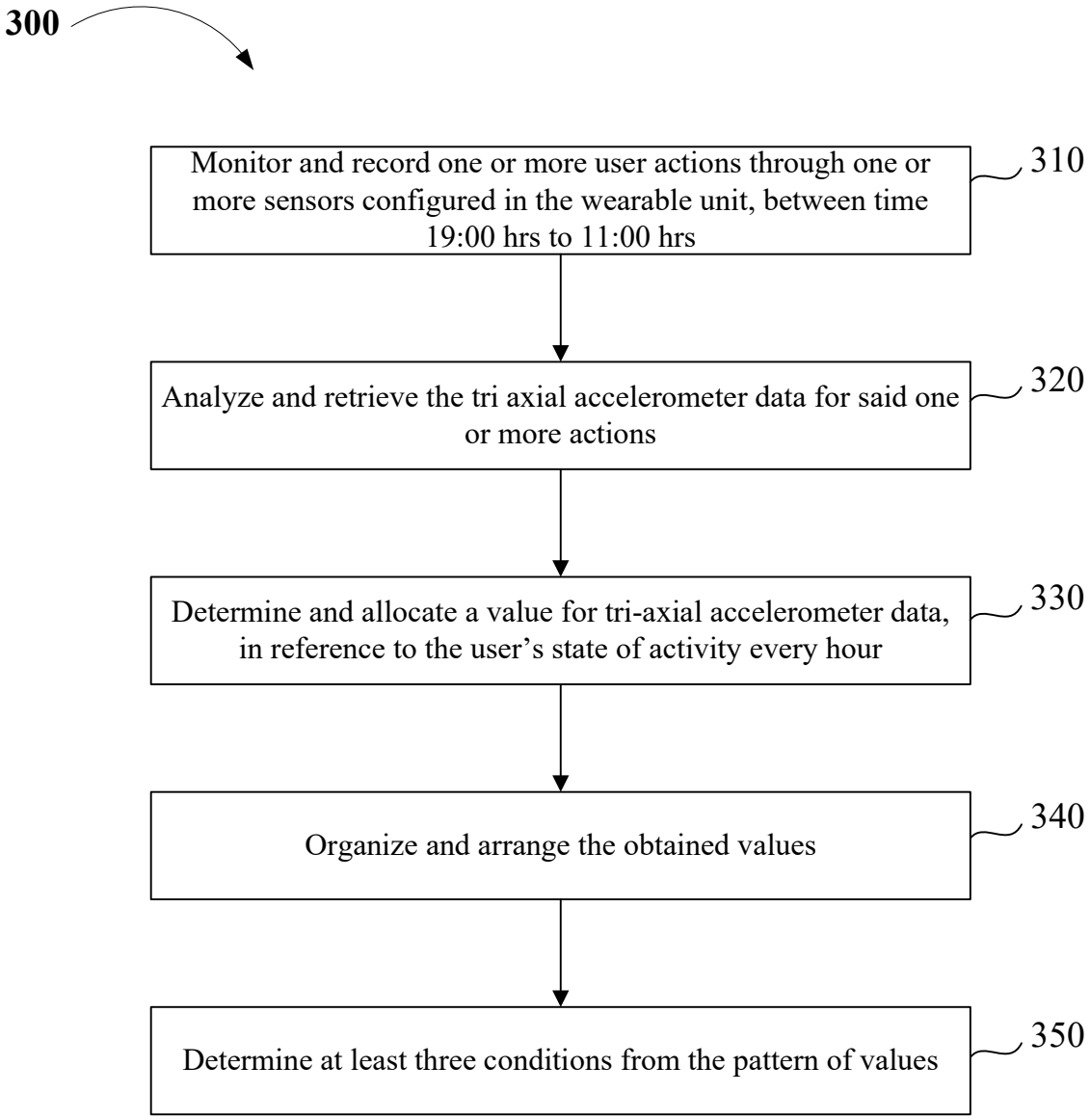

300
Monitor and record one or more user actions through one or more sensors configured in the wearable unit, between time 19:00 hrs to 11:00 hrs
310
Analyze and retrieve the tri axial accelerometer data for said one or more actions
320
Determine and allocate a value for tri-axial accelerometer data, in reference to the user's state of activity every hour
330
Organize and arrange the obtained values
340
Determine at least three conditions from the pattern of values
350

FIG. 3

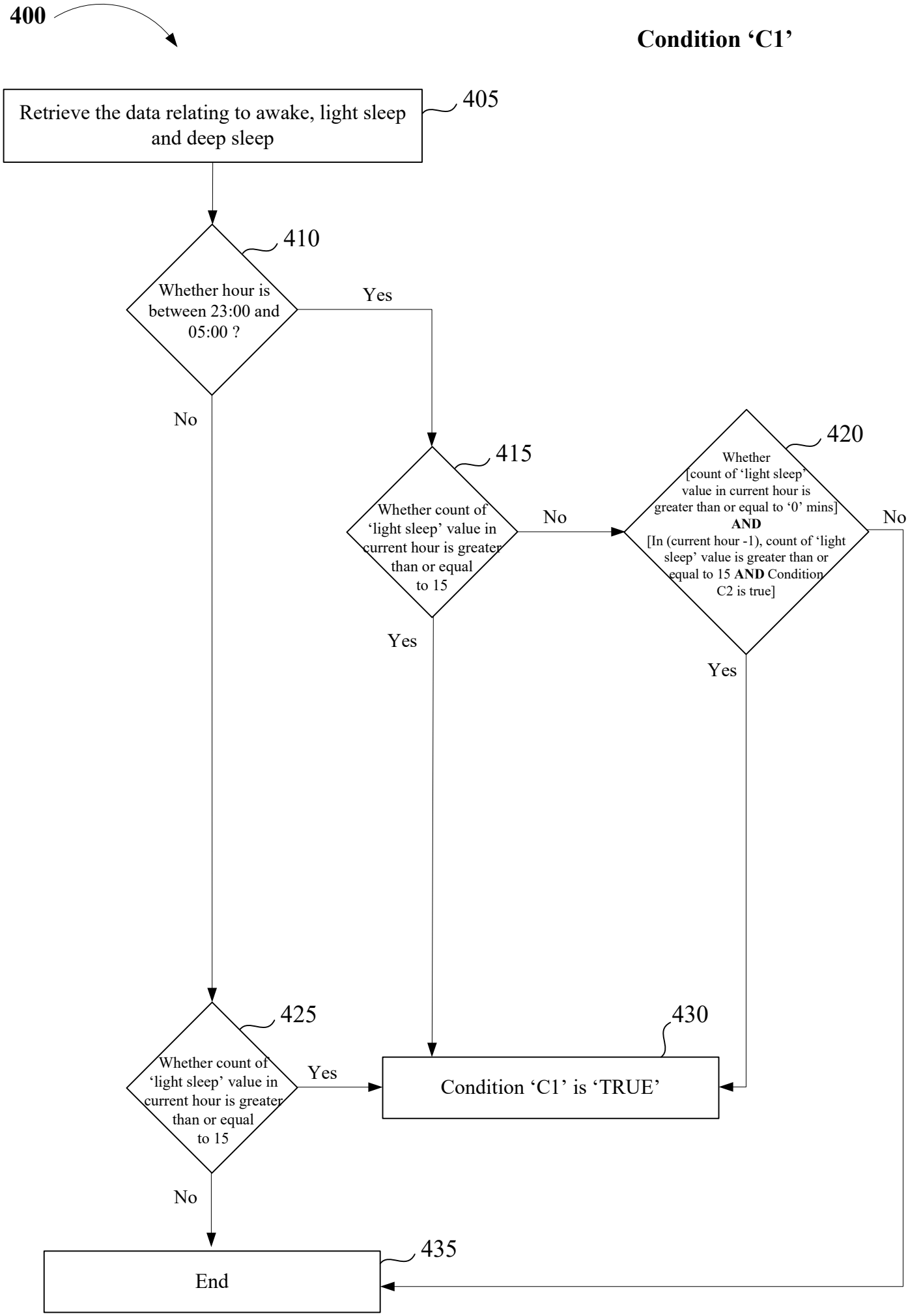

400
Condition ‘C1’
Retrieve the data relating to awake, light sleep and deep sleep
405
410
Whether hour is between 23:00 and 05:00 ?
Yes
No
415
Whether count of ‘light sleep’ value in current hour is greater than or equal to 15
No
420
Whether [count of ‘light sleep’ value in current hour is greater than or equal to ‘0’ mins] AND [In (current hour -1), count of ‘light sleep’ value is greater than or equal to 15 AND Condition C2 is true]
No
Yes
Yes
425
Whether count of ‘light sleep’ value in current hour is greater than or equal to 15
Yes
430
Condition ‘C1’ is ‘TRUE’
No
435
End

FIG. 4A

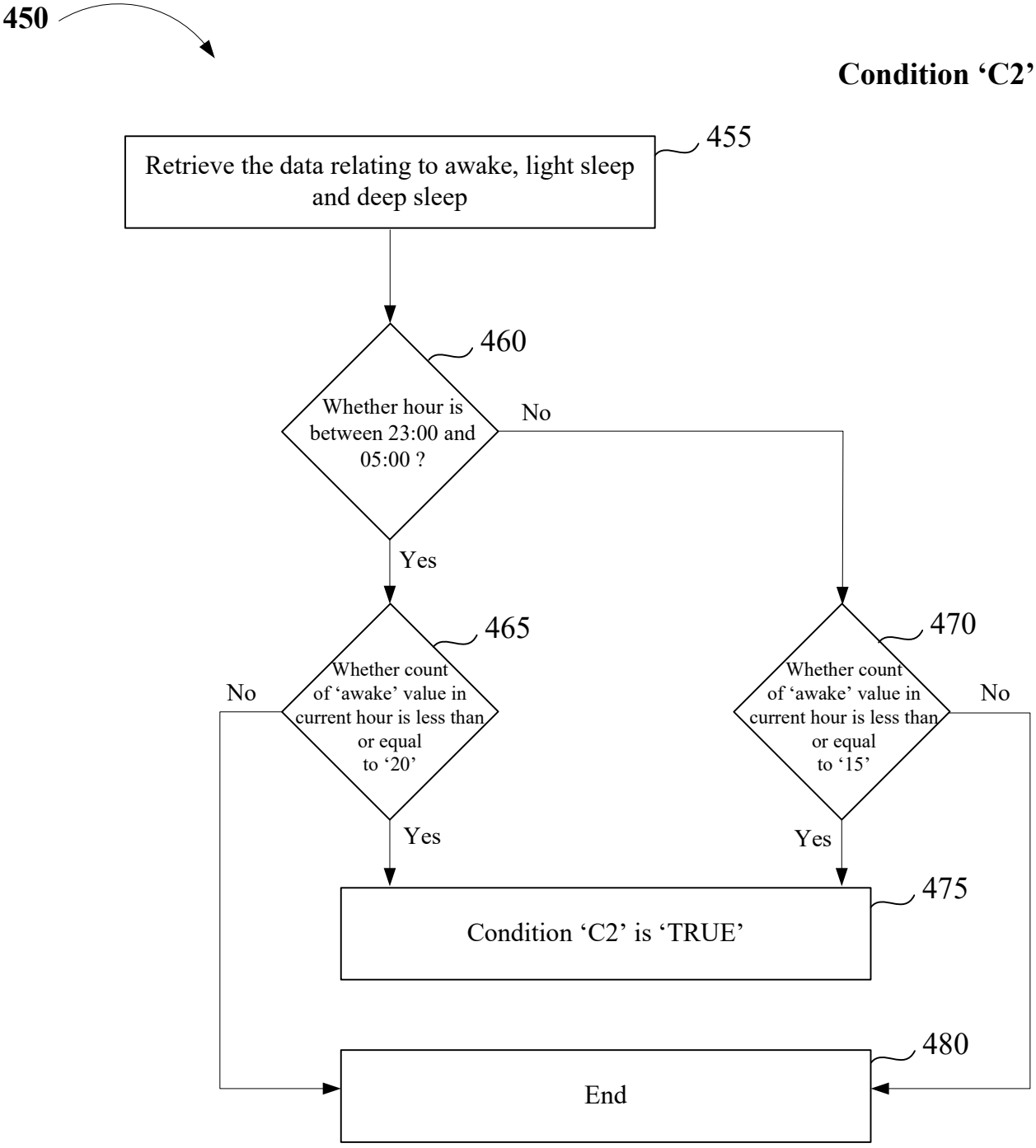

450
Condition ‘C2’
Retrieve the data relating to awake, light sleep and deep sleep
455
460
Whether hour is between 23:00 and 05:00 ?
No
Yes
465
Whether count of ‘awake’ value in current hour is less than or equal to ‘20’
No
Yes
470
Whether count of ‘awake’ value in current hour is less than or equal to ‘15’
No
Yes
475
Condition ‘C2’ is ‘TRUE’
480
End

FIG. 4B

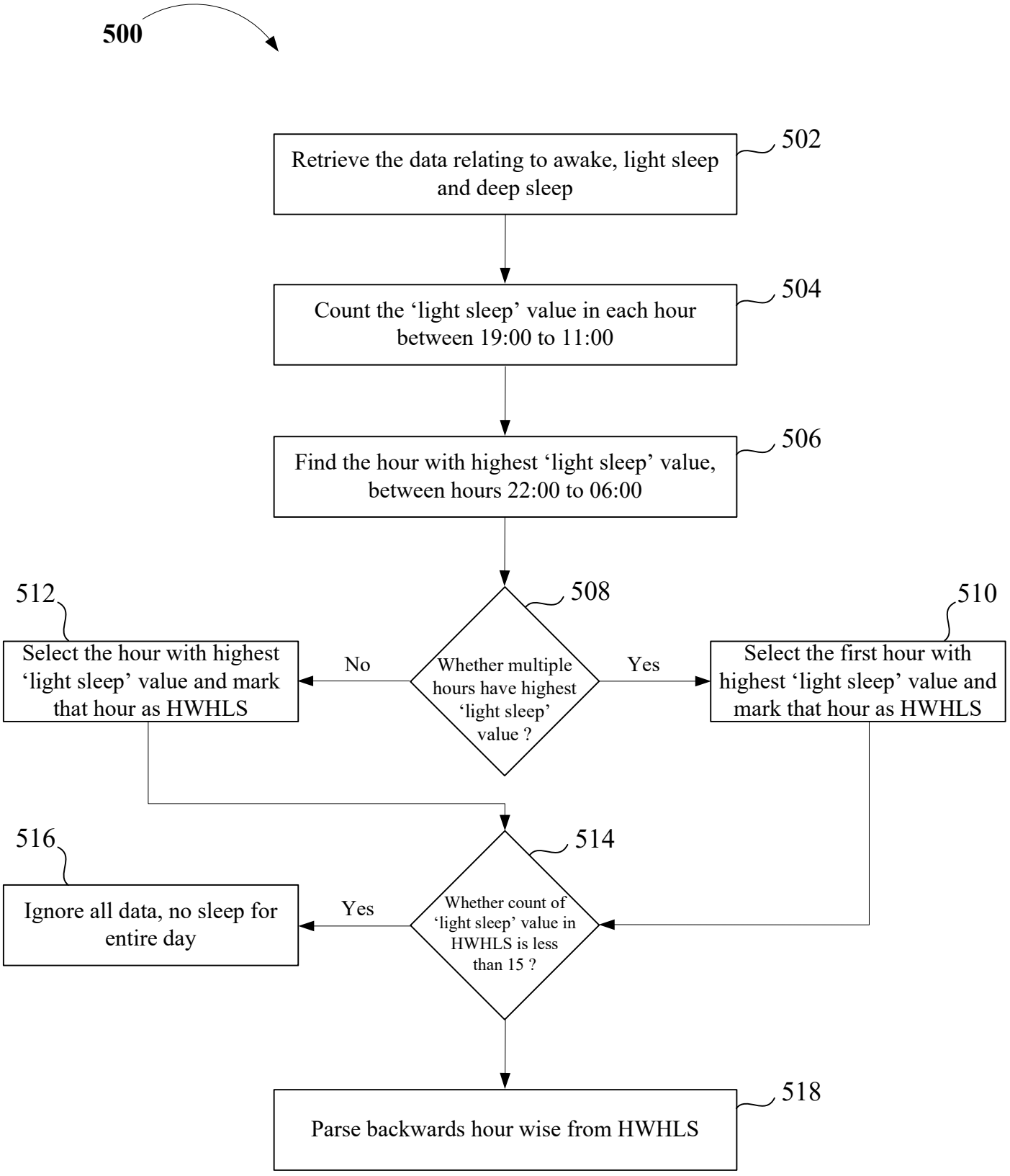

500
Retrieve the data relating to awake, light sleep and deep sleep
502
Count the 'light sleep' value in each hour between 19:00 to 11:00
504
Find the hour with highest 'light sleep' value, between hours 22:00 to 06:00
506
Whether multiple hours have highest 'light sleep' value ?
508
No
Yes
Select the hour with highest 'light sleep' value and mark that hour as HWHLS
512
Select the first hour with highest 'light sleep' value and mark that hour as HWHLS
510
Whether count of 'light sleep' value in HWHLS is less than 15 ?
514
Yes
Ignore all data, no sleep for entire day
516
Parse backwards hour wise from HWHLS
518

FIG. 5A

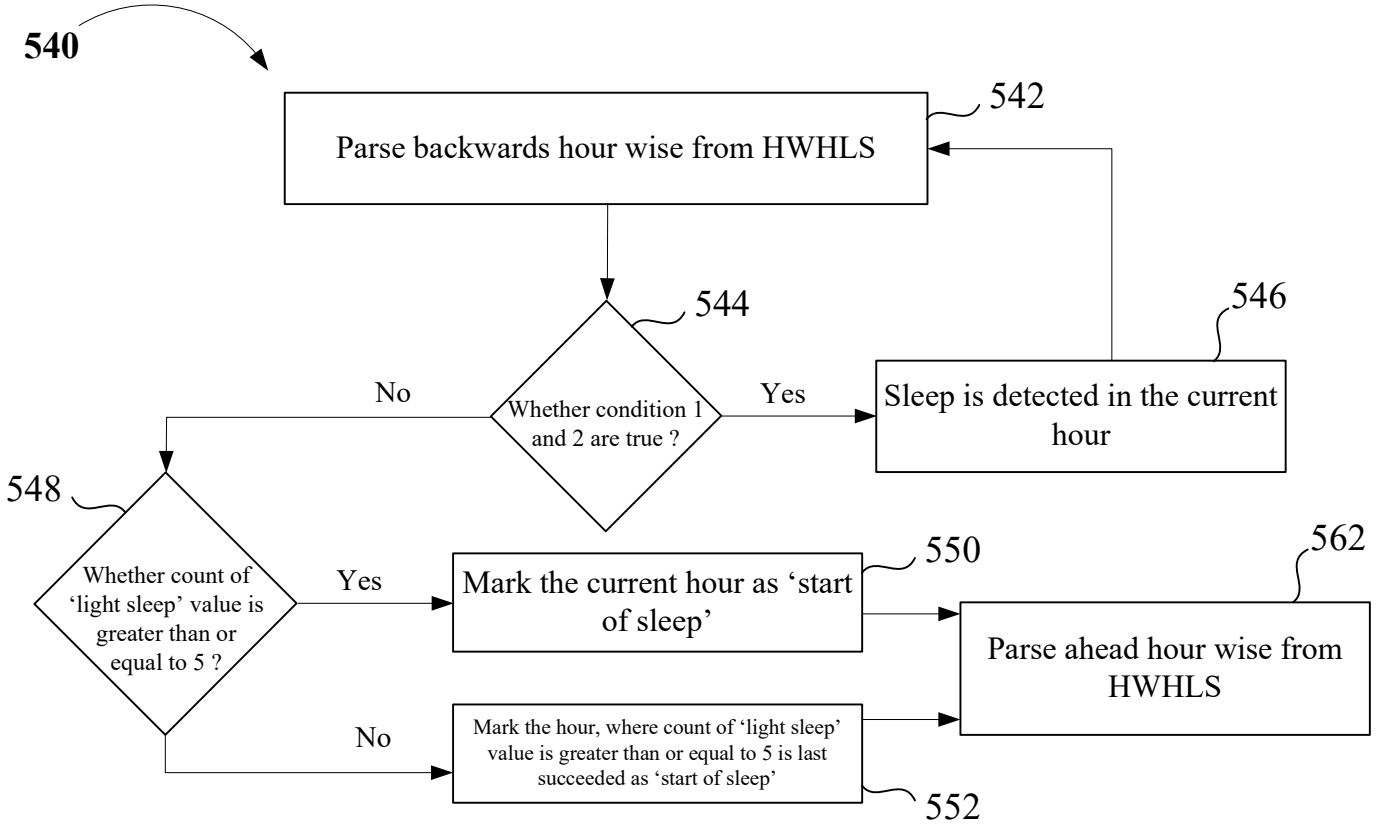

540
Parse backwards hour wise from HWHLS
542
Whether condition 1 and 2 are true ?
544
No
Yes
Sleep is detected in the current hour
546
Whether count of 'light sleep' value is greater than or equal to 5 ?
548
Yes
Mark the current hour as 'start of sleep'
550
No
Mark the hour, where count of 'light sleep' value is greater than or equal to 5 is last succeeded as 'start of sleep'
552
Parse ahead hour wise from HWHLS
562

FIG. 5B

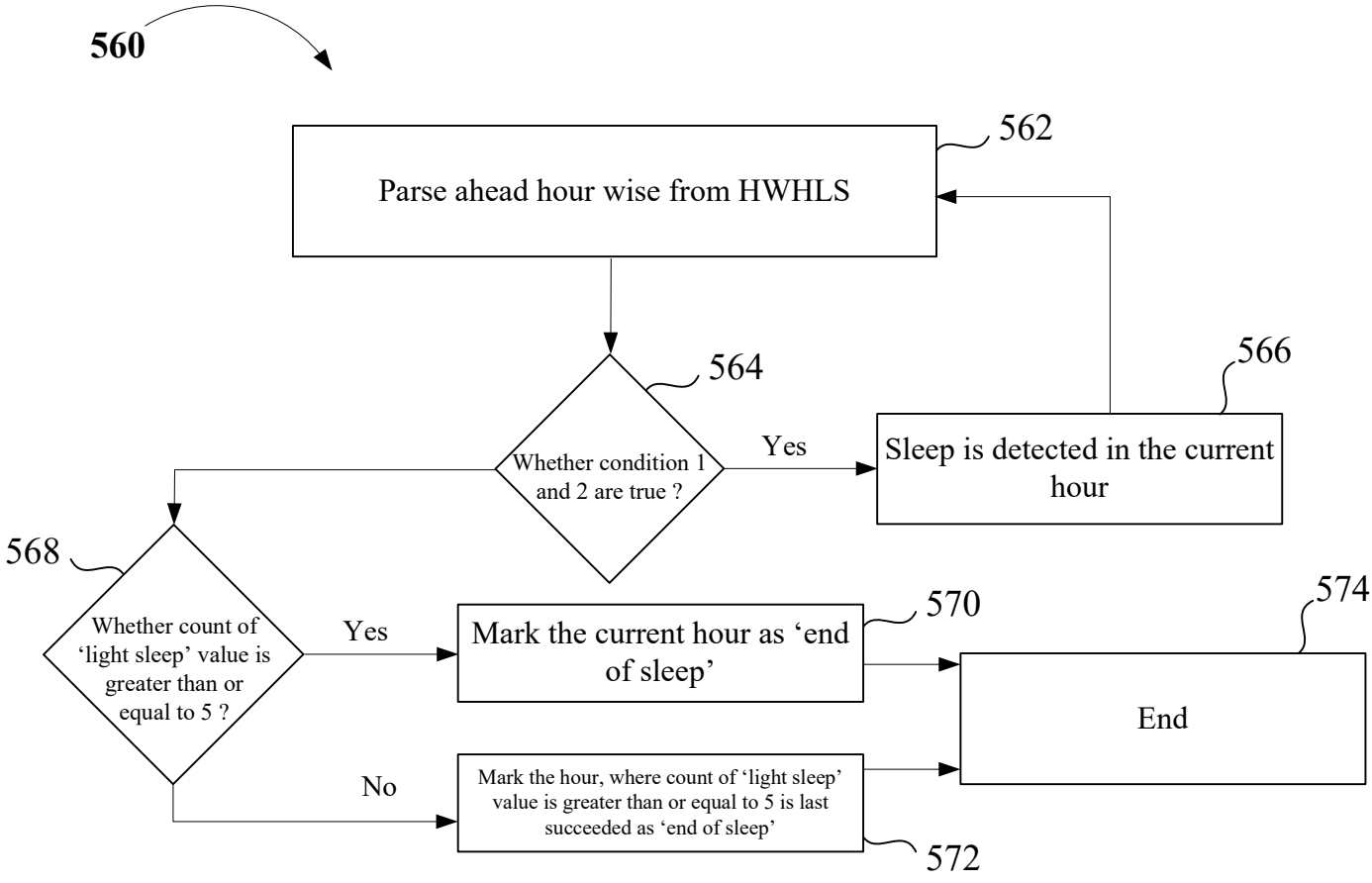

560
Parse ahead hour wise from HWHLS
562
Whether condition 1 and 2 are true ?
564
Yes
Sleep is detected in the current hour
566
Whether count of 'light sleep' value is greater than or equal to 5 ?
568
Yes
Mark the current hour as 'end of sleep'
570
No
Mark the hour, where count of 'light sleep' value is greater than or equal to 5 is last succeeded as 'end of sleep'
572
End
574

FIG. 5C

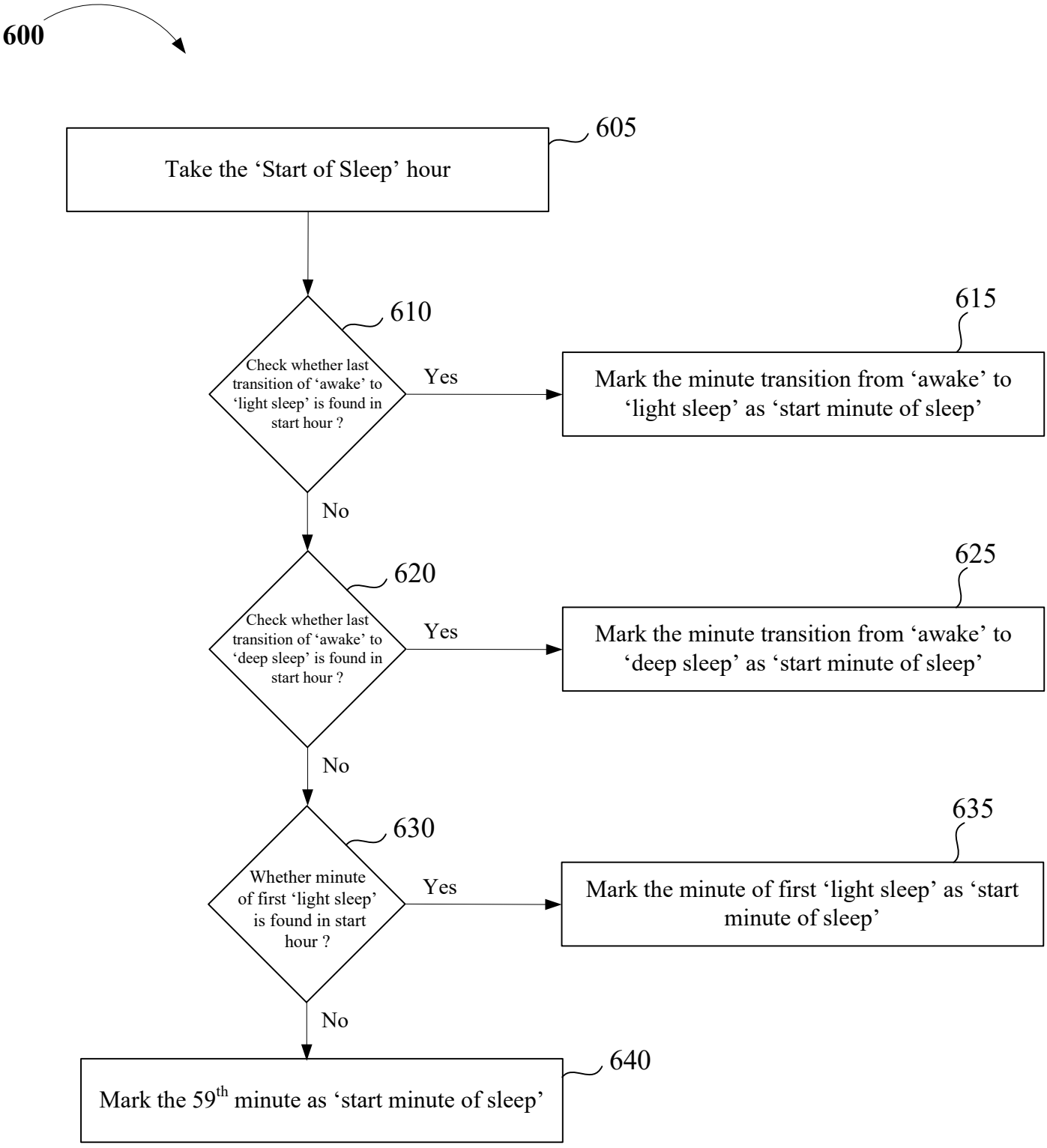

600
605
Take the ‘Start of Sleep’ hour
610
Check whether last transition of ‘awake’ to ‘light sleep’ is found in start hour ?
Yes
615
Mark the minute transition from ‘awake’ to ‘light sleep’ as ‘start minute of sleep’
No
620
Check whether last transition of ‘awake’ to ‘deep sleep’ is found in start hour ?
Yes
625
Mark the minute transition from ‘awake’ to ‘deep sleep’ as ‘start minute of sleep’
No
630
Whether minute of first ‘light sleep’ is found in start hour ?
Yes
635
Mark the minute of first ‘light sleep’ as ‘start minute of sleep’
No
640
Mark the 59th minute as ‘start minute of sleep’

FIG. 6

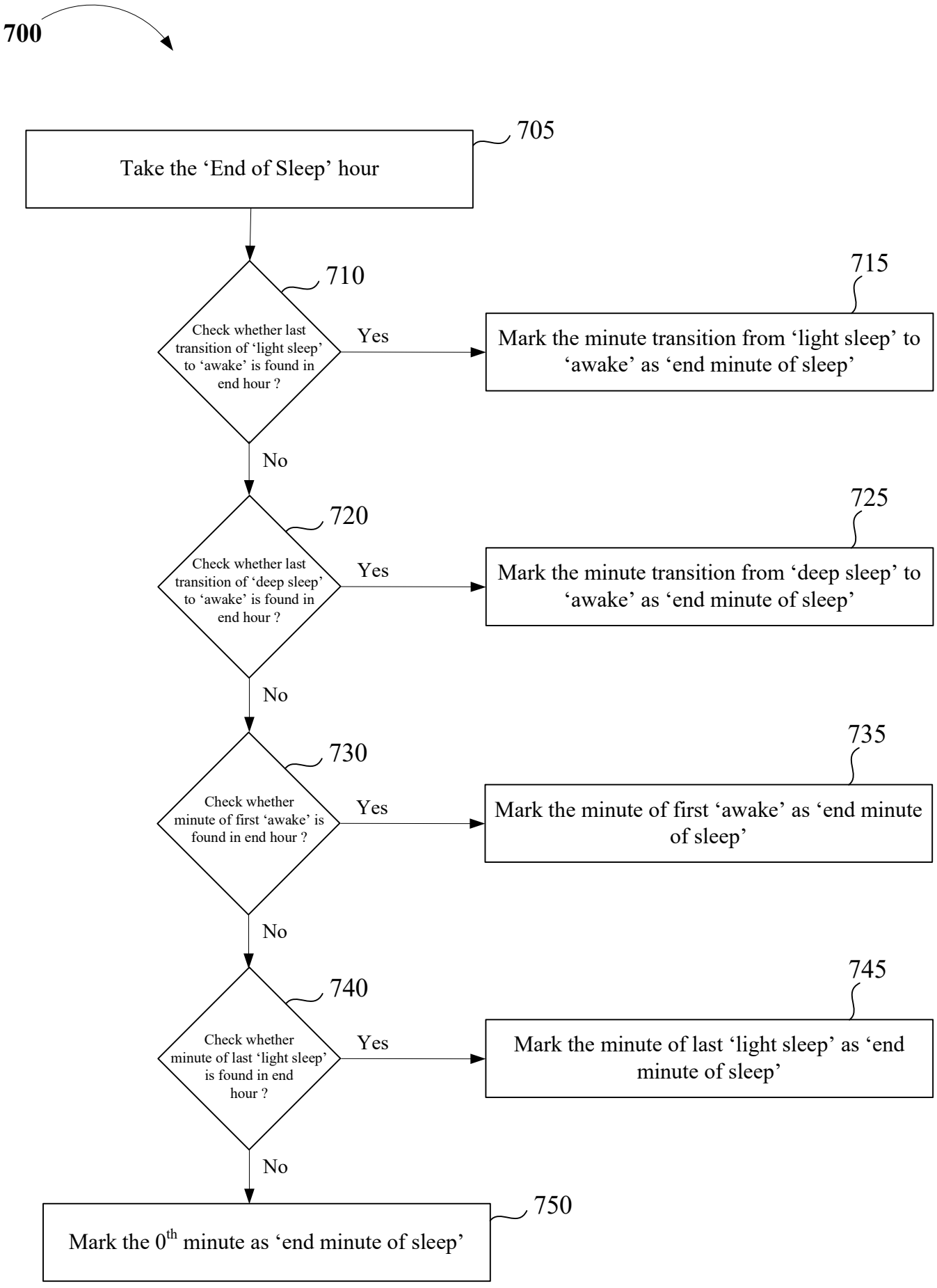

700
Take the ‘End of Sleep’ hour
705
Check whether last transition of ‘light sleep’ to ‘awake’ is found in end hour ?
710
Yes
Mark the minute transition from ‘light sleep’ to ‘awake’ as ‘end minute of sleep’
715
No
Check whether last transition of ‘deep sleep’ to ‘awake’ is found in end hour ?
720
Yes
Mark the minute transition from ‘deep sleep’ to ‘awake’ as ‘end minute of sleep’
725
No
Check whether minute of first ‘awake’ is found in end hour ?
730
Yes
Mark the minute of first ‘awake’ as ‘end minute of sleep’
735
No
Check whether minute of last ‘light sleep’ is found in end hour ?
740
Yes
Mark the minute of last ‘light sleep’ as ‘end minute of sleep’
745
No
Mark the 0th minute as ‘end minute of sleep’
750

FIG. 7

| Hours | Minutes | | |