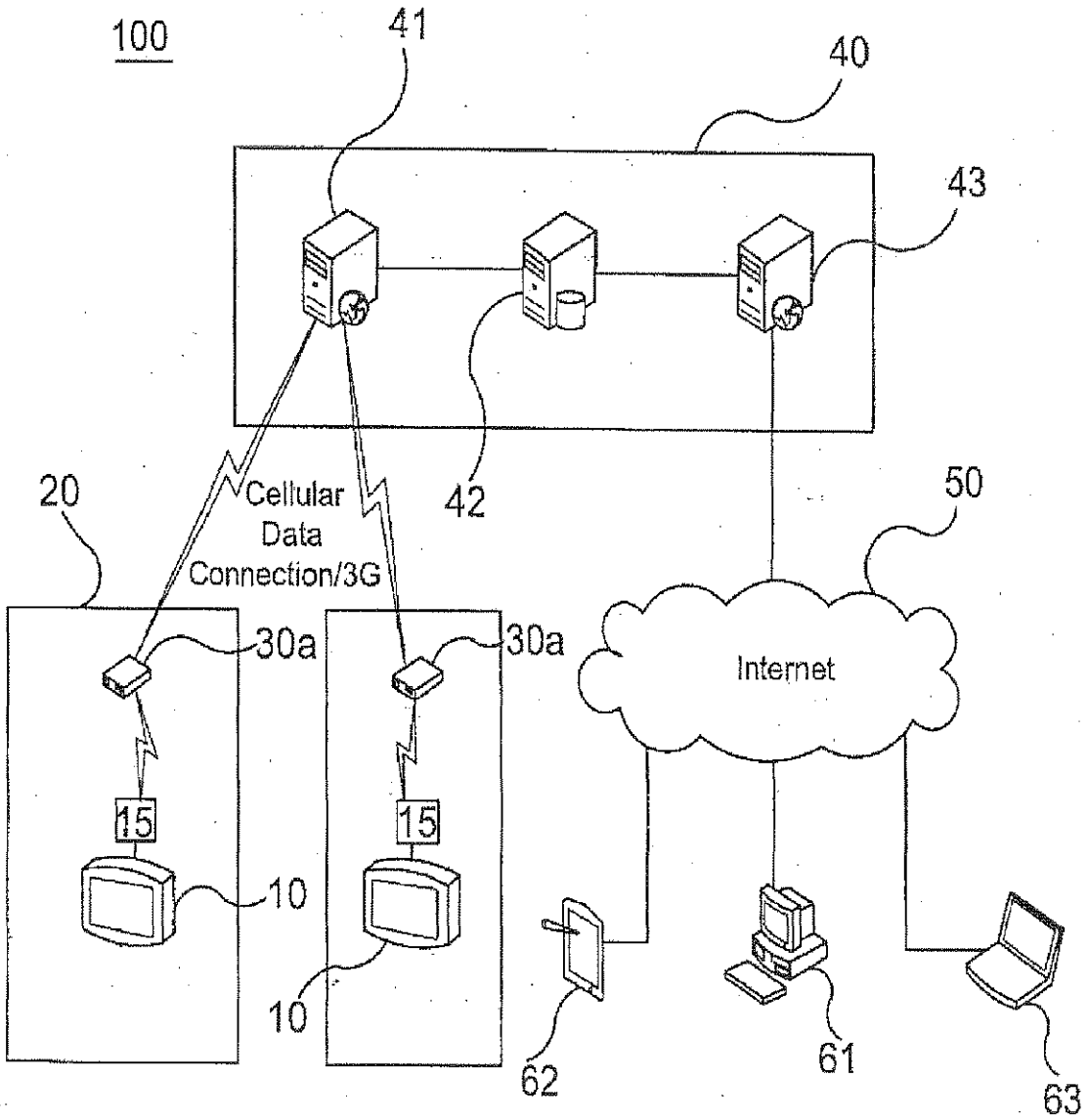
100
41
40
43
42
20
Cellular
Data
Connection/3G
50
30a
30a
Internet
15
15
10
10
62
61
63

FIG.1(a)

70

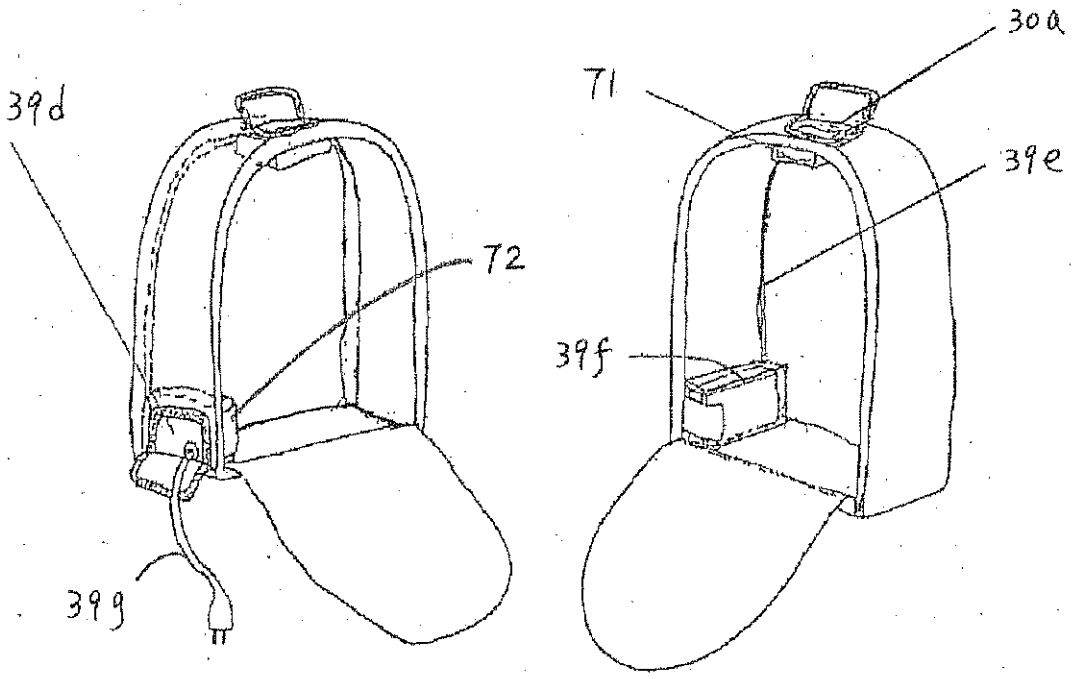

FIG. 1b

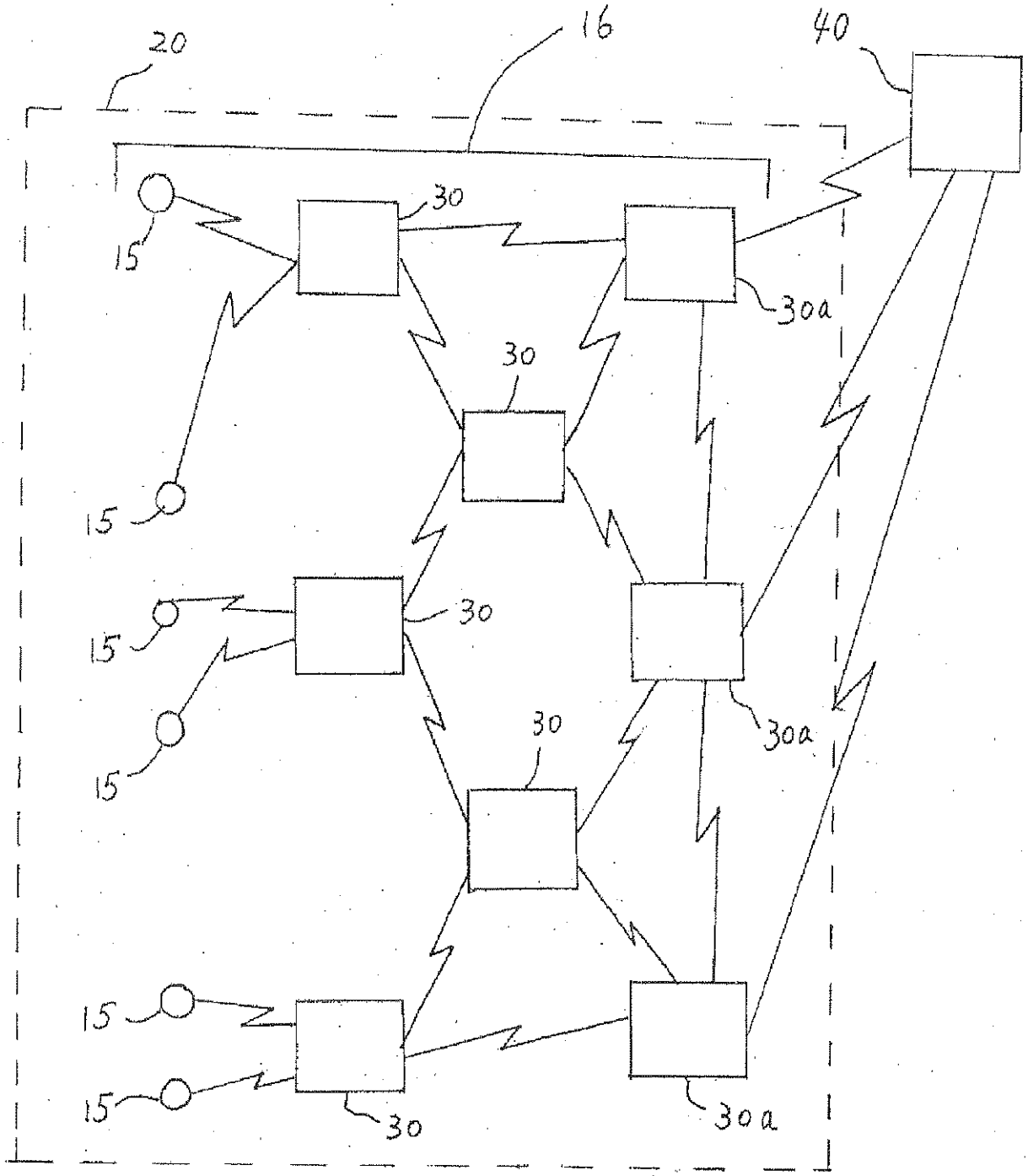

FIG. 2

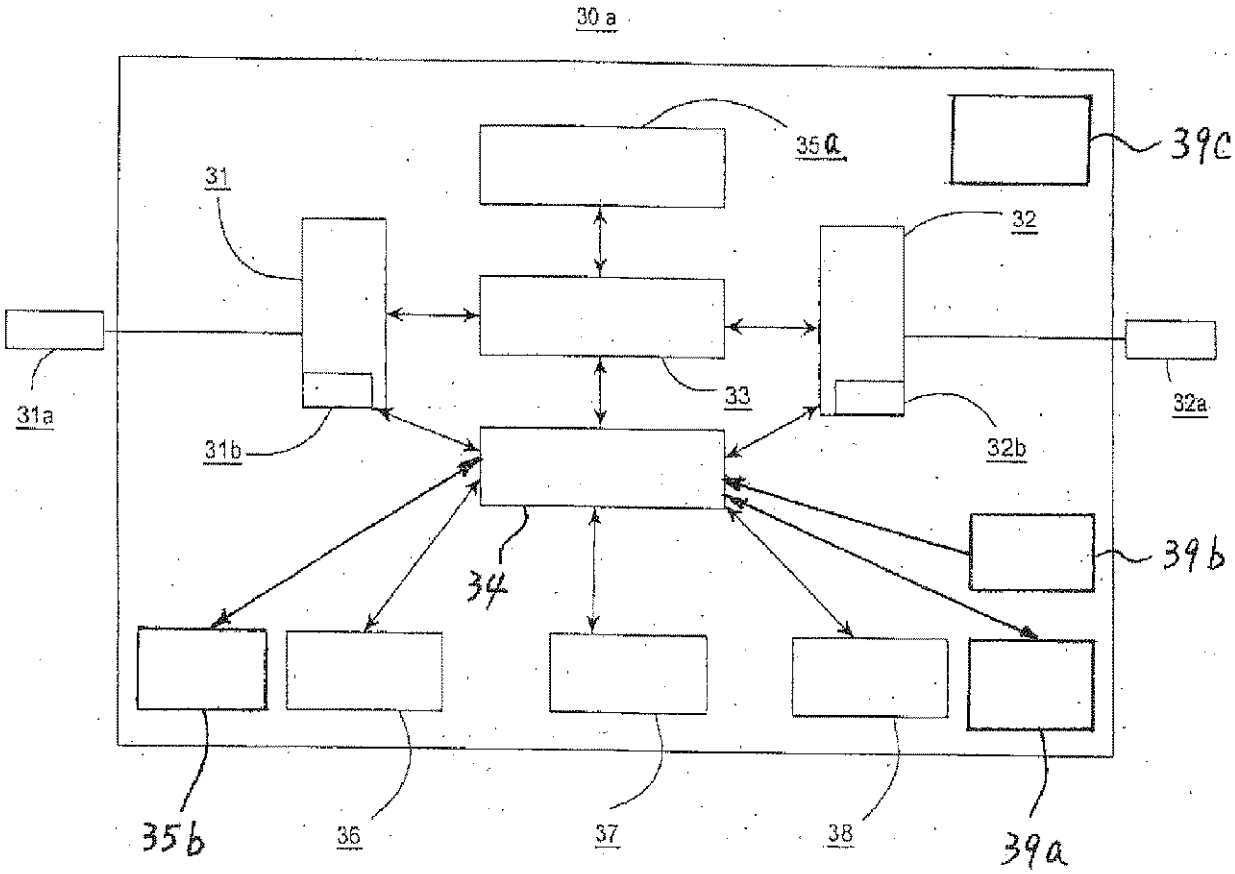

FIG. 3

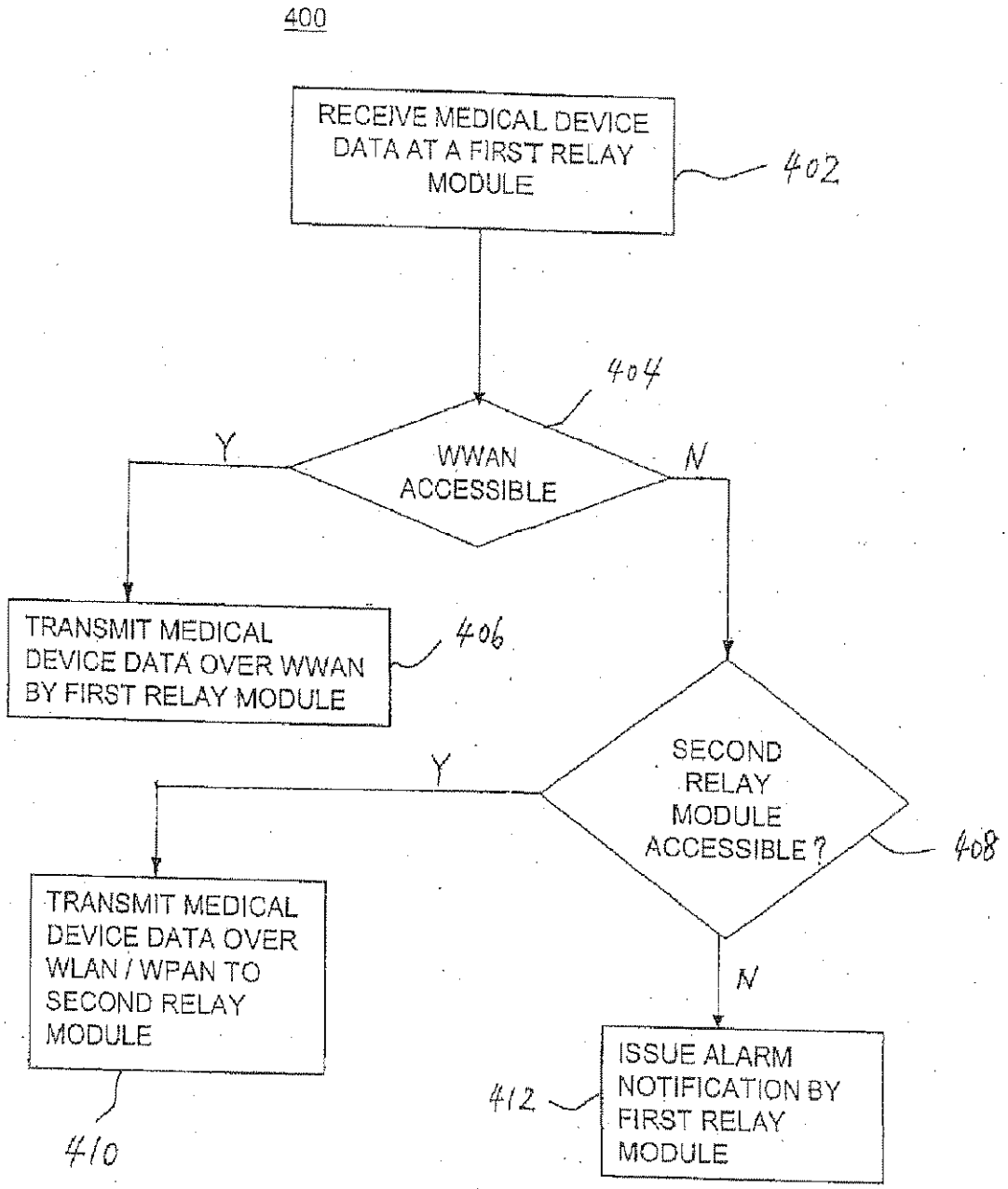
400
RECEIVE MEDICAL DEVICE DATA AT A FIRST RELAY MODULE
402
404
WWAN ACCESSIBLE
Y
N
TRANSMIT MEDICAL DEVICE DATA OVER WWAN BY FIRST RELAY MODULE
406
SECOND RELAY MODULE ACCESSIBLE ?
408
Y
N
TRANSMIT MEDICAL DEVICE DATA OVER WLAN / WPAN TO SECOND RELAY MODULE
410
ISSUE ALARM NOTIFICATION BY FIRST RELAY MODULE
412

FIG. 4

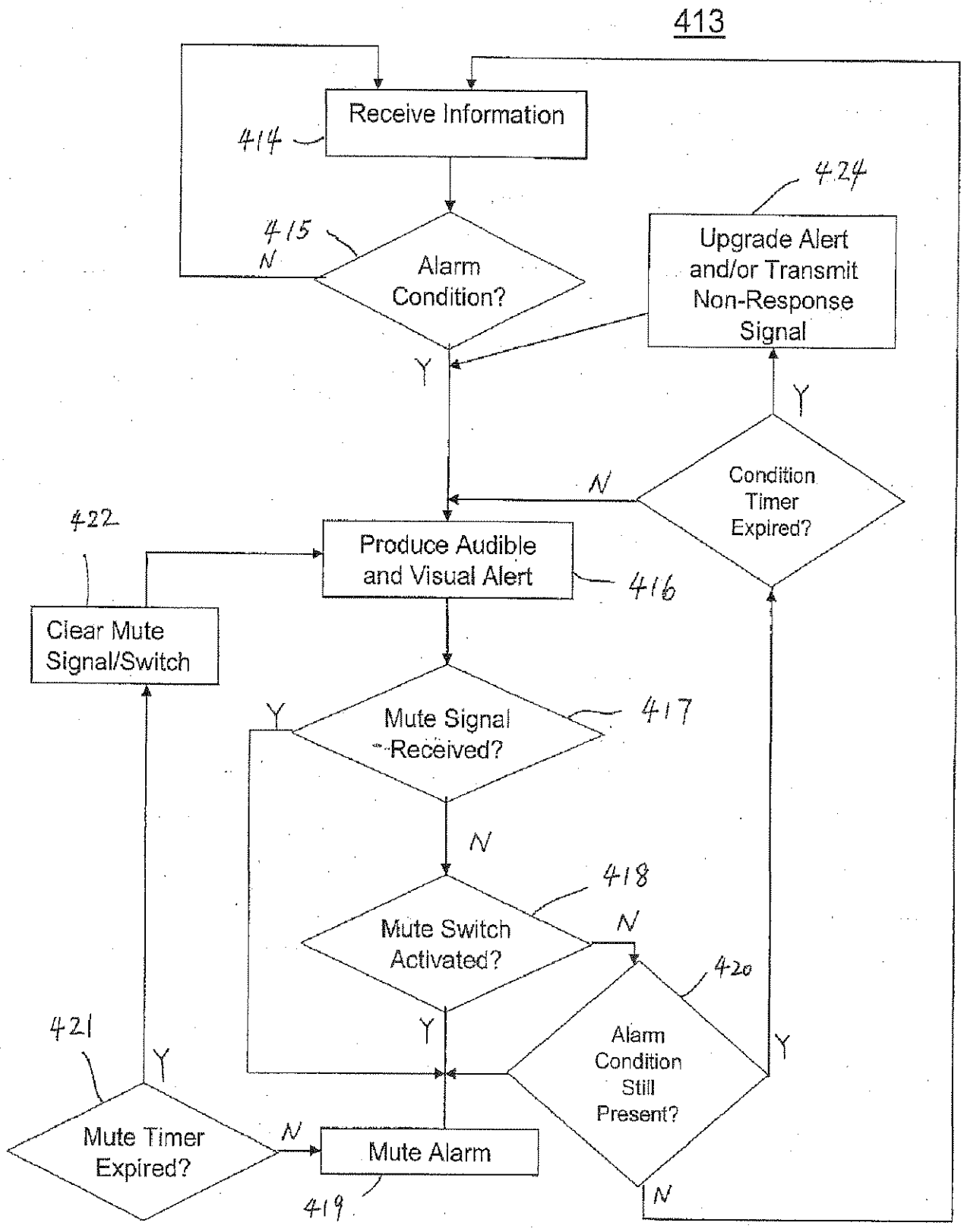
413
Receive Information
414
415
N
Alarm Condition?
Y
424
Upgrade Alert and/or Transmit Non-Response Signal
Y
N
Condition Timer Expired?
422
Produce Audible and Visual Alert
416
Clear Mute Signal/Switch
Y
Mute Signal Received?
417
N
418
Mute Switch Activated?
N
420
Y
Alarm Condition Still Present?
Y
N
421
Y
Mute Timer Expired?
N
Mute Alarm
419

FIG. 5(a)

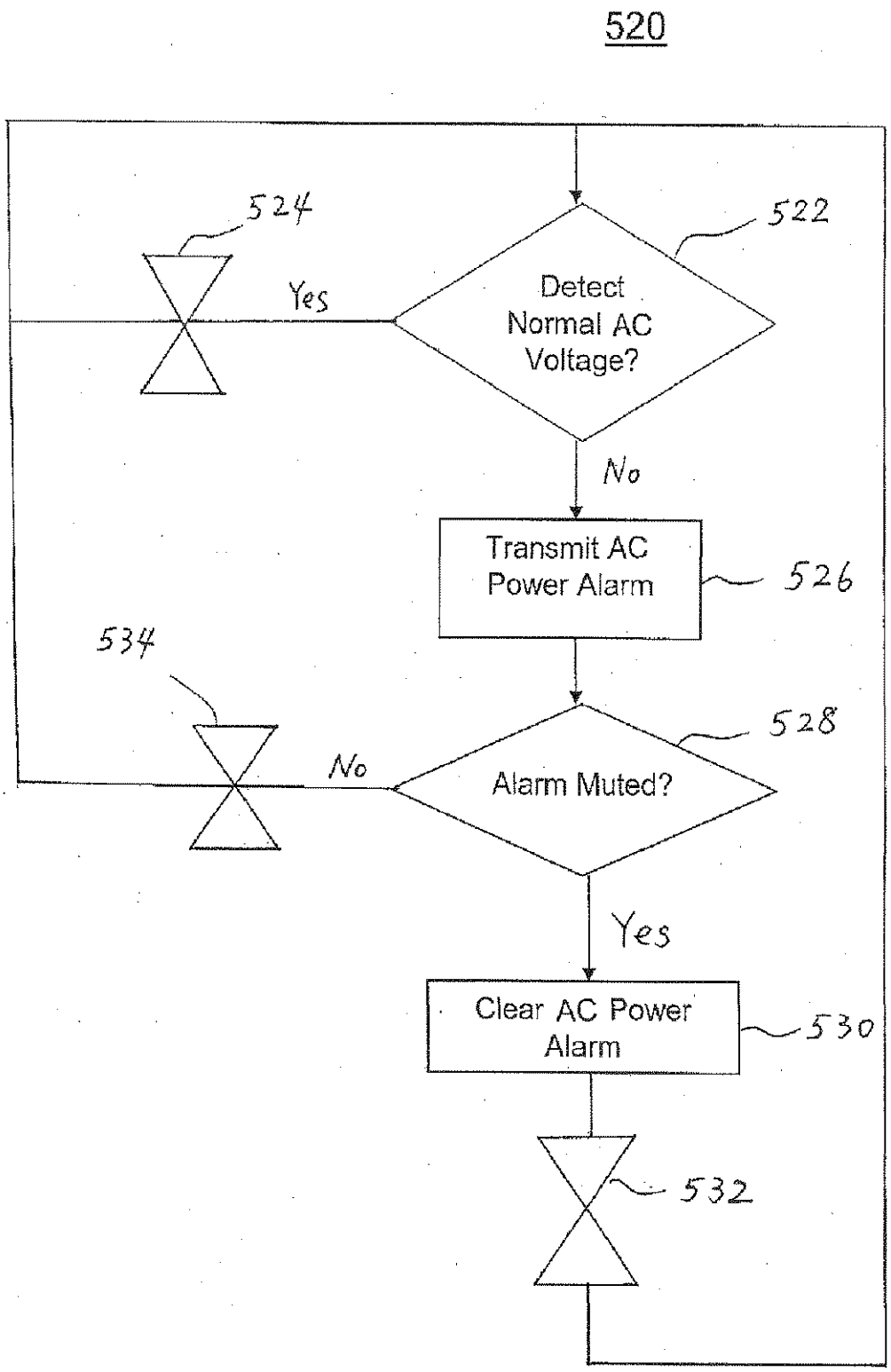
520
524
522
Yes
Detect Normal AC Voltage?
No
Transmit AC Power Alarm
526
534
528
No
Alarm Muted?
Yes
Clear AC Power Alarm
530
532

FIG. 5b

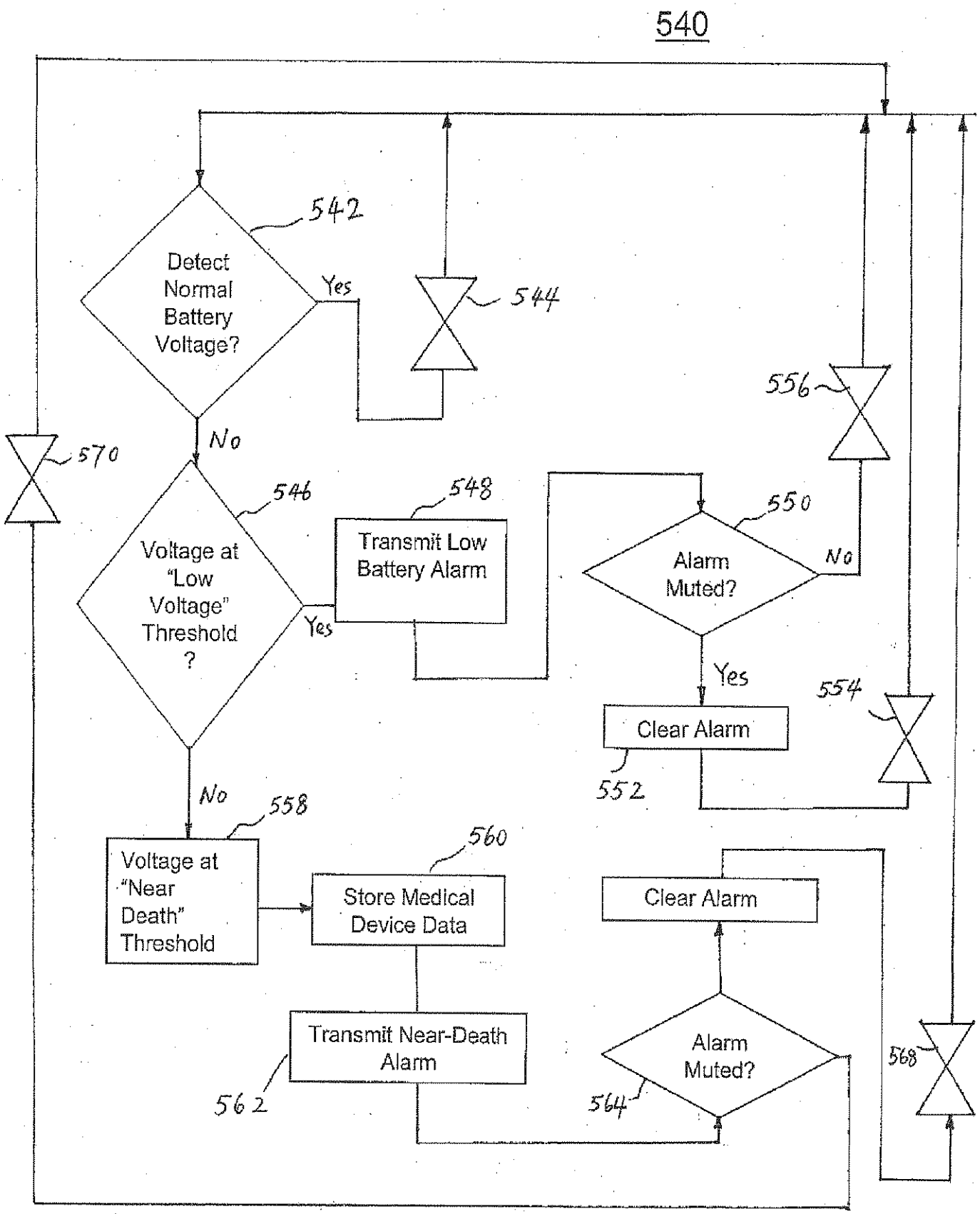
540
542
Detect Normal Battery Voltage?
Yes
544
No
570
546
Voltage at "Low Voltage" Threshold ?
Yes
548
Transmit Low Battery Alarm
550
Alarm Muted?
No
Yes
556
554
Clear Alarm
552
No
558
Voltage at "Near Death" Threshold
560
Store Medical Device Data
Transmit Near-Death Alarm
562
Clear Alarm
Alarm Muted?
564
568

FIG. 5C

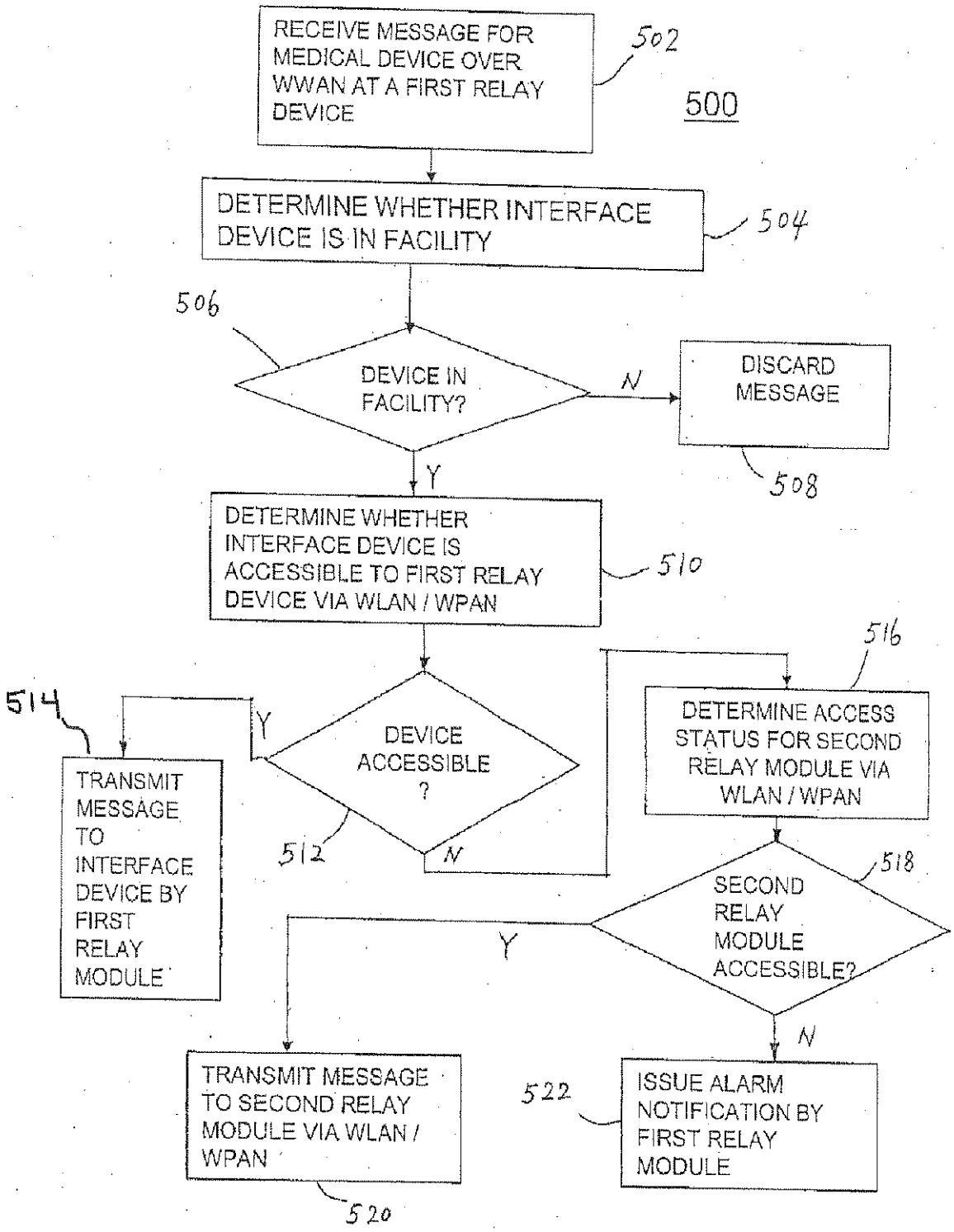
RECEIVE MESSAGE FOR MEDICAL DEVICE OVER WWAN AT A FIRST RELAY DEVICE
502
500
DETERMINE WHETHER INTERFACE DEVICE IS IN FACILITY
504
506
DEVICE IN FACILITY?
N
DISCARD MESSAGE
508
Y
DETERMINE WHETHER INTERFACE DEVICE IS ACCESSIBLE TO FIRST RELAY DEVICE VIA WLAN / WPAN
510
516
514
Y
DEVICE ACCESSIBLE ?
512
N
DETERMINE ACCESS STATUS FOR SECOND RELAY MODULE VIA WLAN / WPAN
TRANSMIT MESSAGE TO INTERFACE DEVICE BY FIRST RELAY MODULE
518
SECOND RELAY MODULE ACCESSIBLE?
Y
N
TRANSMIT MESSAGE TO SECOND RELAY MODULE VIA WLAN / WPAN
520
522
ISSUE ALARM NOTIFICATION BY FIRST RELAY MODULE

FIG. 6

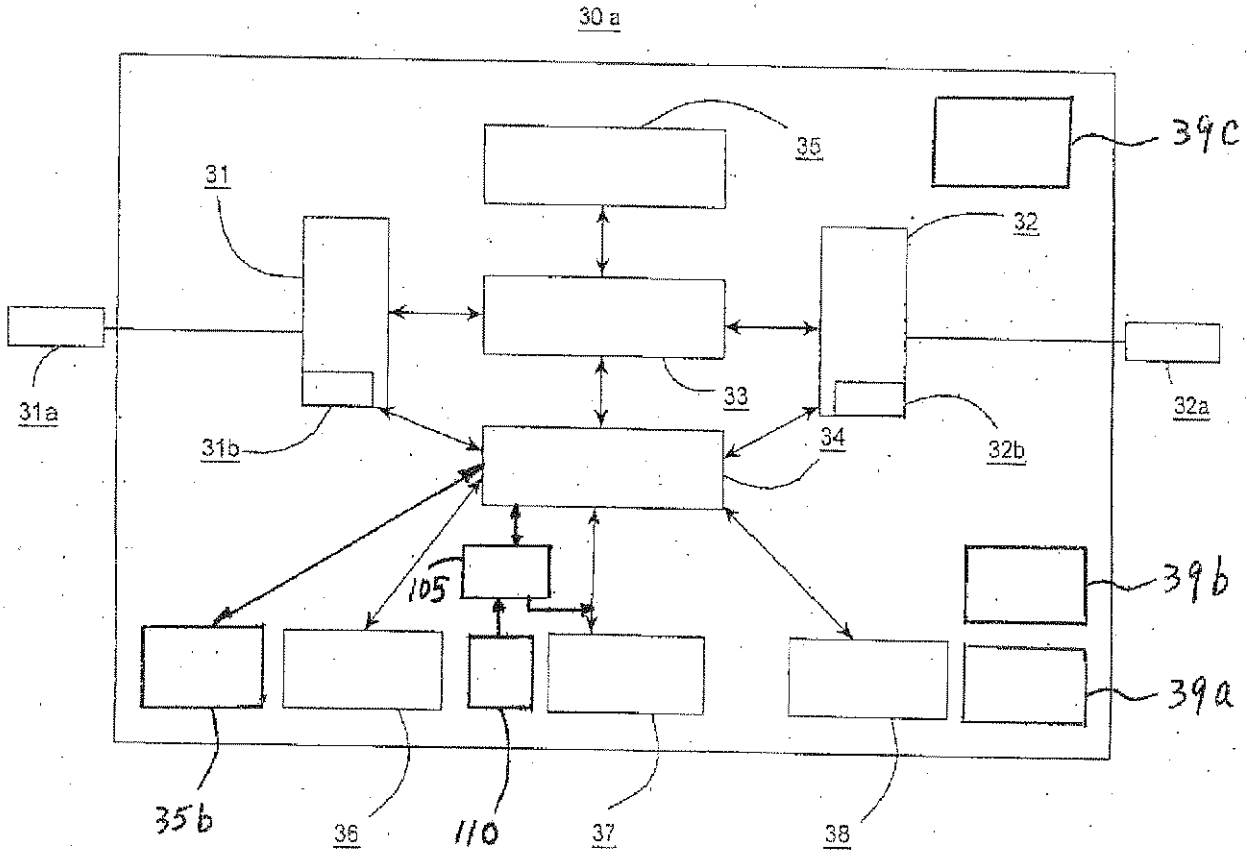

FIG. 7

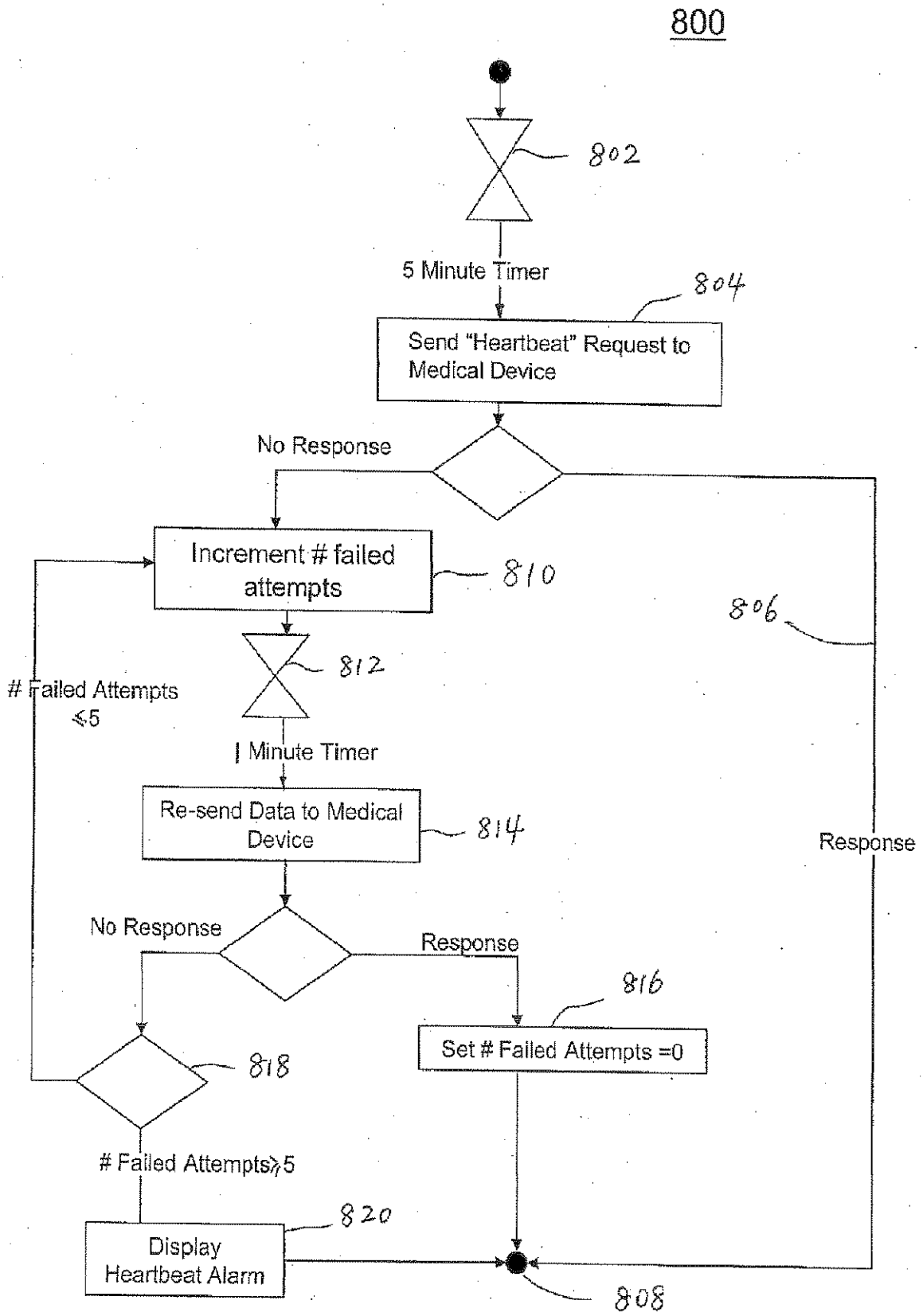
800
802
5 Minute Timer
804
Send "Heartbeat" Request to Medical Device
No Response
Increment # failed attempts
810
806
812
Failed Attempts ≤5
1 Minute Timer
Re-send Data to Medical Device
814
Response
No Response
Response
816
Set # Failed Attempts =0
818
Failed Attempts ≥5
820
Display Heartbeat Alarm
808

FIG. 8