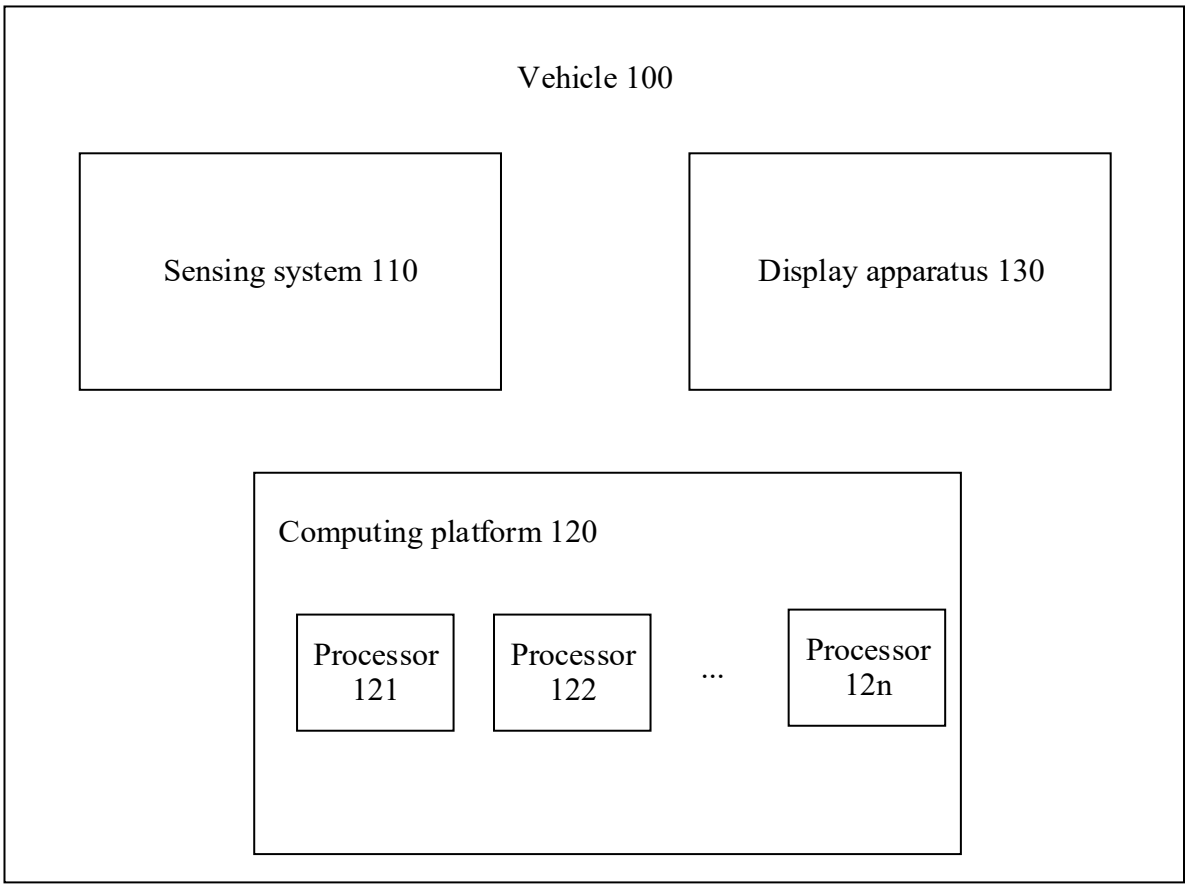

Vehicle 100
Sensing system 110
Display apparatus 130
Computing platform 120
Processor 121
Processor 122
...
Processor 12n

FIG. 1

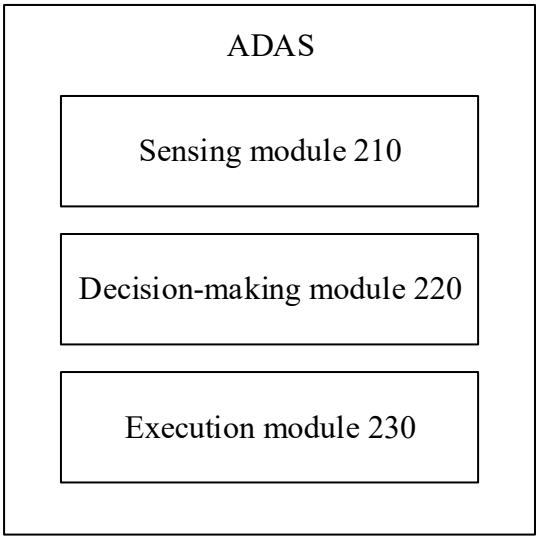

ADAS
Sensing module 210
Decision-making module 220
Execution module 230

FIG. 2

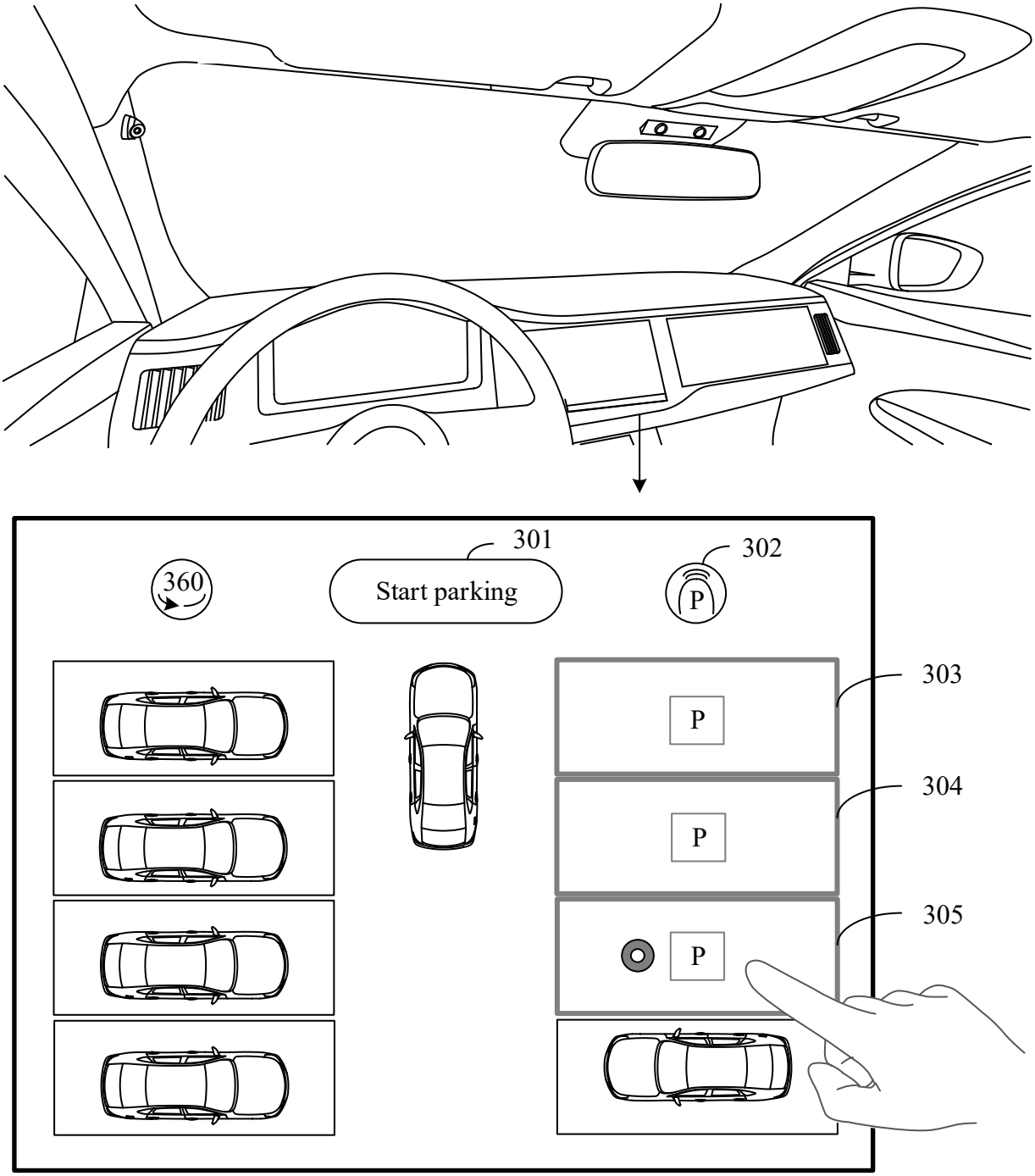


FIG. 3

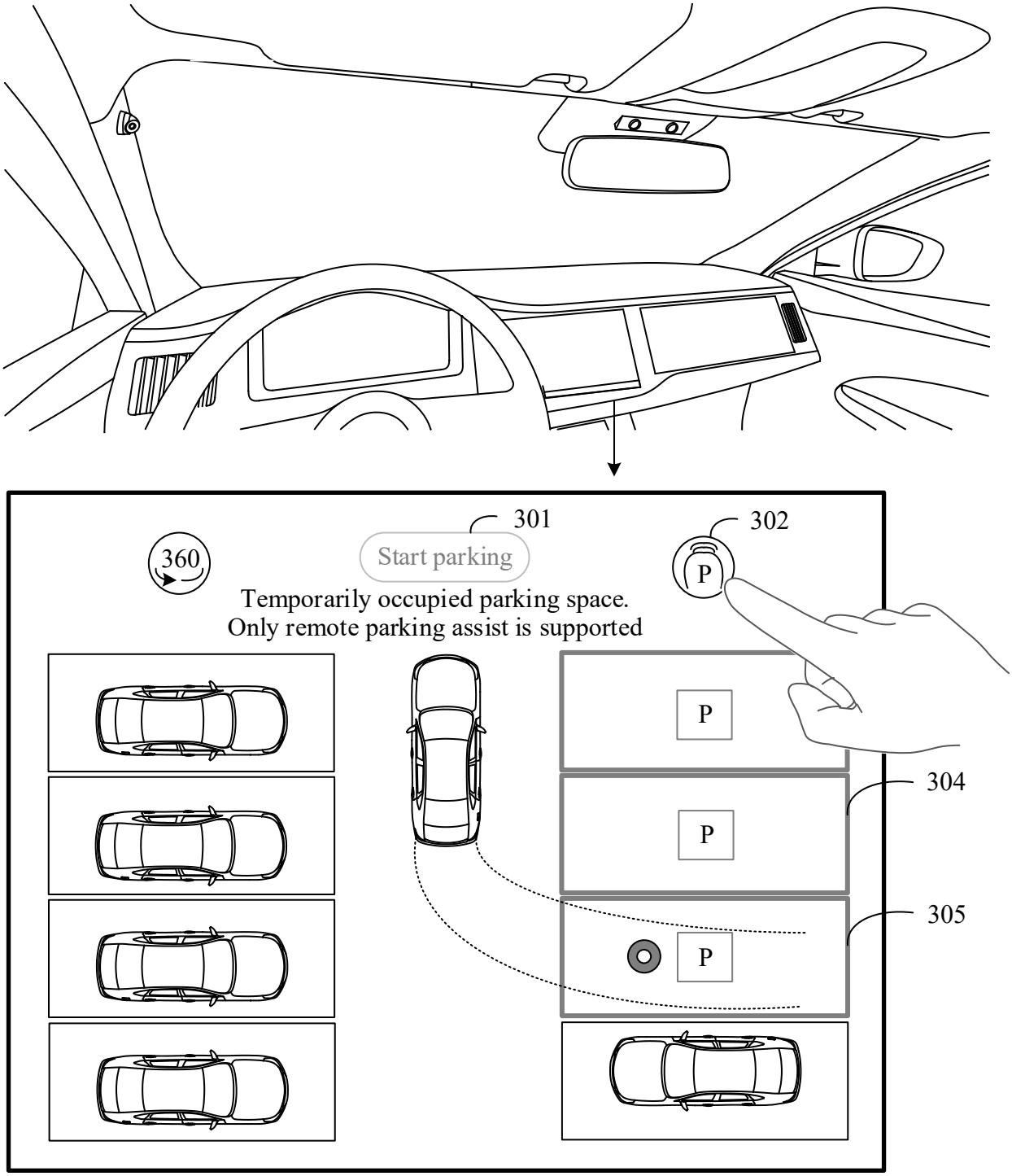

301
302
360
Start parking
P
Temporarily occupied parking space.
Only remote parking assist is supported
P
304
P
305
P

FIG. 4

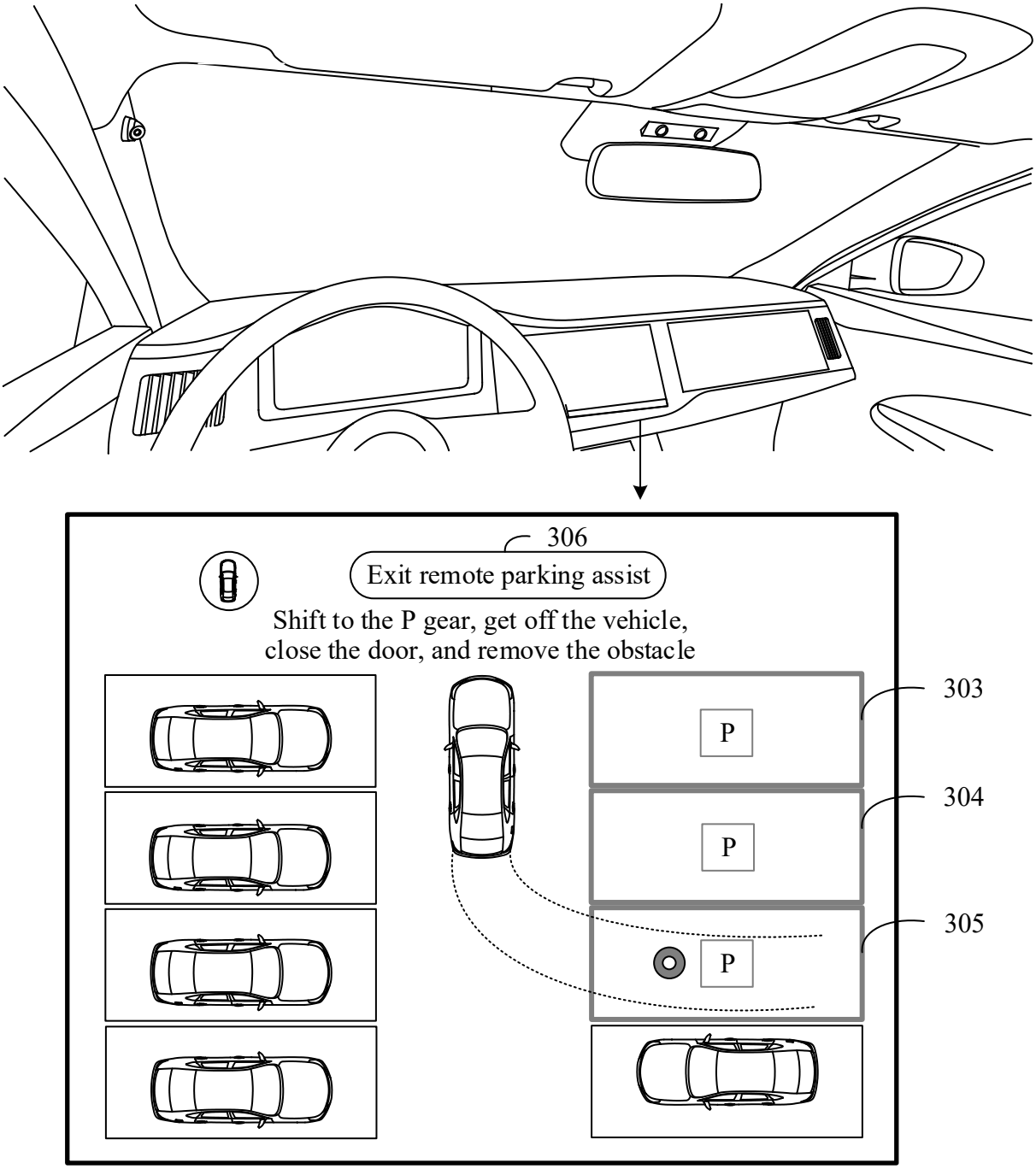

306
Exit remote parking assist
Shift to the P gear, get off the vehicle,
close the door, and remove the obstacle
303
304
305
P
P
P

FIG. 5

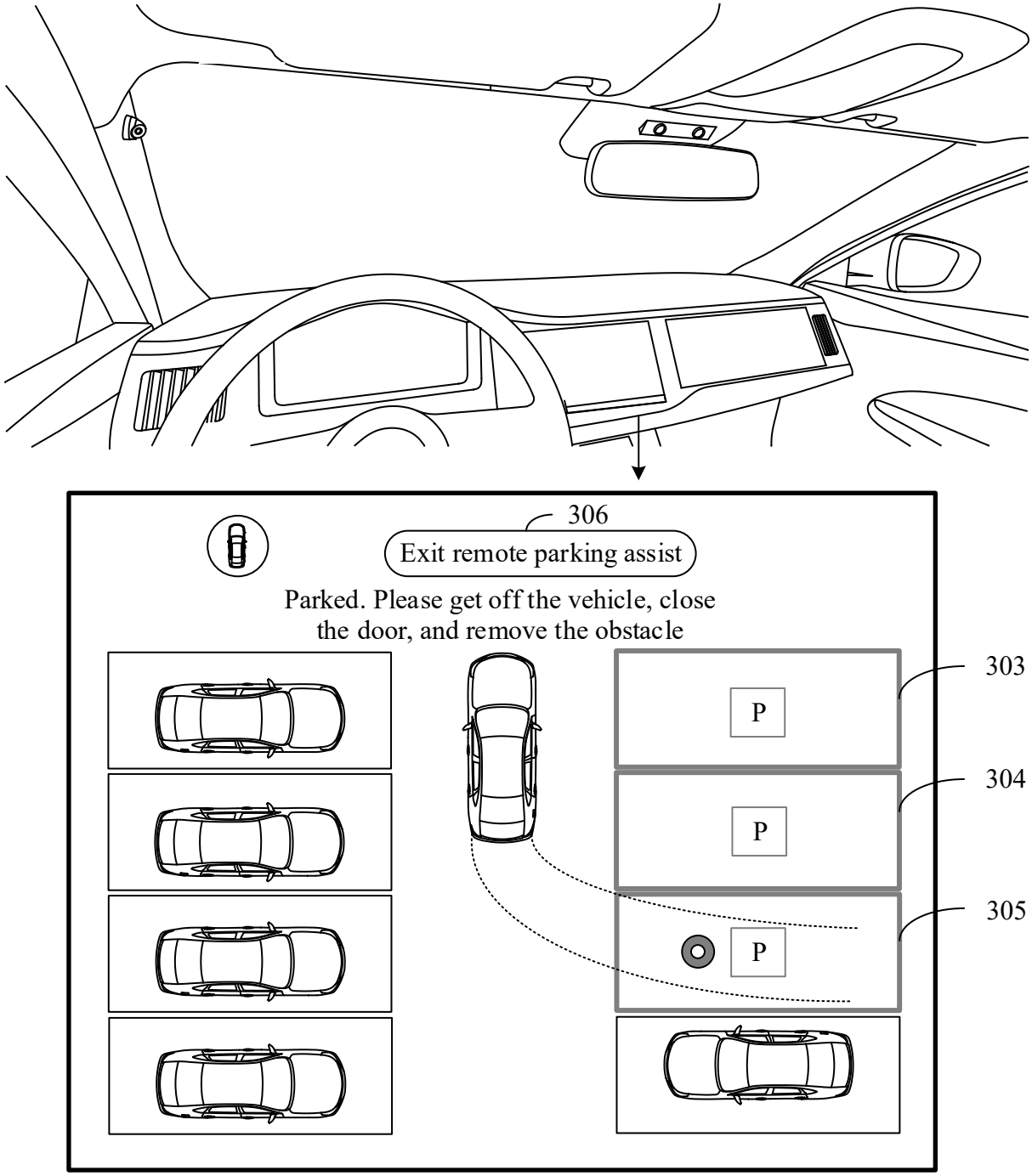

306
Exit remote parking assist
Parked. Please get off the vehicle, close the door, and remove the obstacle
303
304
305
P
P
P

FIG. 6

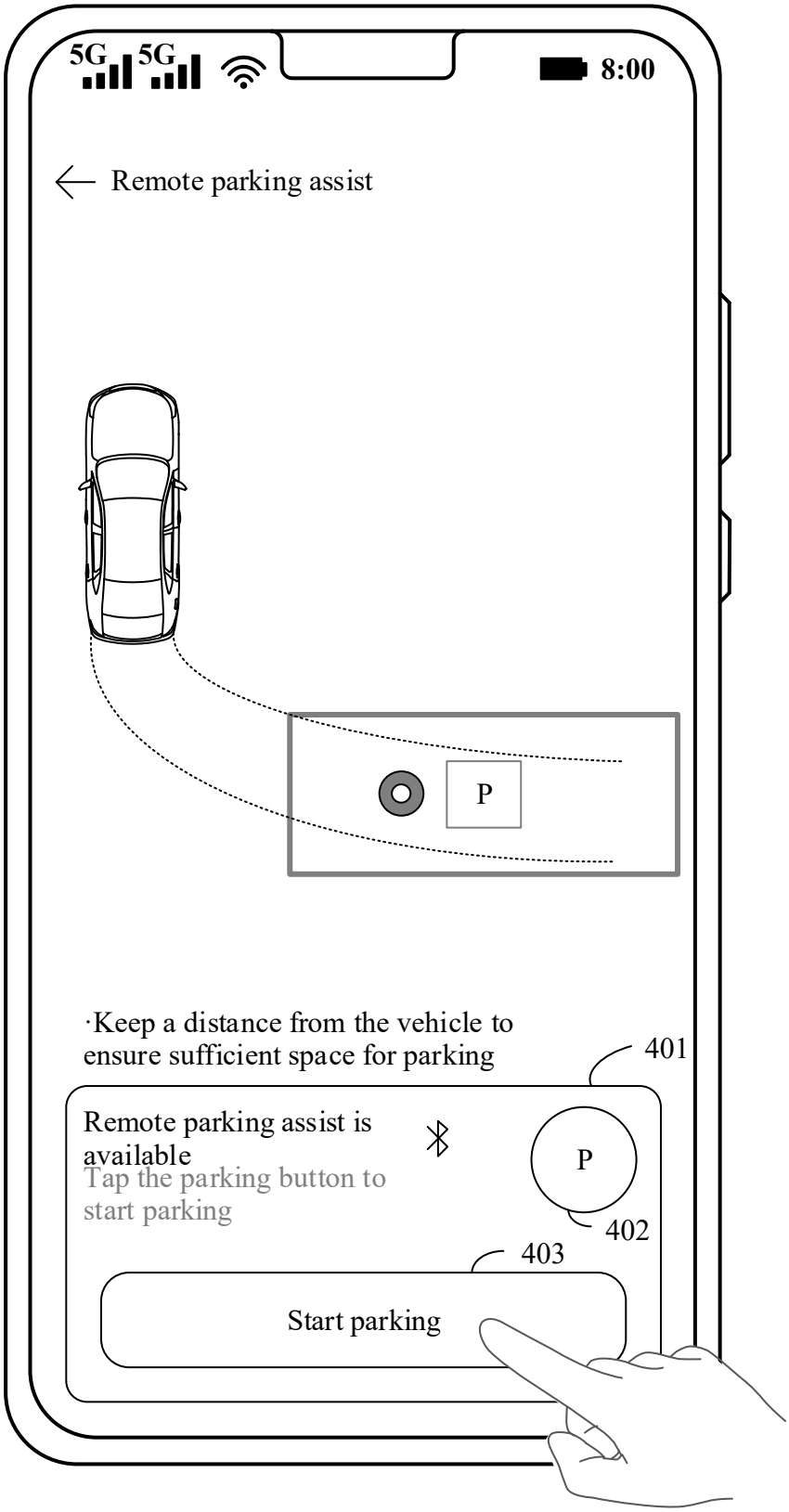

5G
5G
8:00
Remote parking assist
P
·Keep a distance from the vehicle to ensure sufficient space for parking
401
Remote parking assist is available
Tap the parking button to start parking
P
402
403
Start parking

FIG. 7

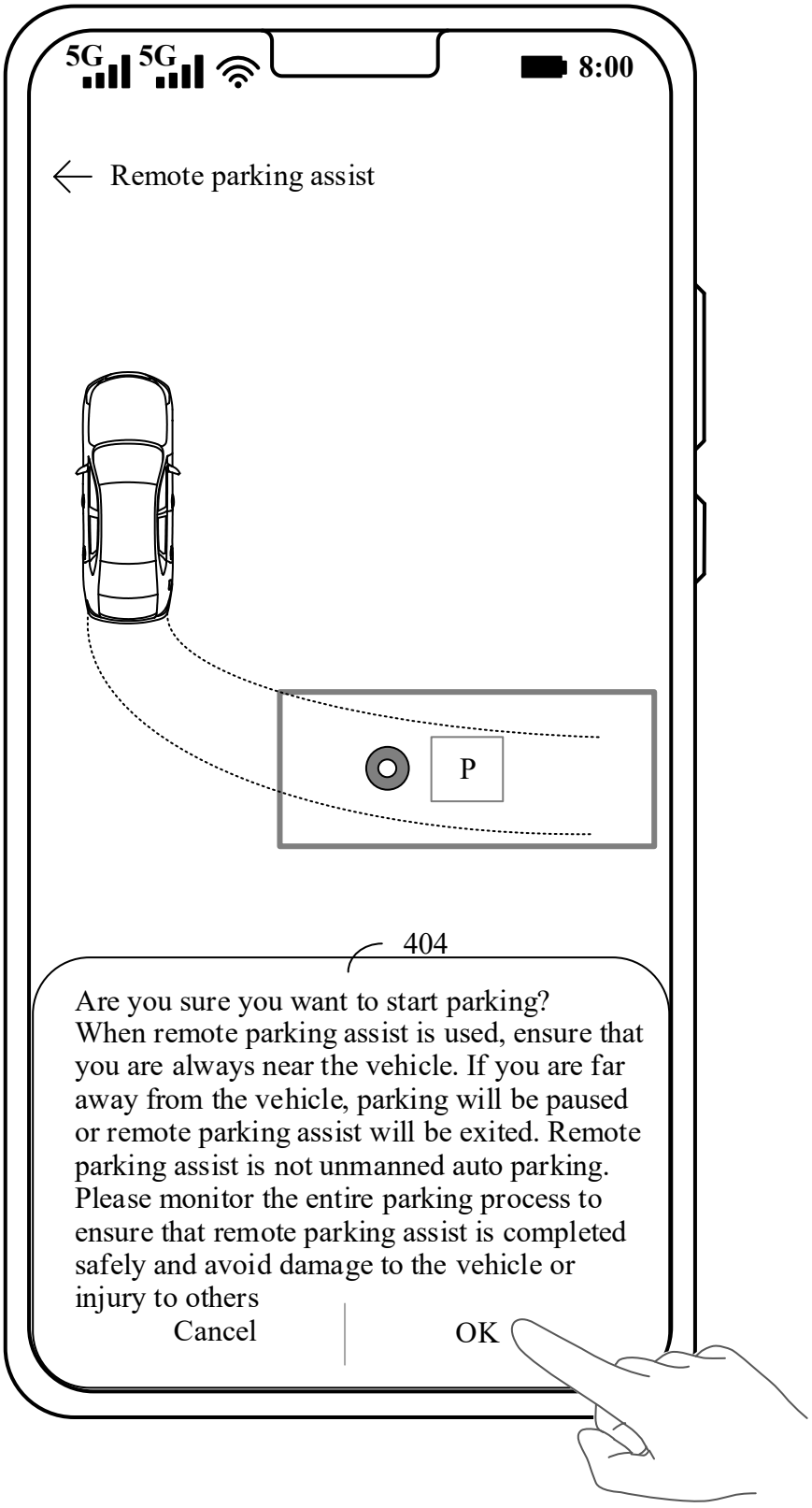

5G
5G
8:00
Remote parking assist
P
404
Are you sure you want to start parking?
When remote parking assist is used, ensure that you are always near the vehicle. If you are far away from the vehicle, parking will be paused or remote parking assist will be exited. Remote parking assist is not unmanned auto parking. Please monitor the entire parking process to ensure that remote parking assist is completed safely and avoid damage to the vehicle or injury to others
Cancel
OK

FIG. 8

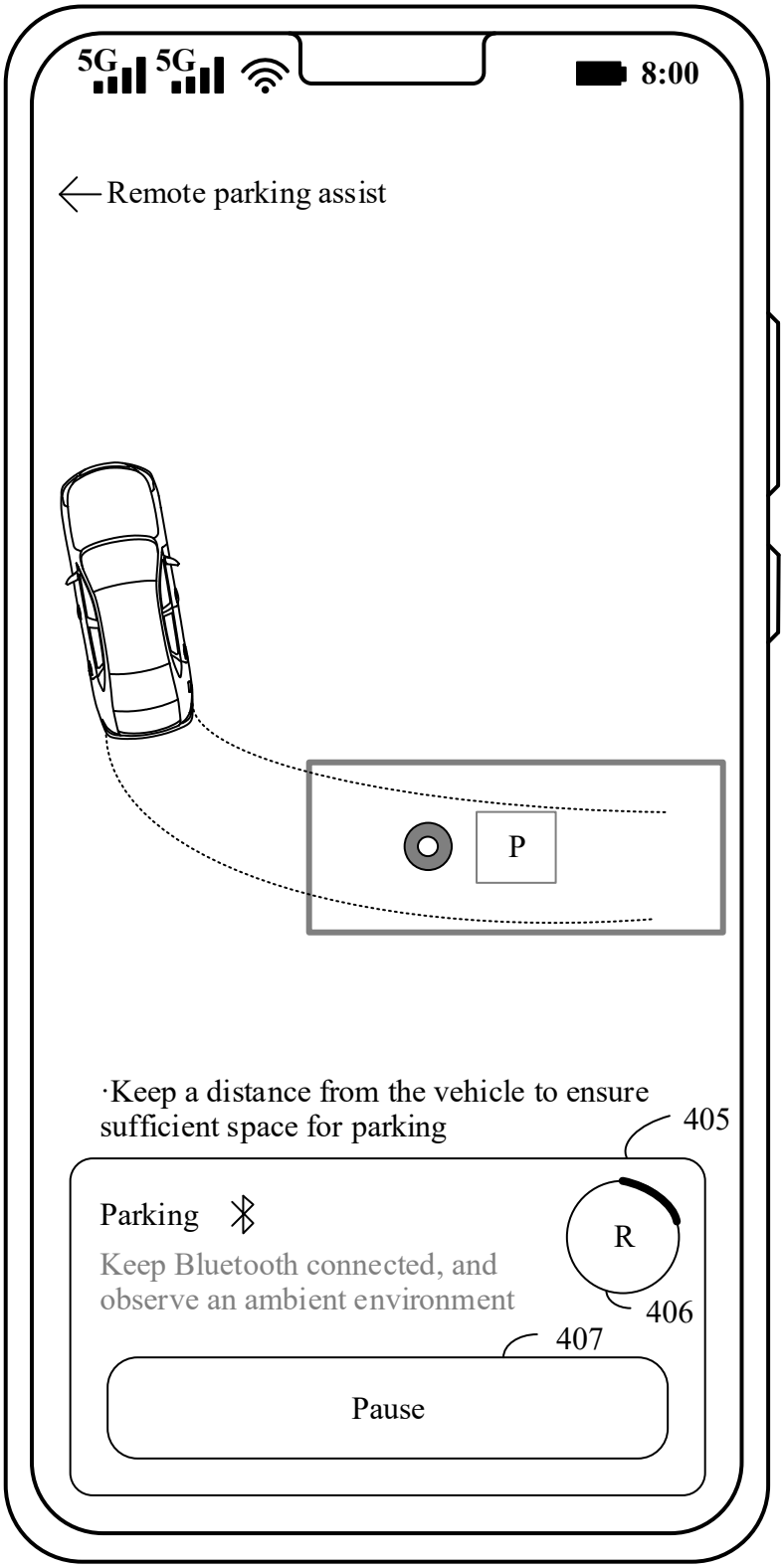

5G
5G
8:00
Remote parking assist
P
·Keep a distance from the vehicle to ensure sufficient space for parking
405
Parking
Keep Bluetooth connected, and observe an ambient environment
R
406
407
Pause

FIG. 9

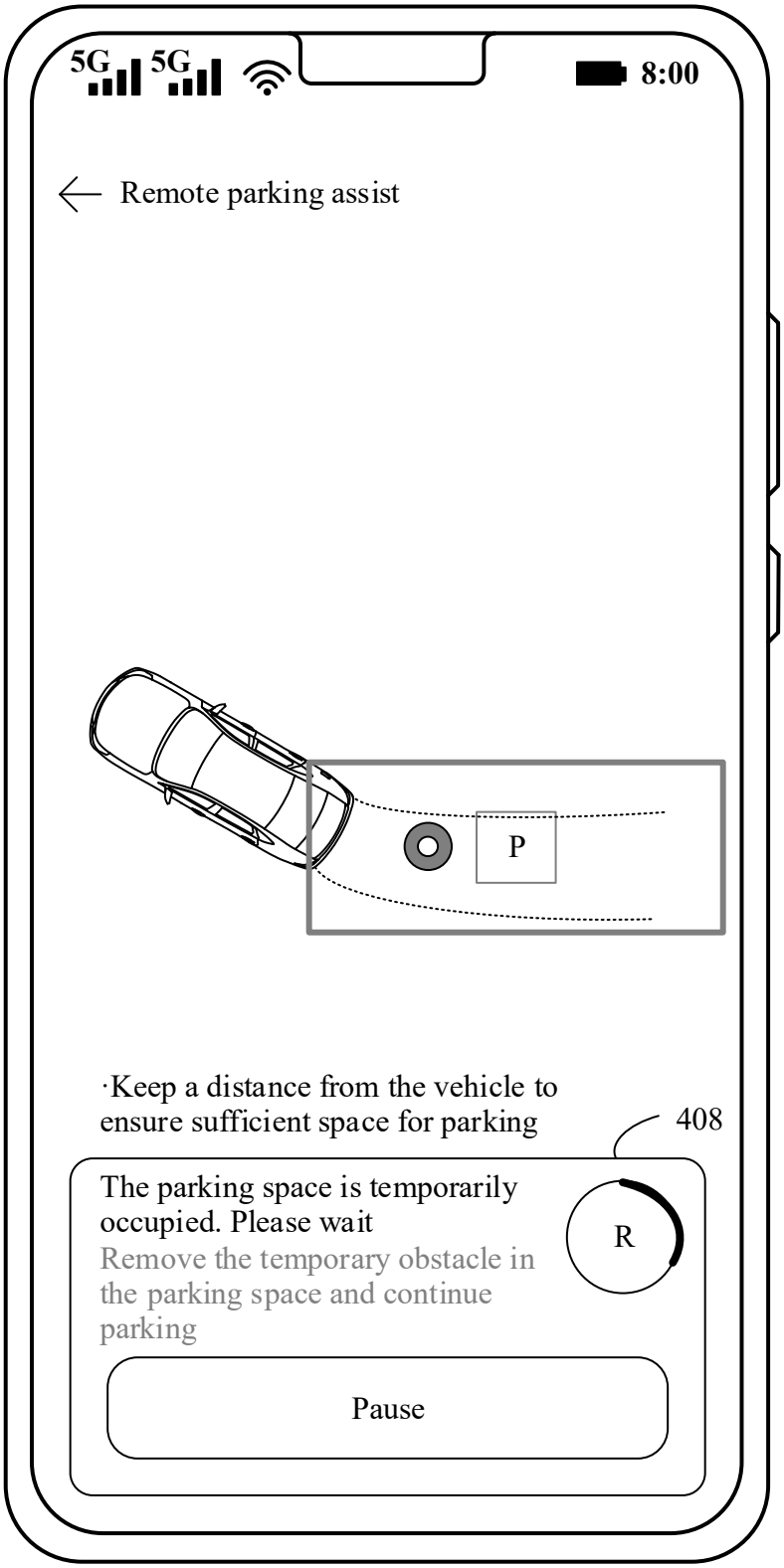

5G
5G
8:00
Remote parking assist
P
·Keep a distance from the vehicle to ensure sufficient space for parking
408
The parking space is temporarily occupied. Please wait
Remove the temporary obstacle in the parking space and continue parking
R
Pause

FIG. 10

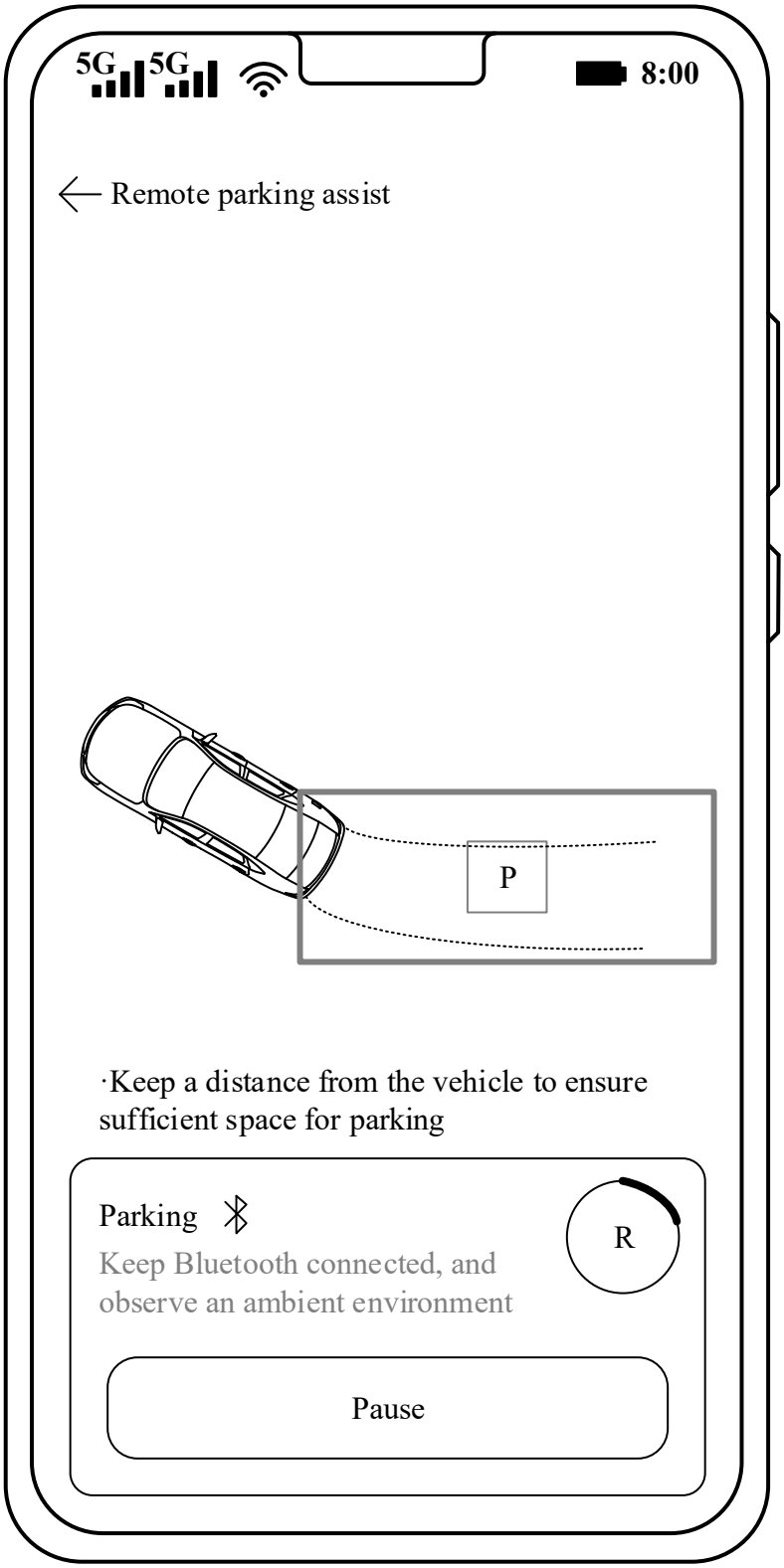

5G
5G
8:00
Remote parking assist
P
·Keep a distance from the vehicle to ensure sufficient space for parking
Parking
Keep Bluetooth connected, and observe an ambient environment
R
Pause

FIG. 11

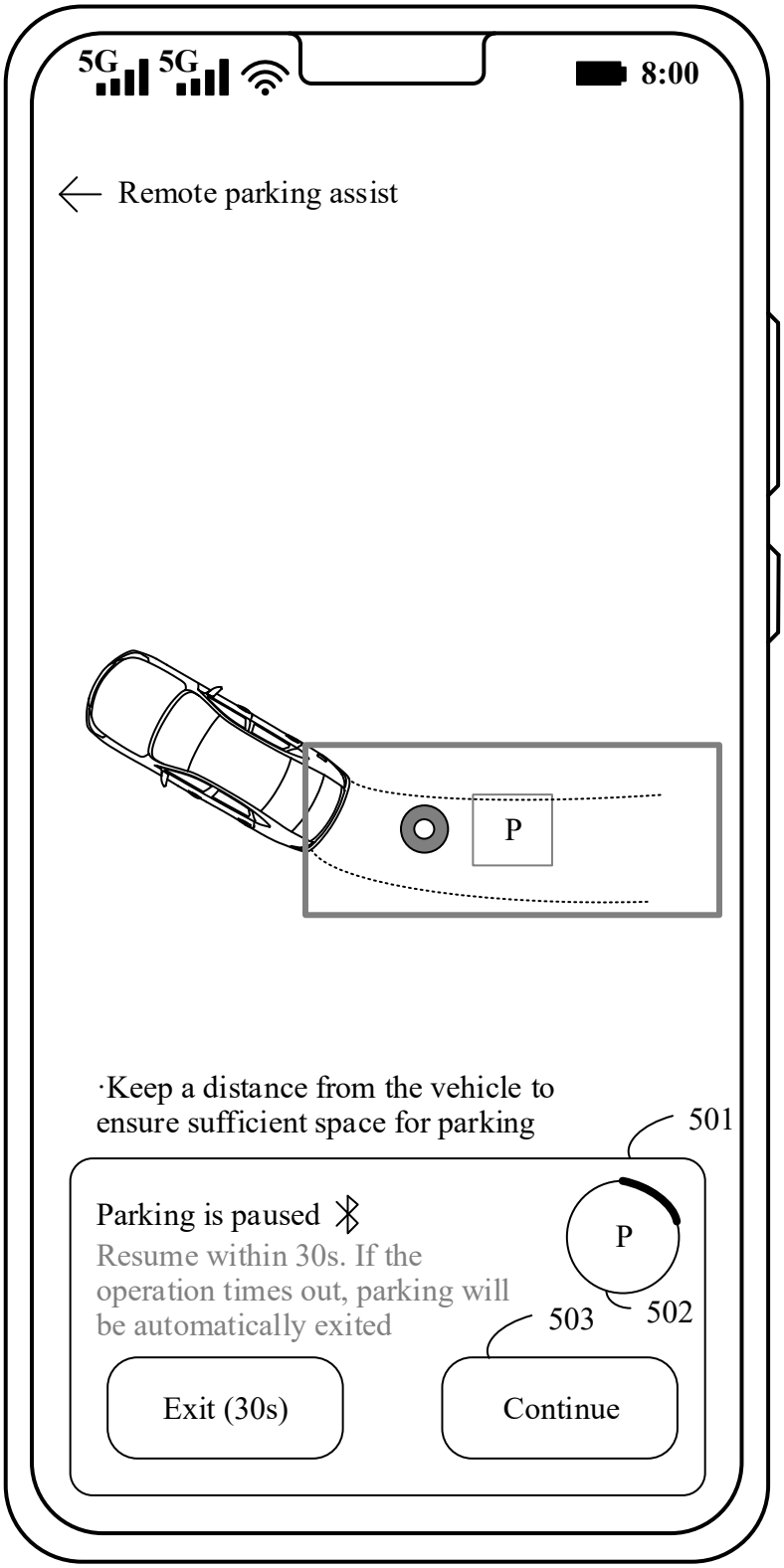

5G
5G
8:00
Remote parking assist
P
·Keep a distance from the vehicle to ensure sufficient space for parking
501
Parking is paused
Resume within 30s. If the operation times out, parking will be automatically exited
P
502
503
Exit (30s)
Continue

FIG. 12

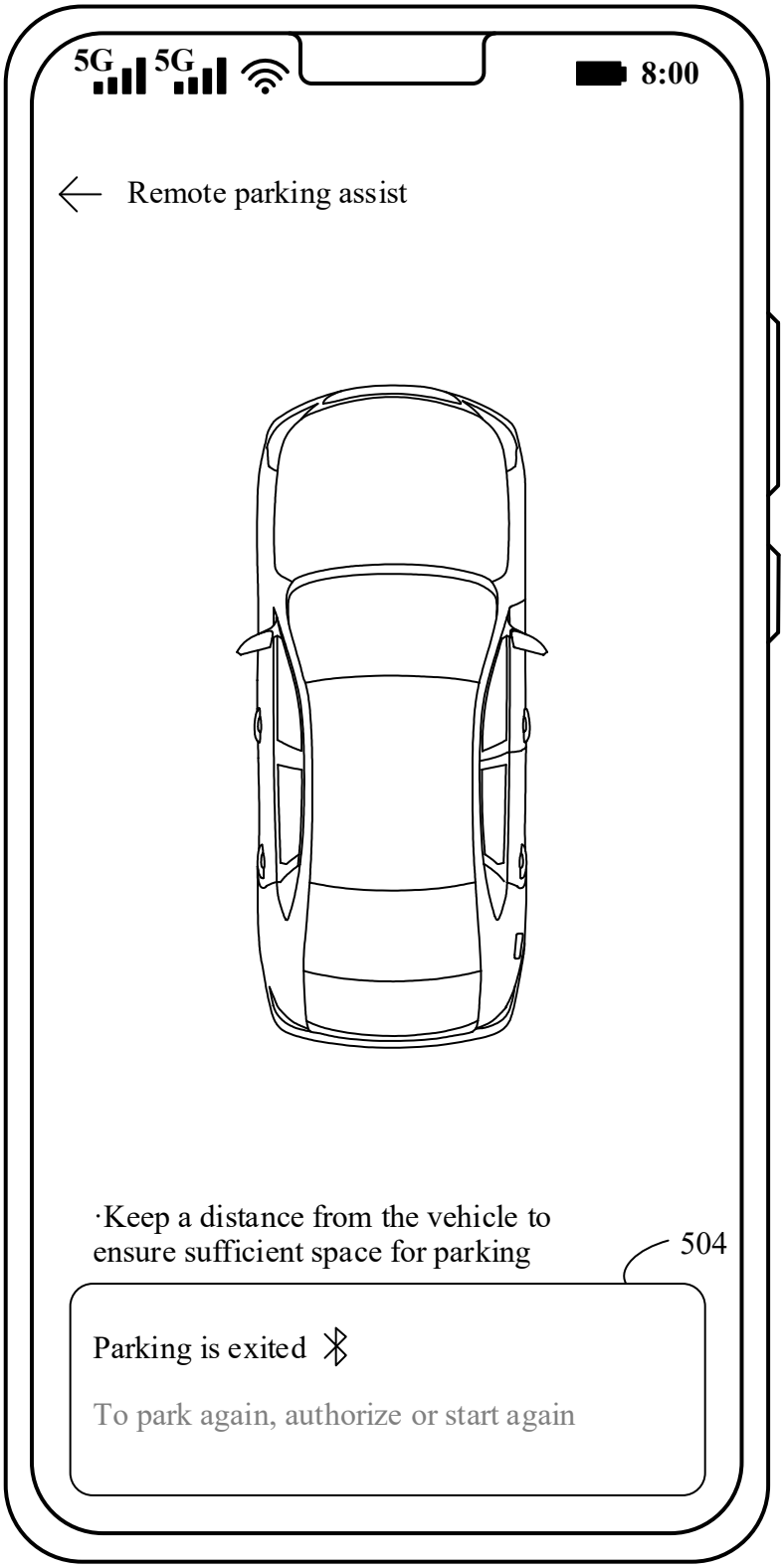

5G
5G
8:00
Remote parking assist
·Keep a distance from the vehicle to ensure sufficient space for parking
504
Parking is exited
To park again, authorize or start again

FIG. 13

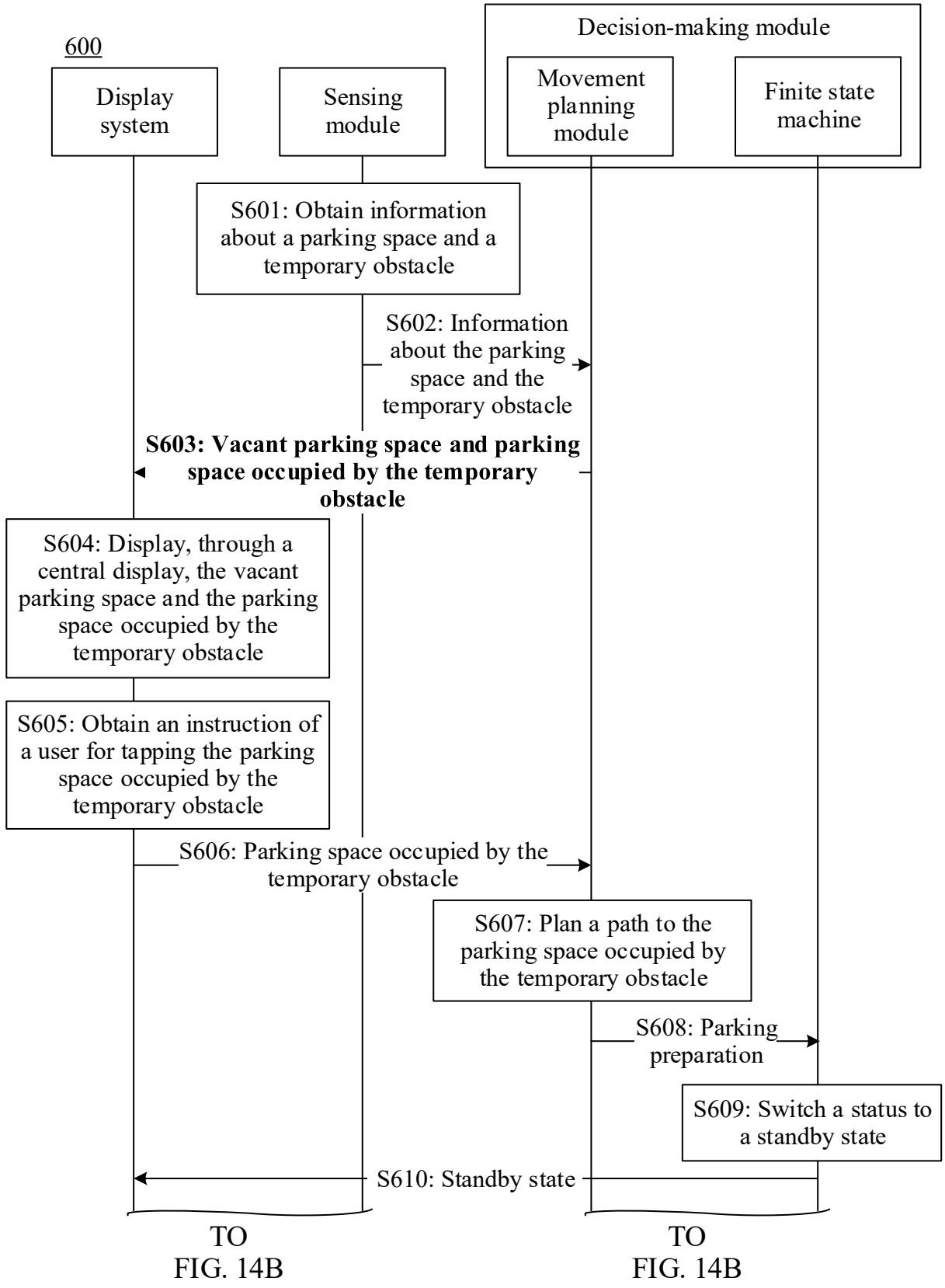

600
Display system
Sensing module
Decision-making module
Movement planning module
Finite state machine
S601: Obtain information about a parking space and a temporary obstacle
S602: Information about the parking space and the temporary obstacle
S603: Vacant parking space and parking space occupied by the temporary obstacle
S604: Display, through a central display, the vacant parking space and the parking space occupied by the temporary obstacle
S605: Obtain an instruction of a user for tapping the parking space occupied by the temporary obstacle
S606: Parking space occupied by the temporary obstacle
S607: Plan a path to the parking space occupied by the temporary obstacle
S608: Parking preparation
S609: Switch a status to a standby state
S610: Standby state
TO FIG. 14B
TO FIG. 14B

FIG. 14A

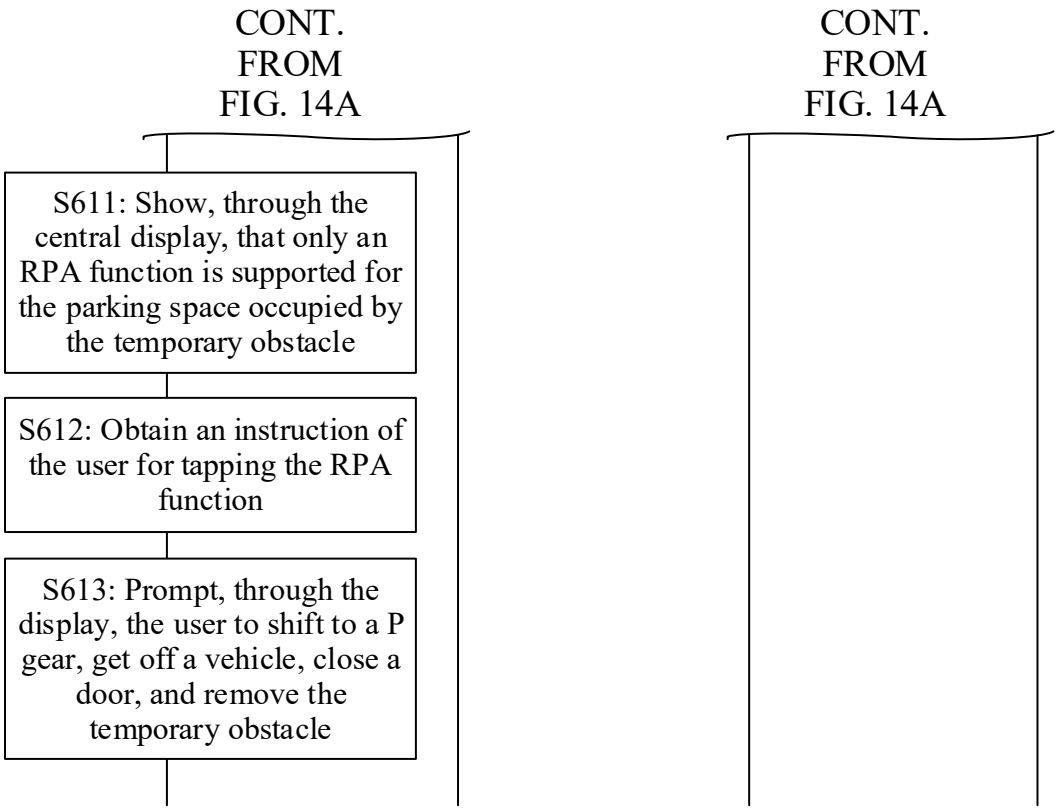

CONT. FROM FIG. 14A
CONT. FROM FIG. 14A
S611: Show, through the central display, that only an RPA function is supported for the parking space occupied by the temporary obstacle
S612: Obtain an instruction of the user for tapping the RPA function
S613: Prompt, through the display, the user to shift to a P gear, get off a vehicle, close a door, and remove the temporary obstacle

FIG. 14B

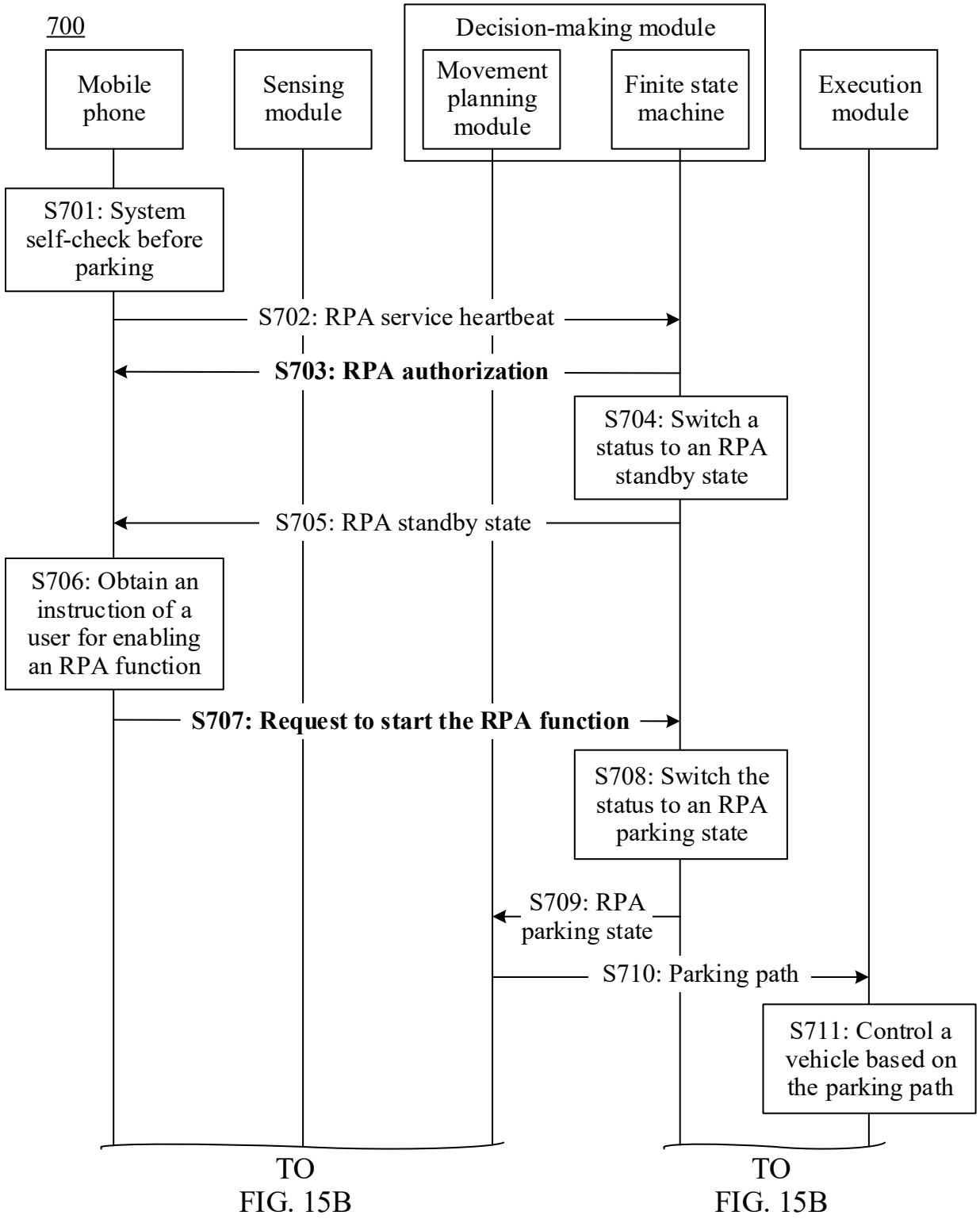

700
Mobile phone
Sensing module
Decision-making module
Movement planning module
Finite state machine
Execution module
S701: System self-check before parking
S702: RPA service heartbeat
S703: RPA authorization
S704: Switch a status to an RPA standby state
S705: RPA standby state
S706: Obtain an instruction of a user for enabling an RPA function
S707: Request to start the RPA function
S708: Switch the status to an RPA parking state
S709: RPA parking state
S710: Parking path
S711: Control a vehicle based on the parking path
TO FIG. 15B
TO FIG. 15B

FIG. 15A

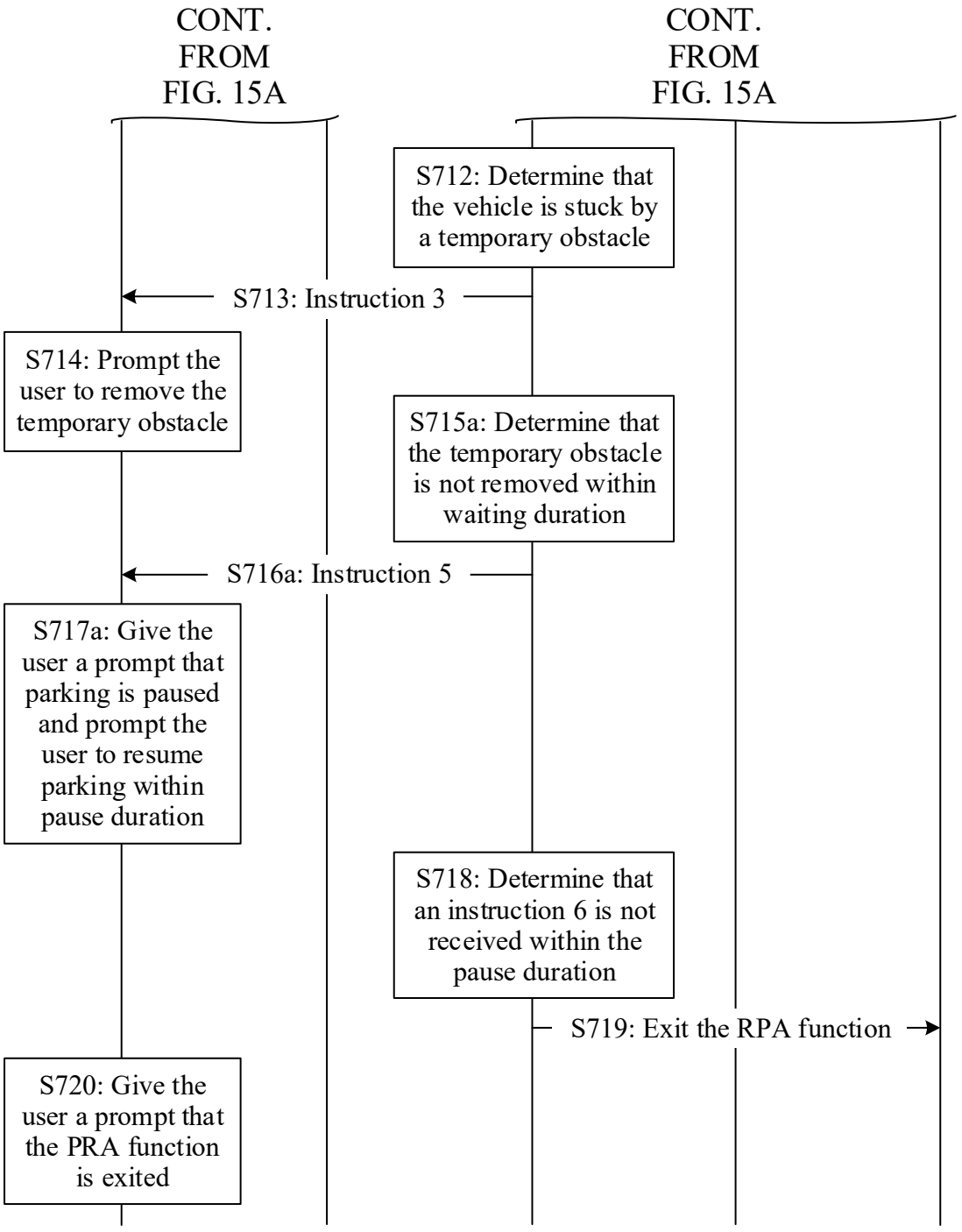

CONT. FROM FIG. 15A
CONT. FROM FIG. 15A
S712: Determine that the vehicle is stuck by a temporary obstacle
S713: Instruction 3
S714: Prompt the user to remove the temporary obstacle
S715a: Determine that the temporary obstacle is not removed within waiting duration
S716a: Instruction 5
S717a: Give the user a prompt that parking is paused and prompt the user to resume parking within pause duration
S718: Determine that an instruction 6 is not received within the pause duration
S719: Exit the RPA function
S720: Give the user a prompt that the PRA function is exited

FIG. 15B

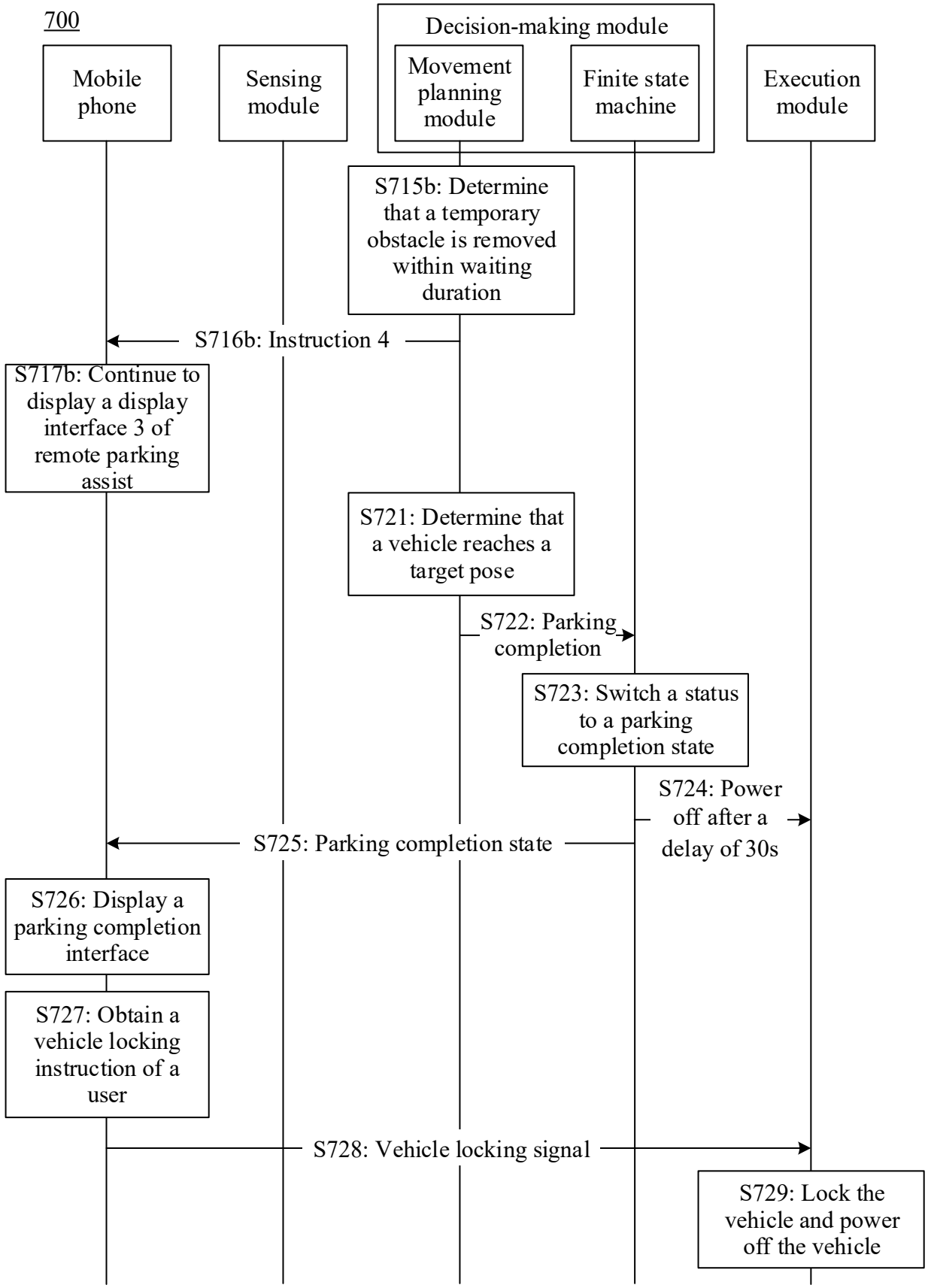

700
Mobile phone
Sensing module
Decision-making module
Movement planning module
Finite state machine
Execution module
S715b: Determine that a temporary obstacle is removed within waiting duration
S716b: Instruction 4
S717b: Continue to display a display interface 3 of remote parking assist
S721: Determine that a vehicle reaches a target pose
S722: Parking completion
S723: Switch a status to a parking completion state
S724: Power off after a delay of 30s
S725: Parking completion state
S726: Display a parking completion interface
S727: Obtain a vehicle locking instruction of a user
S728: Vehicle locking signal
S729: Lock the vehicle and power off the vehicle

FIG. 16

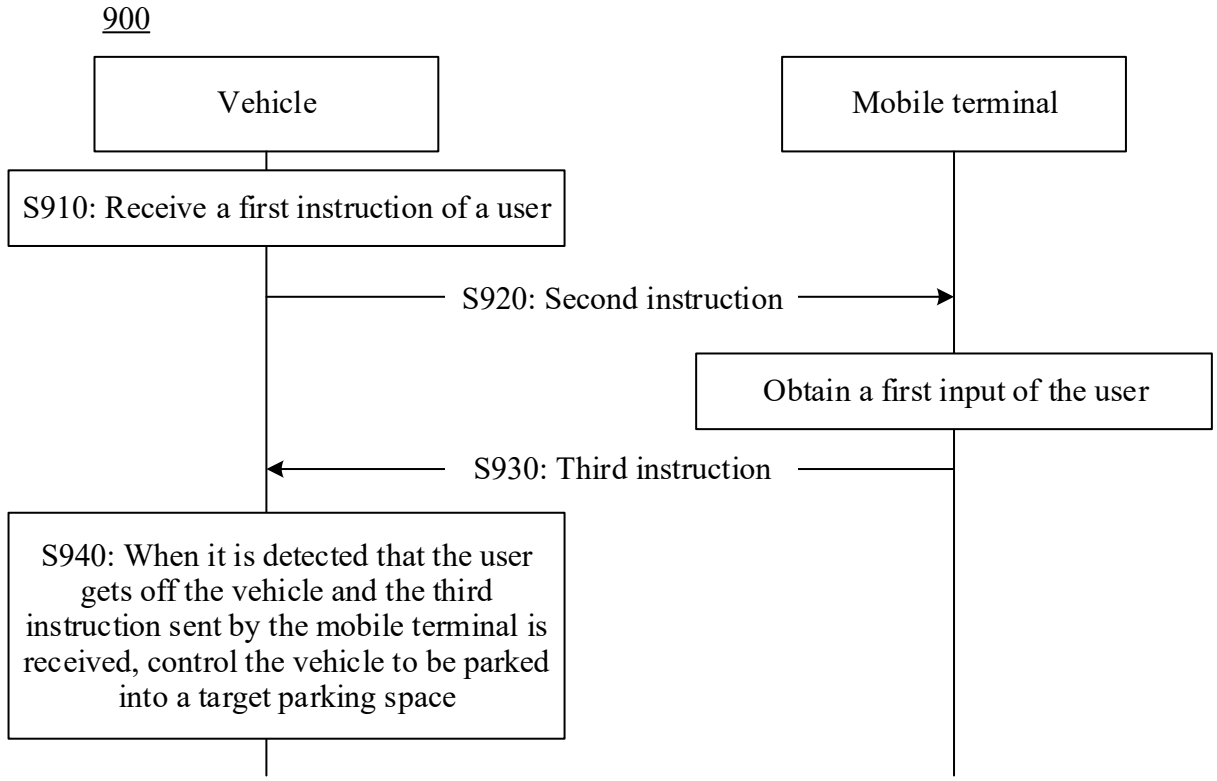

900
Vehicle
Mobile terminal
S910: Receive a first instruction of a user
S920: Second instruction
Obtain a first input of the user
S930: Third instruction
S940: When it is detected that the user gets off the vehicle and the third instruction sent by the mobile terminal is received, control the vehicle to be parked into a target parking space

FIG. 17

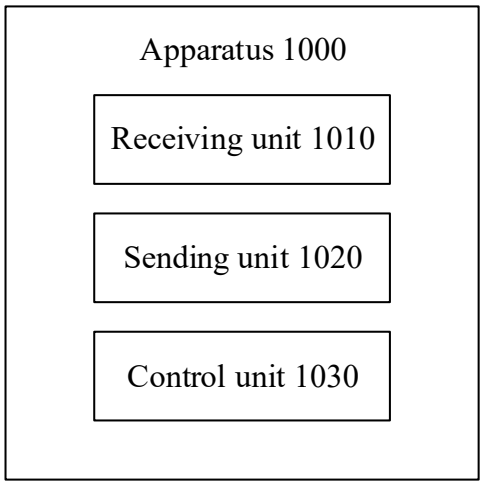

Apparatus 1000
Receiving unit 1010
Sending unit 1020
Control unit 1030

FIG. 18

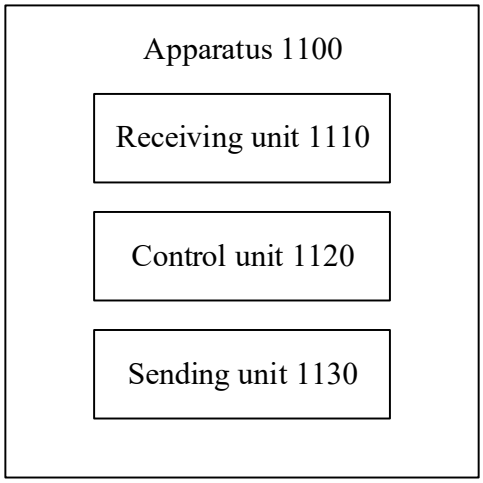

Apparatus 1100
Receiving unit 1110
Control unit 1120
Sending unit 1130

FIG. 19

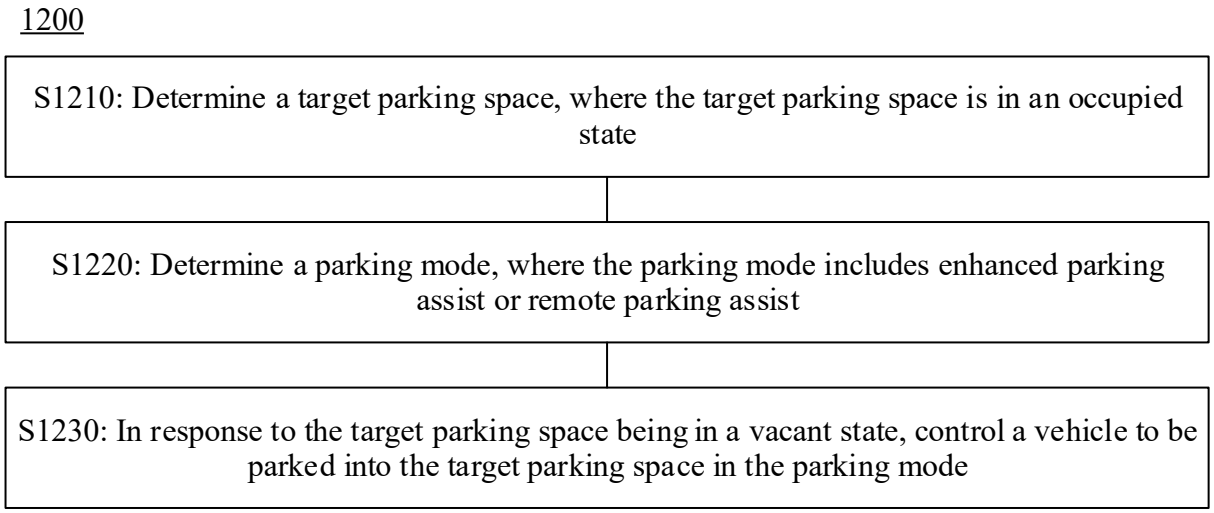

1200
S1210: Determine a target parking space, where the target parking space is in an occupied state
S1220: Determine a parking mode, where the parking mode includes enhanced parking assist or remote parking assist
S1230: In response to the target parking space being in a vacant state, control a vehicle to be parked into the target parking space in the parking mode

FIG. 20

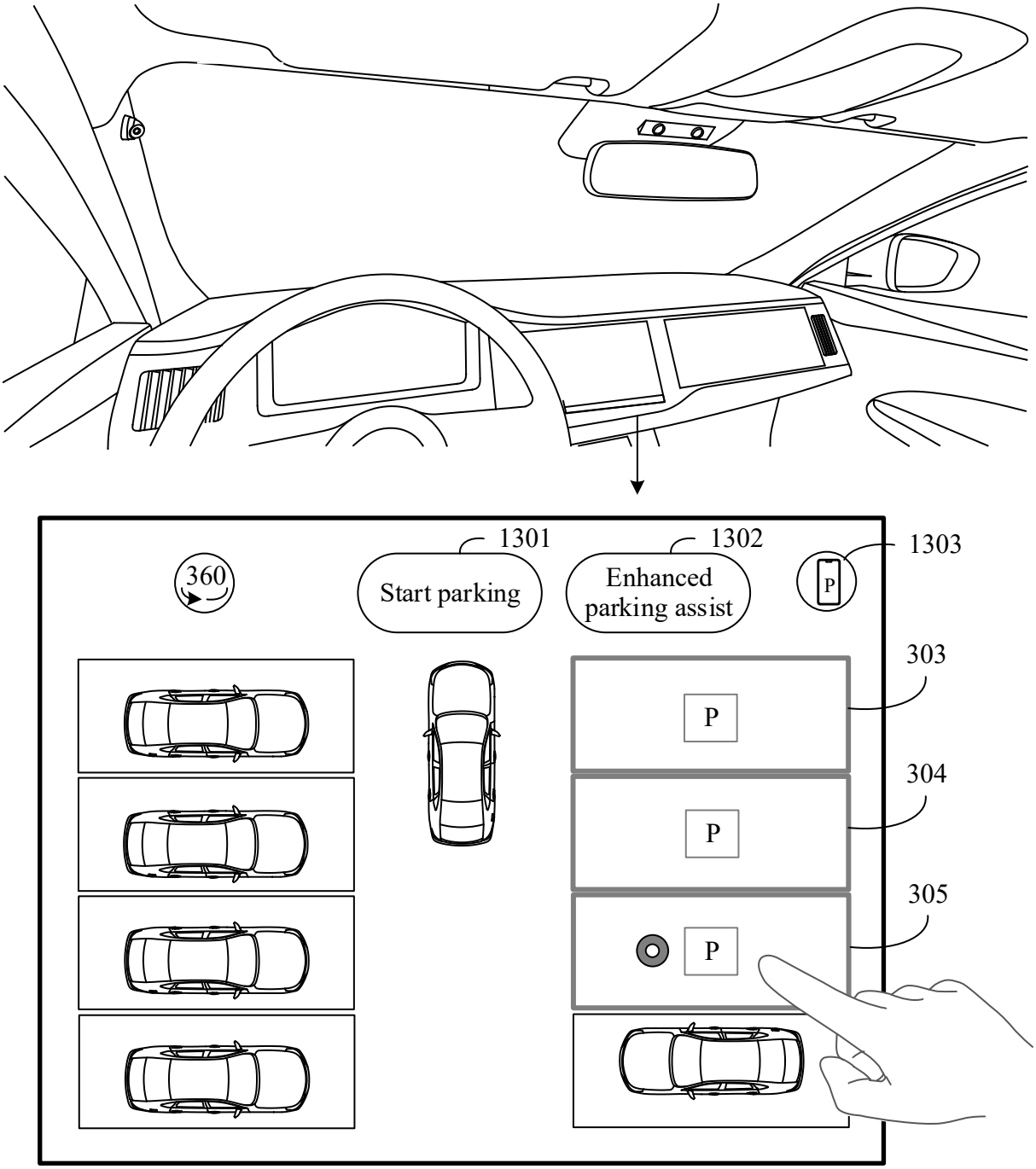

360
1301
Start parking
1302
Enhanced parking assist
1303
P
303
304
305
P
P
P

FIG. 21

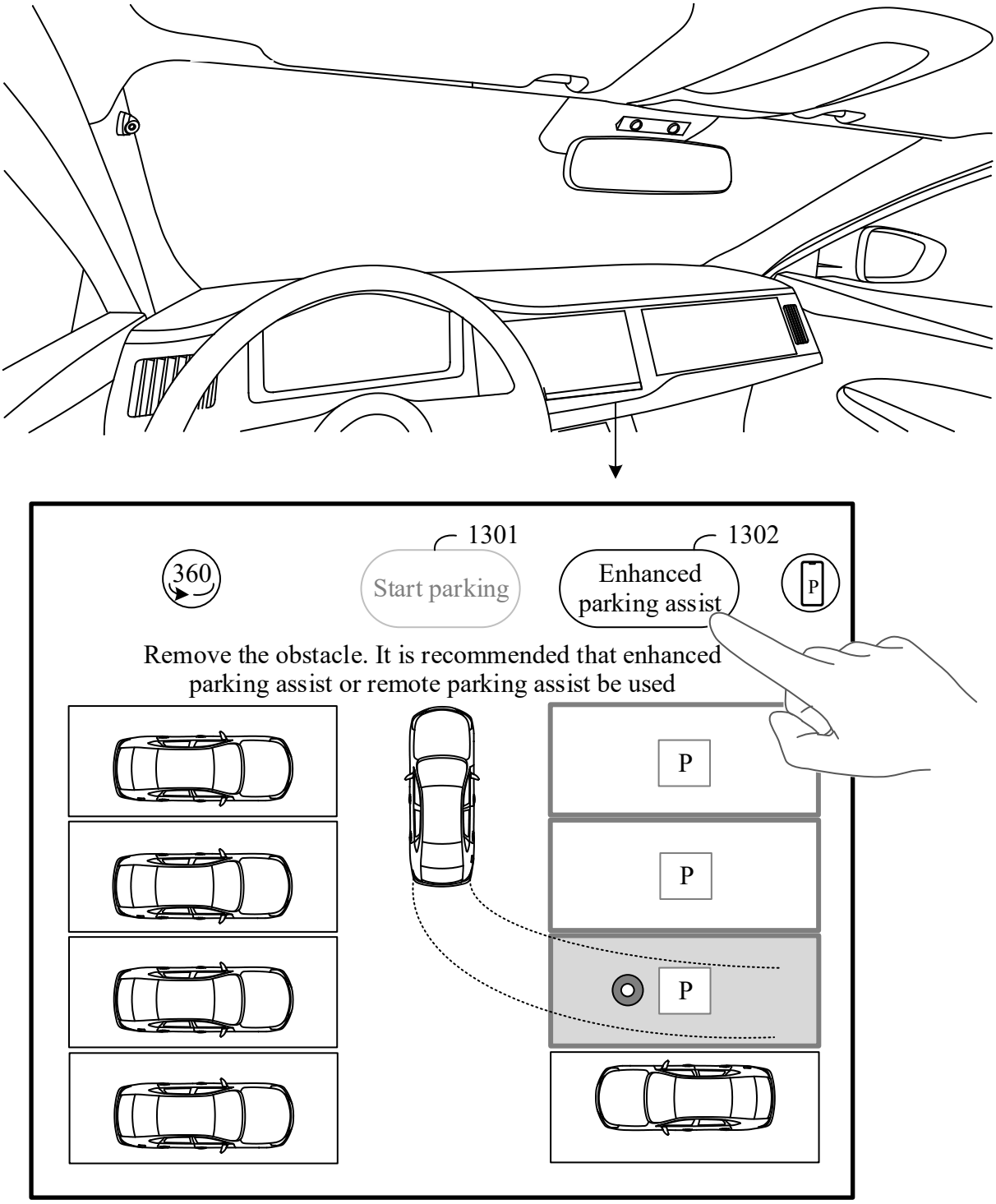
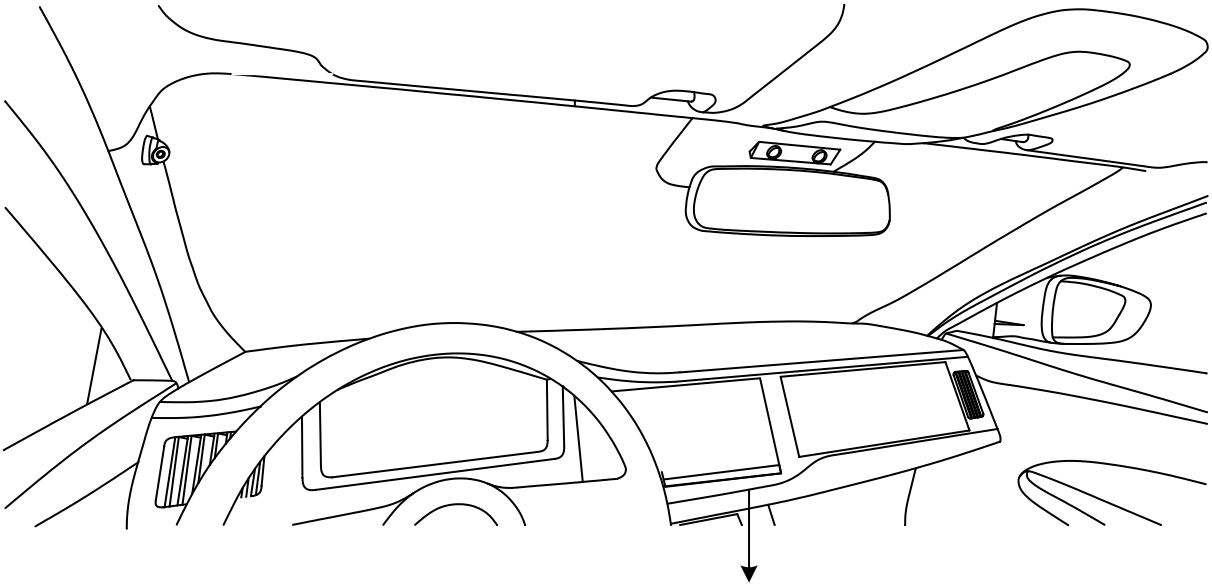

1301
1302
360
Start parking
Enhanced parking assist
P
Remove the obstacle. It is recommended that enhanced parking assist or remote parking assist be used
P
P
P

FIG. 22



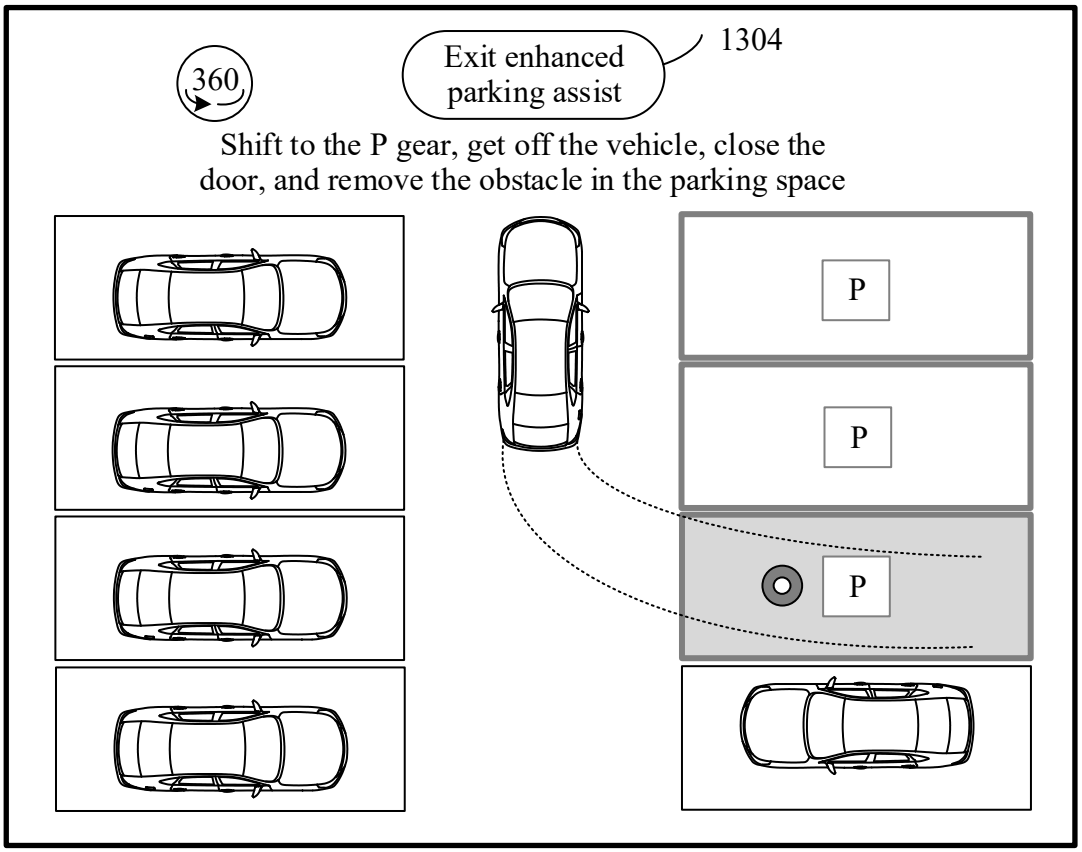

360
Exit enhanced parking assist
1304
Shift to the P gear, get off the vehicle, close the door, and remove the obstacle in the parking space
P
P
P

FIG. 23

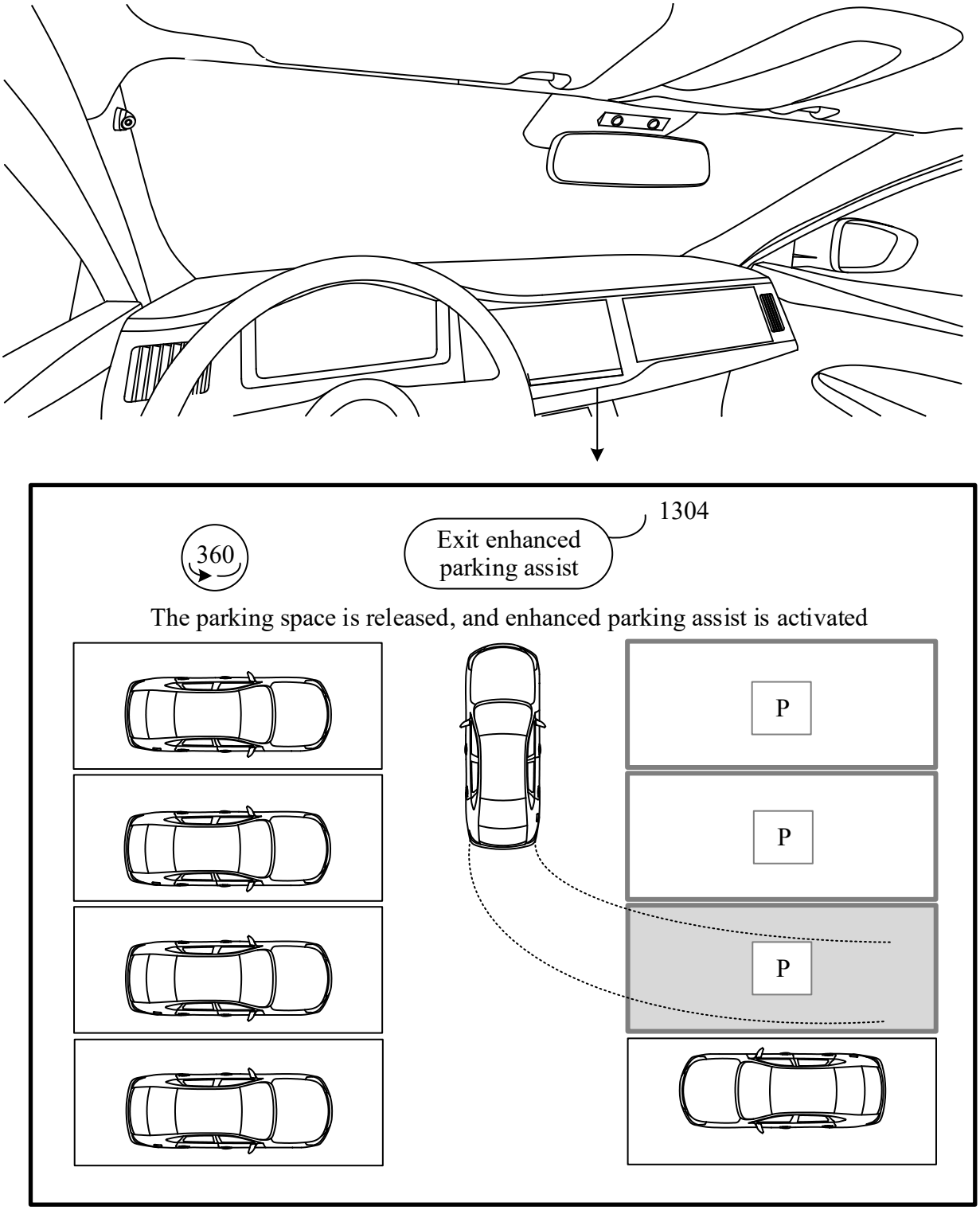

1304
360
Exit enhanced parking assist
The parking space is released, and enhanced parking assist is activated
P
P
P

FIG. 24

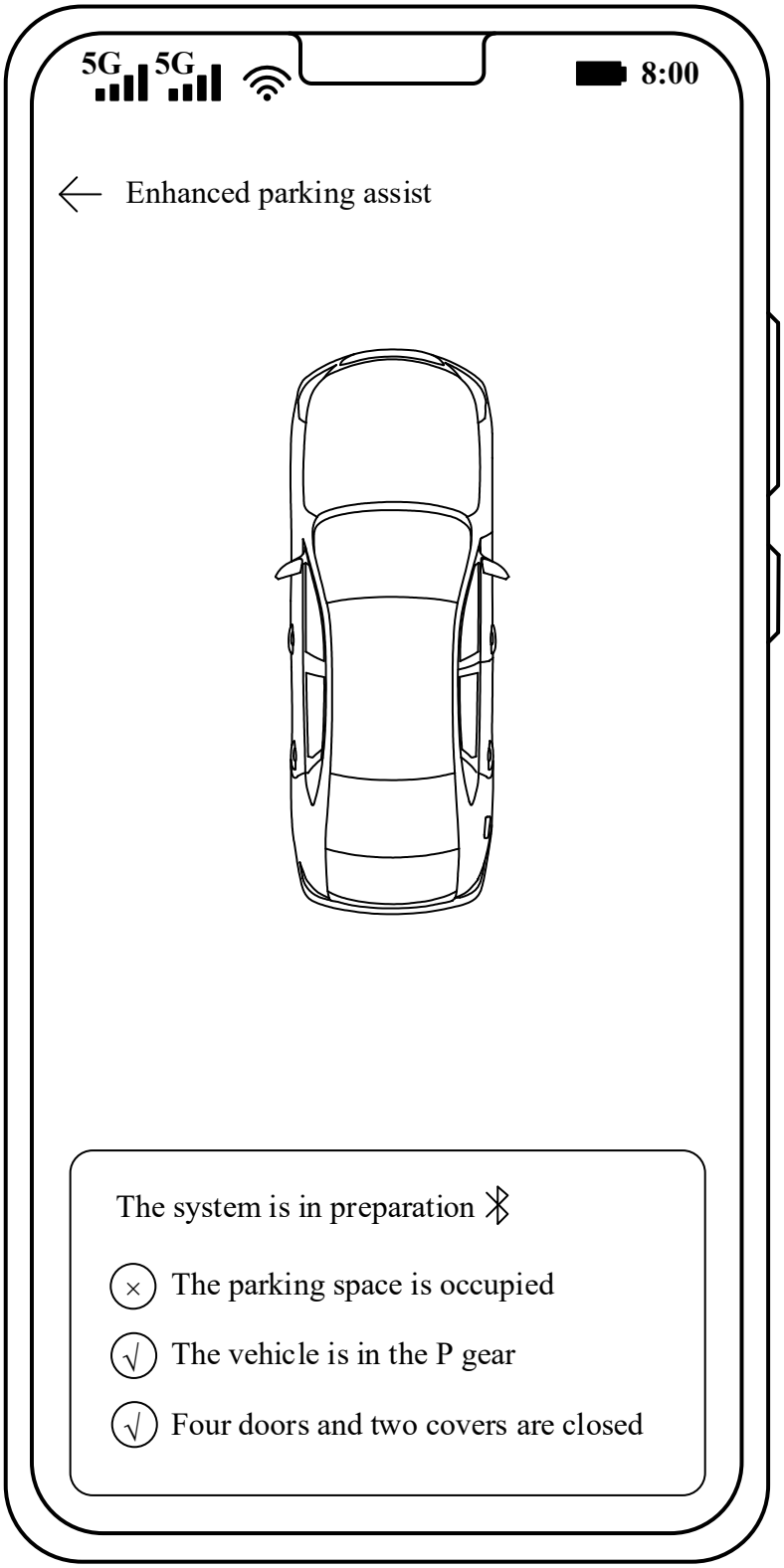

5G 5G
8:00
Enhanced parking assist
The system is in preparation
The parking space is occupied
The vehicle is in the P gear
Four doors and two covers are closed

FIG. 25

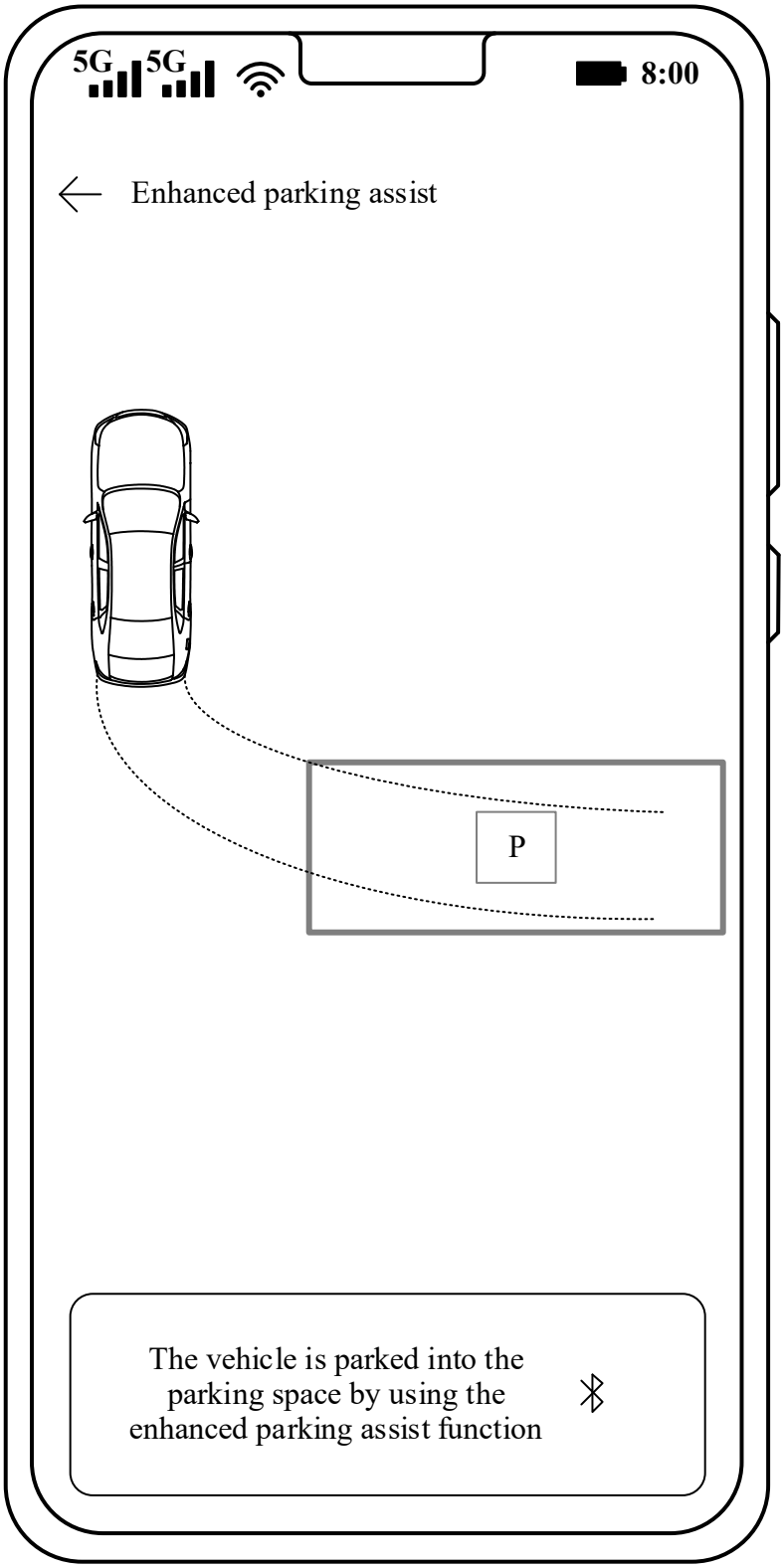

5G
5G
8:00
Enhanced parking assist
P
The vehicle is parked into the parking space by using the enhanced parking assist function

FIG. 26

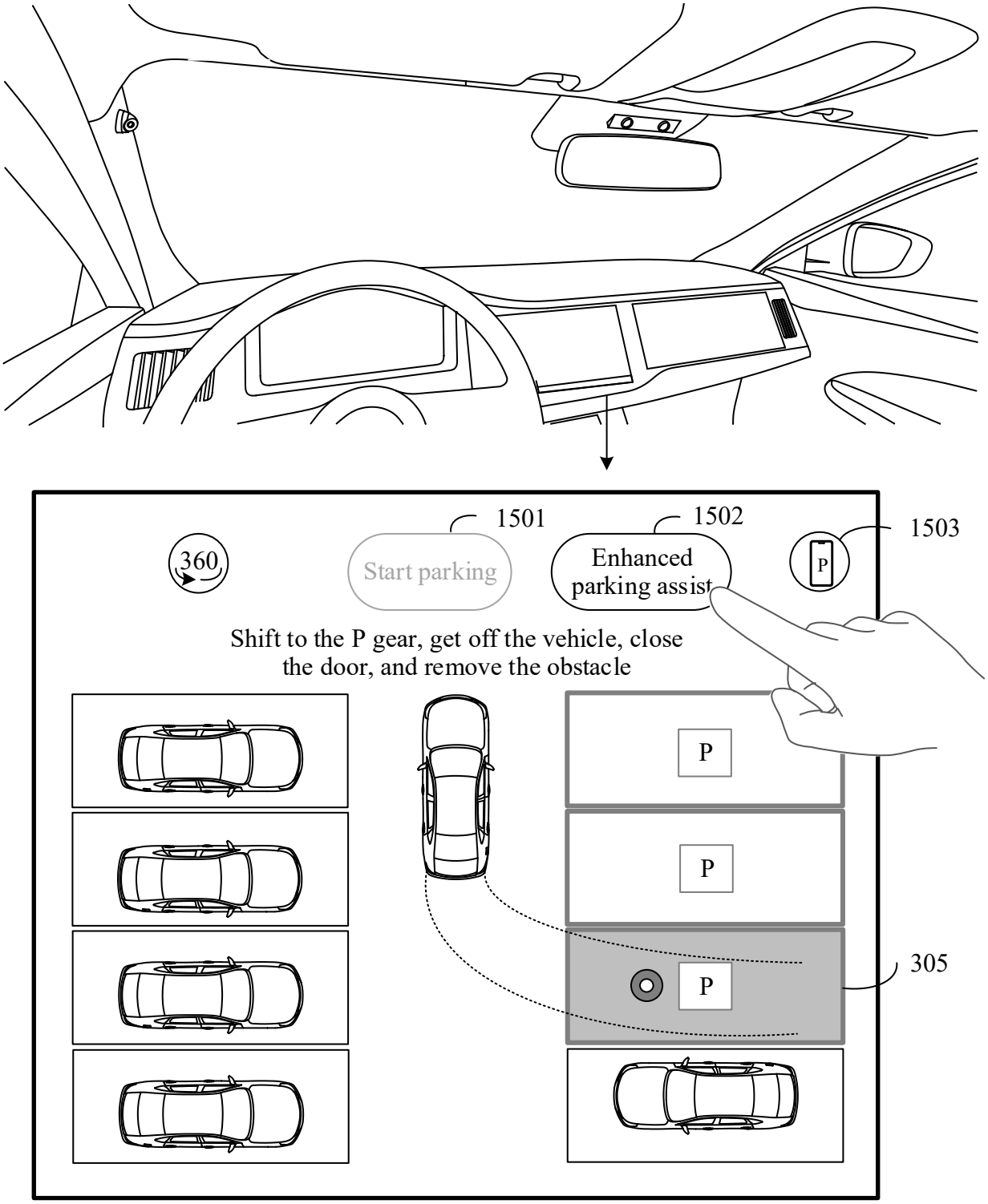

1501
1502
1503
360
Start parking
Enhanced parking assist
P
Shift to the P gear, get off the vehicle, close the door, and remove the obstacle
P
P
P
305

FIG. 27

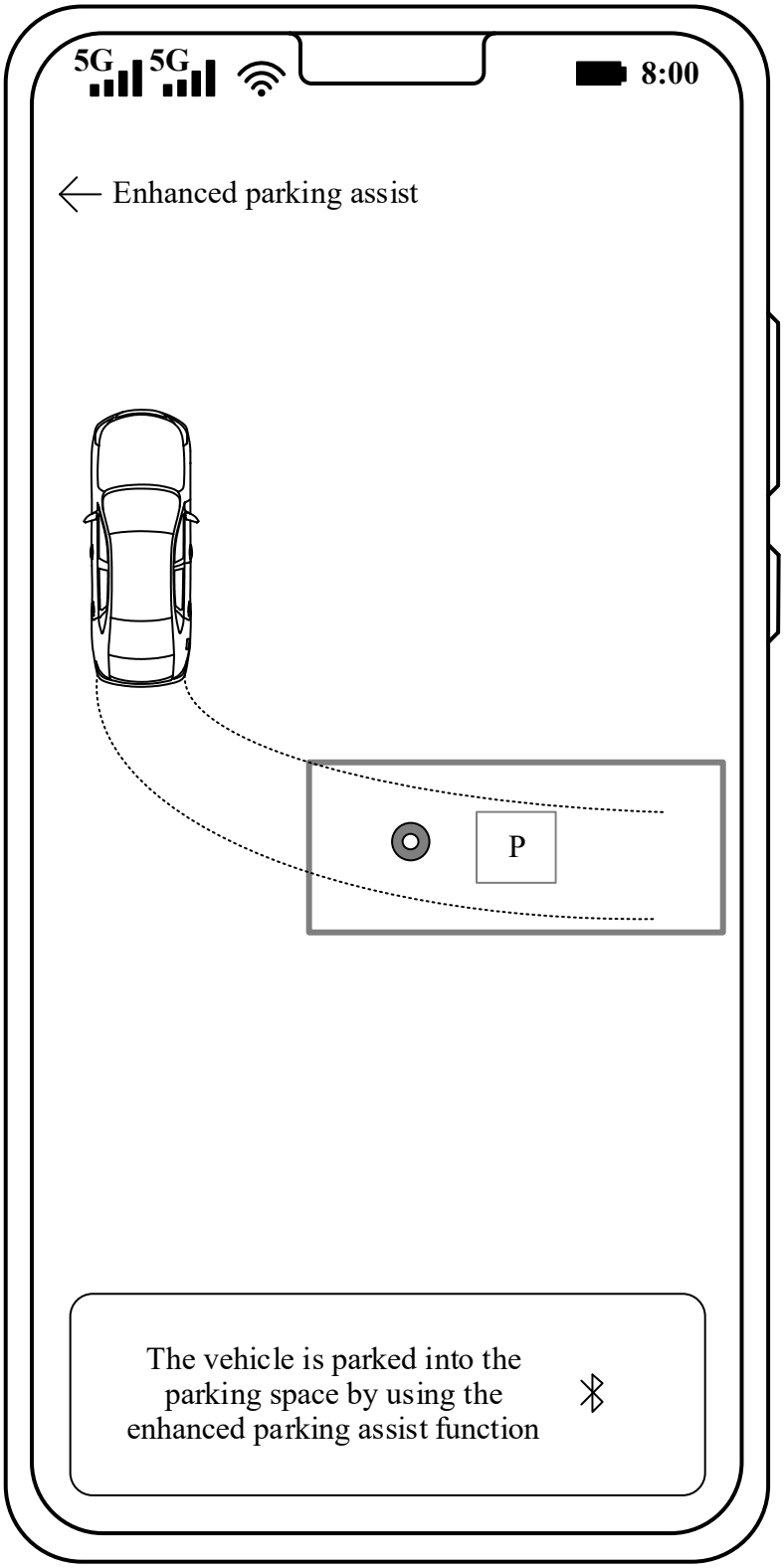

5G
5G
8:00
Enhanced parking assist
P
The vehicle is parked into the parking space by using the enhanced parking assist function

FIG. 28

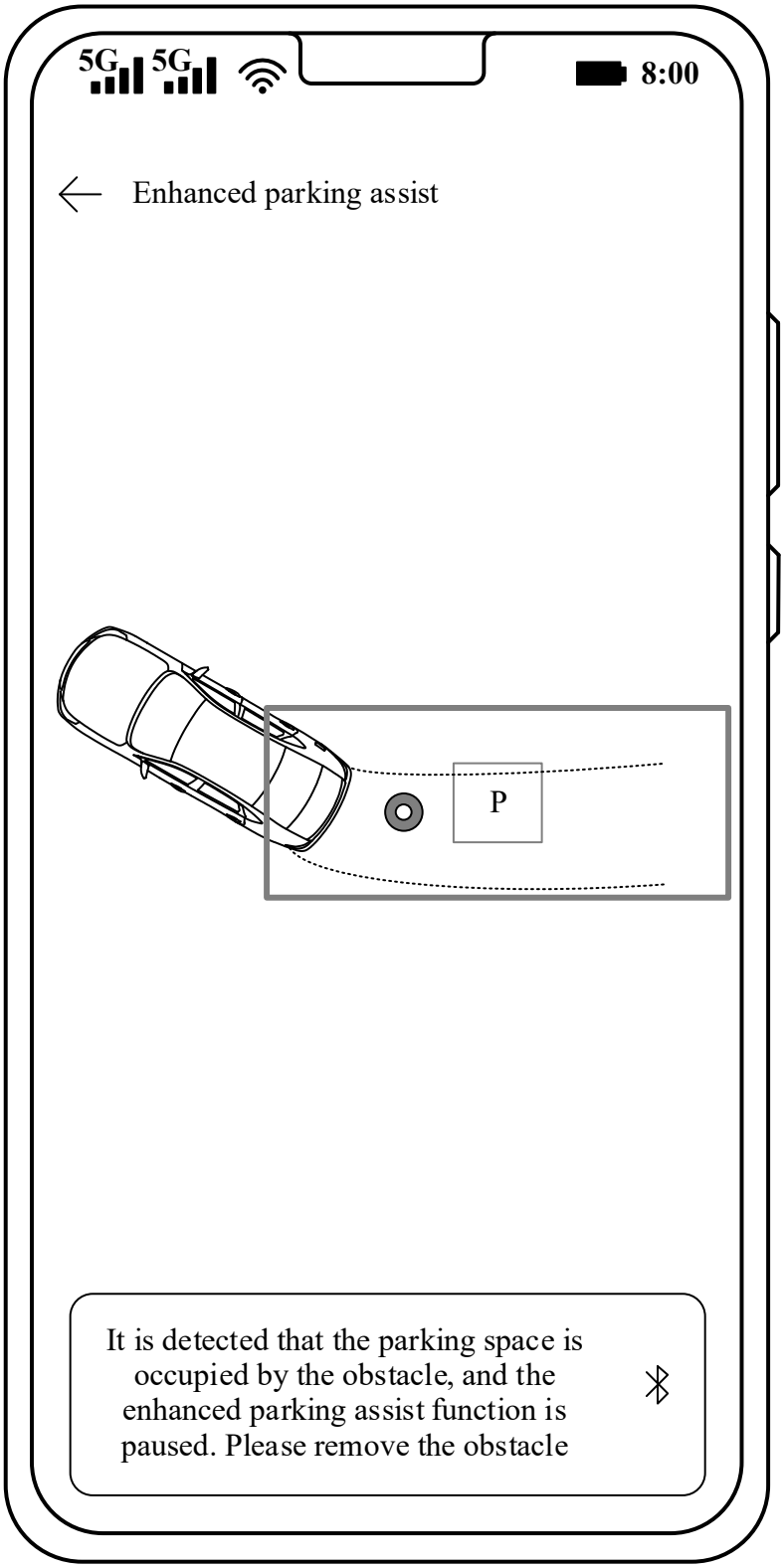

5G
5G
8:00
Enhanced parking assist
P
It is detected that the parking space is occupied by the obstacle, and the enhanced parking assist function is paused. Please remove the obstacle

FIG. 29

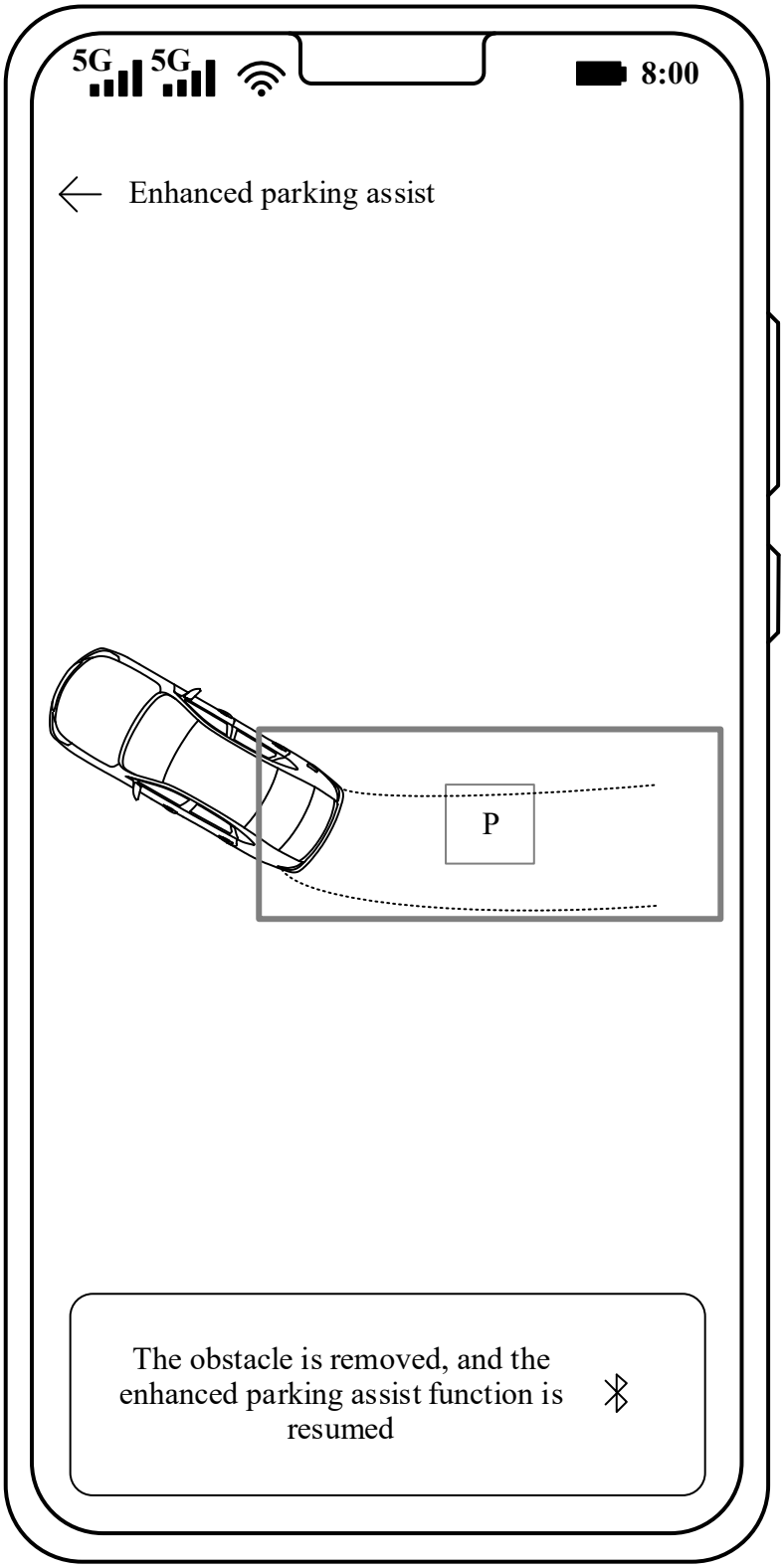

5G
5G
8:00
Enhanced parking assist
P
The obstacle is removed, and the enhanced parking assist function is resumed

FIG. 30

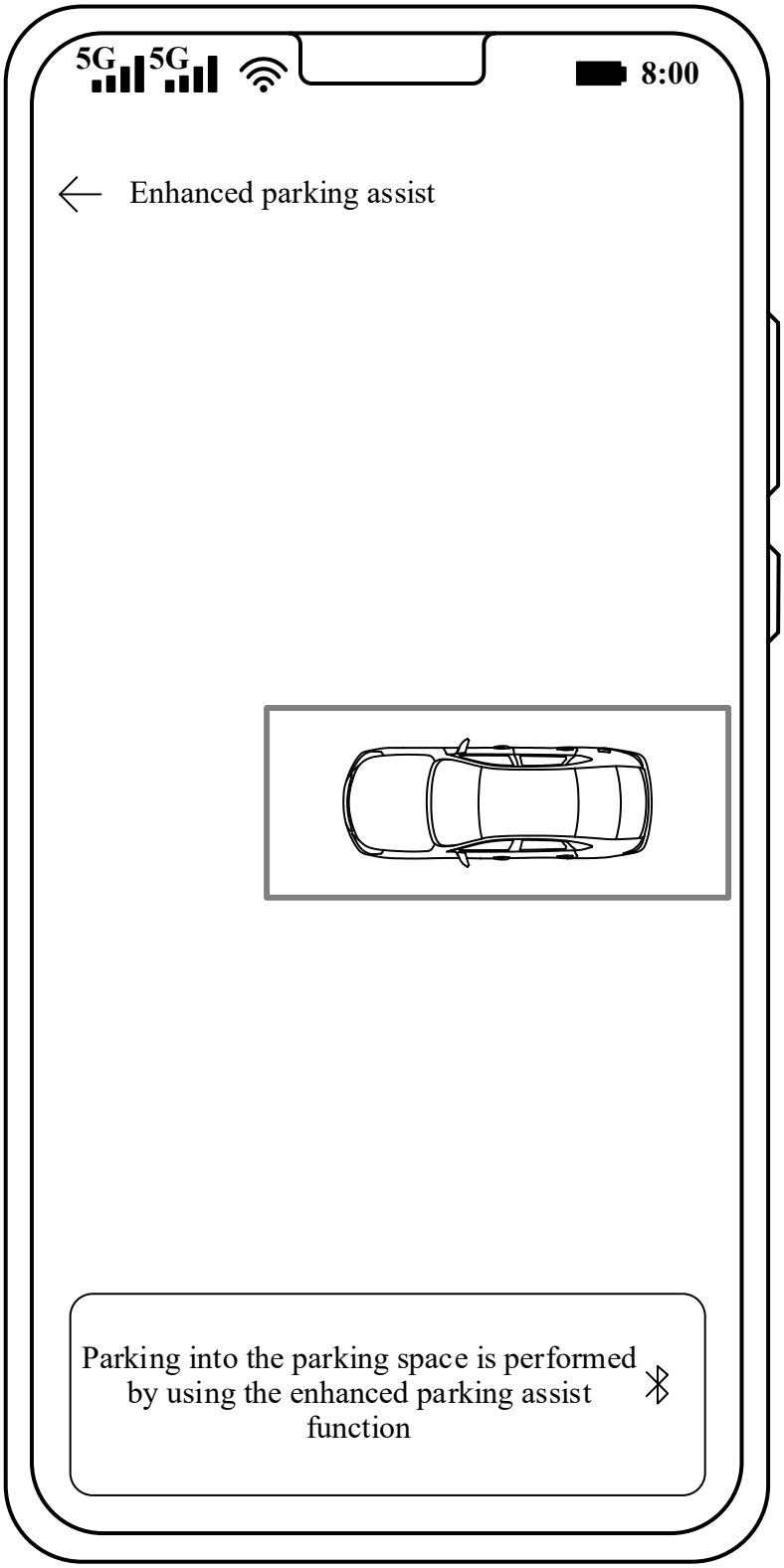

5G
5G
8:00
Enhanced parking assist
Parking into the parking space is performed by using the enhanced parking assist function

FIG. 31

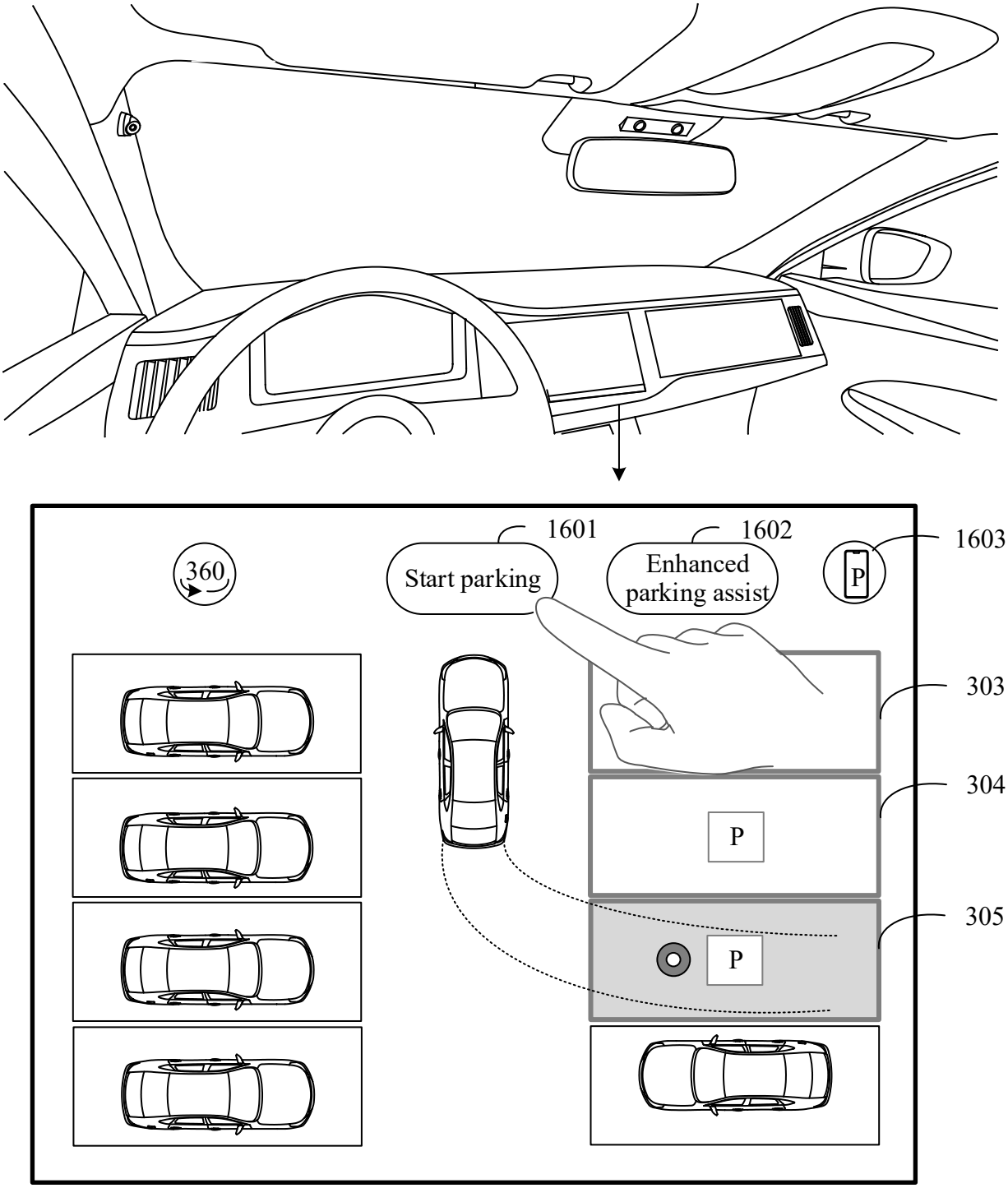

360
1601
Start parking
1602
Enhanced parking assist
1603
P
303
304
P
305
P

FIG. 32

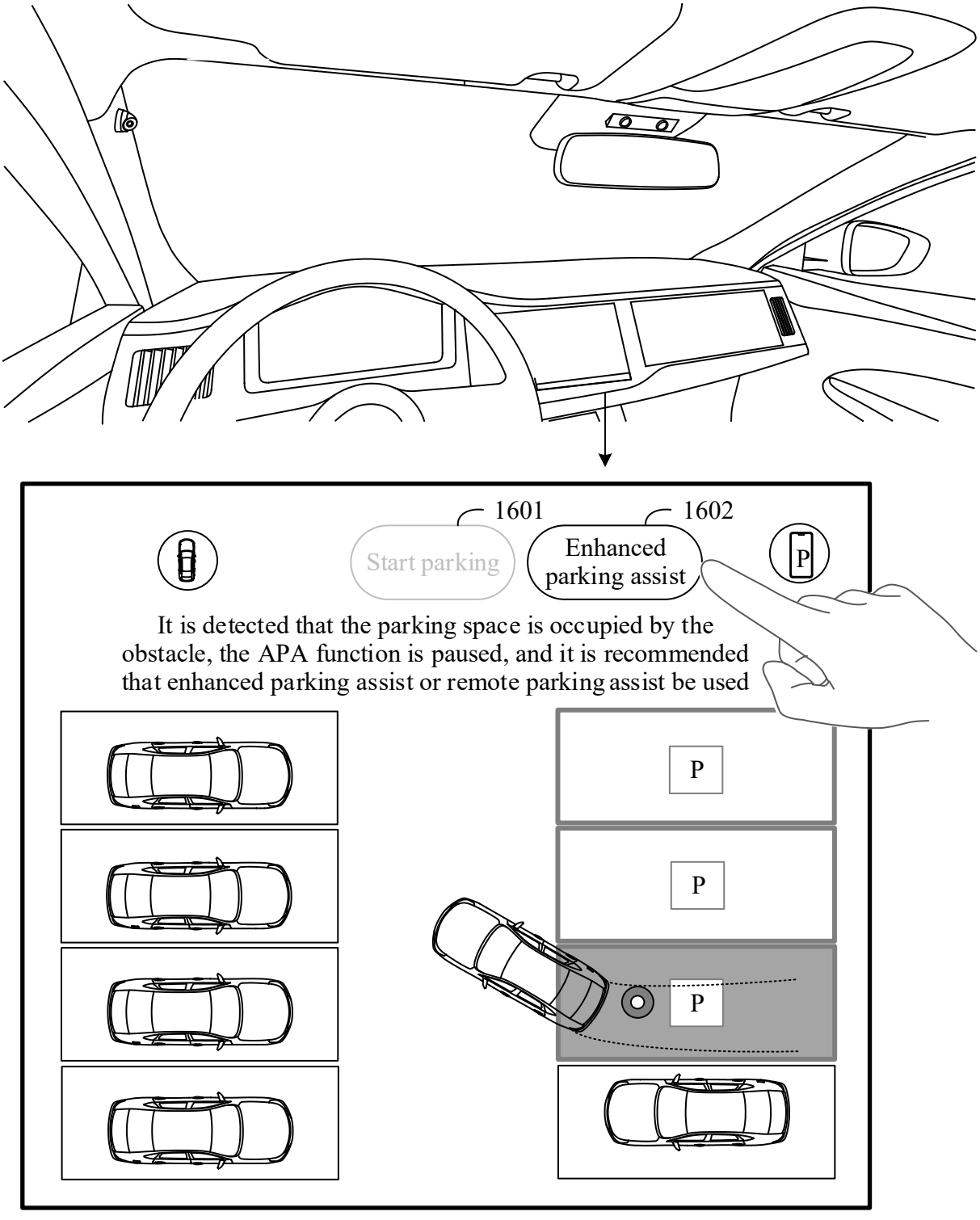

1601
1602
Start parking
Enhanced parking assist
P
It is detected that the parking space is occupied by the obstacle, the APA function is paused, and it is recommended that enhanced parking assist or remote parking assist be used
P
P
P

FIG. 33

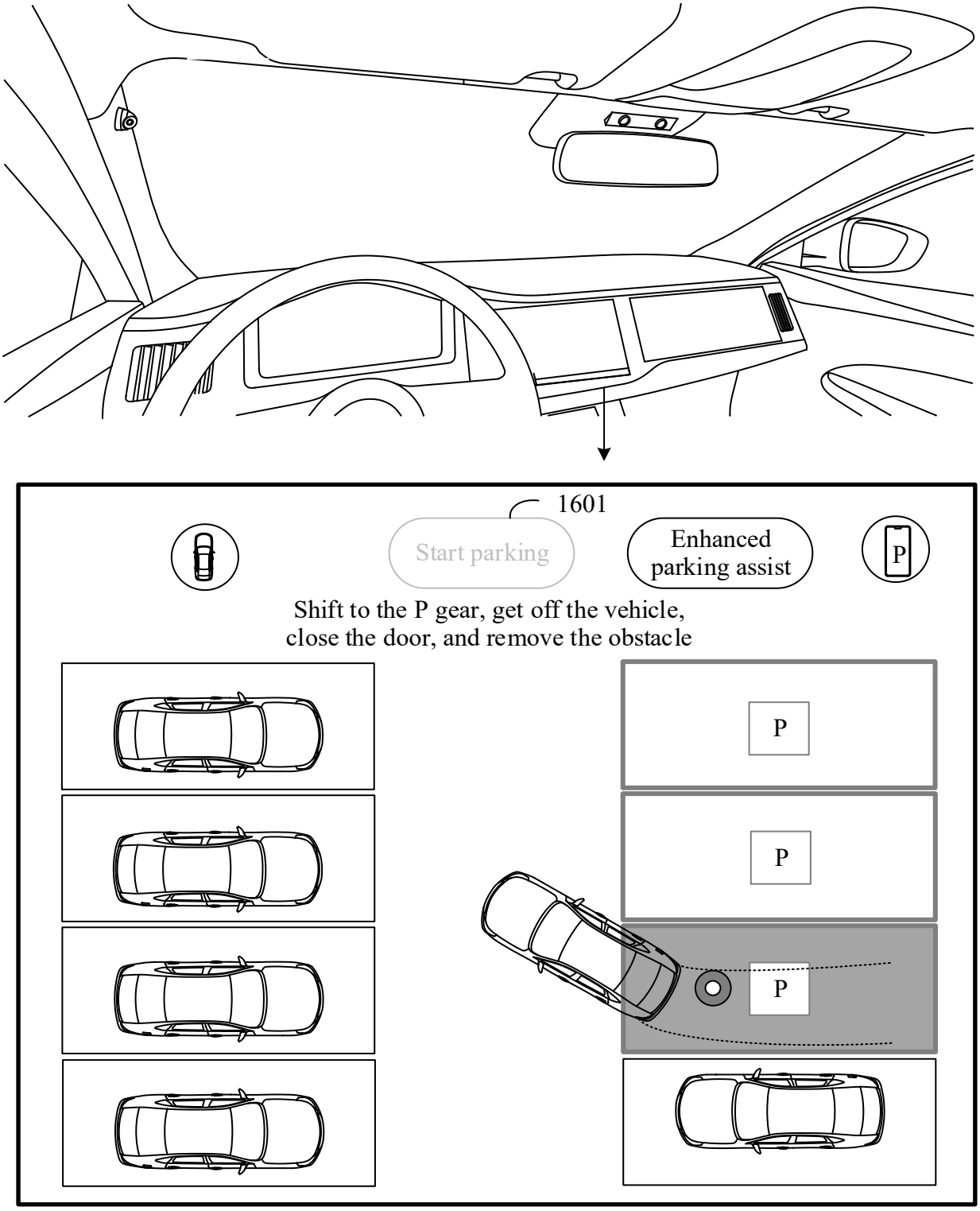

1601
Start parking
Enhanced parking assist
P
Shift to the P gear, get off the vehicle, close the door, and remove the obstacle
P
P
P

FIG. 34

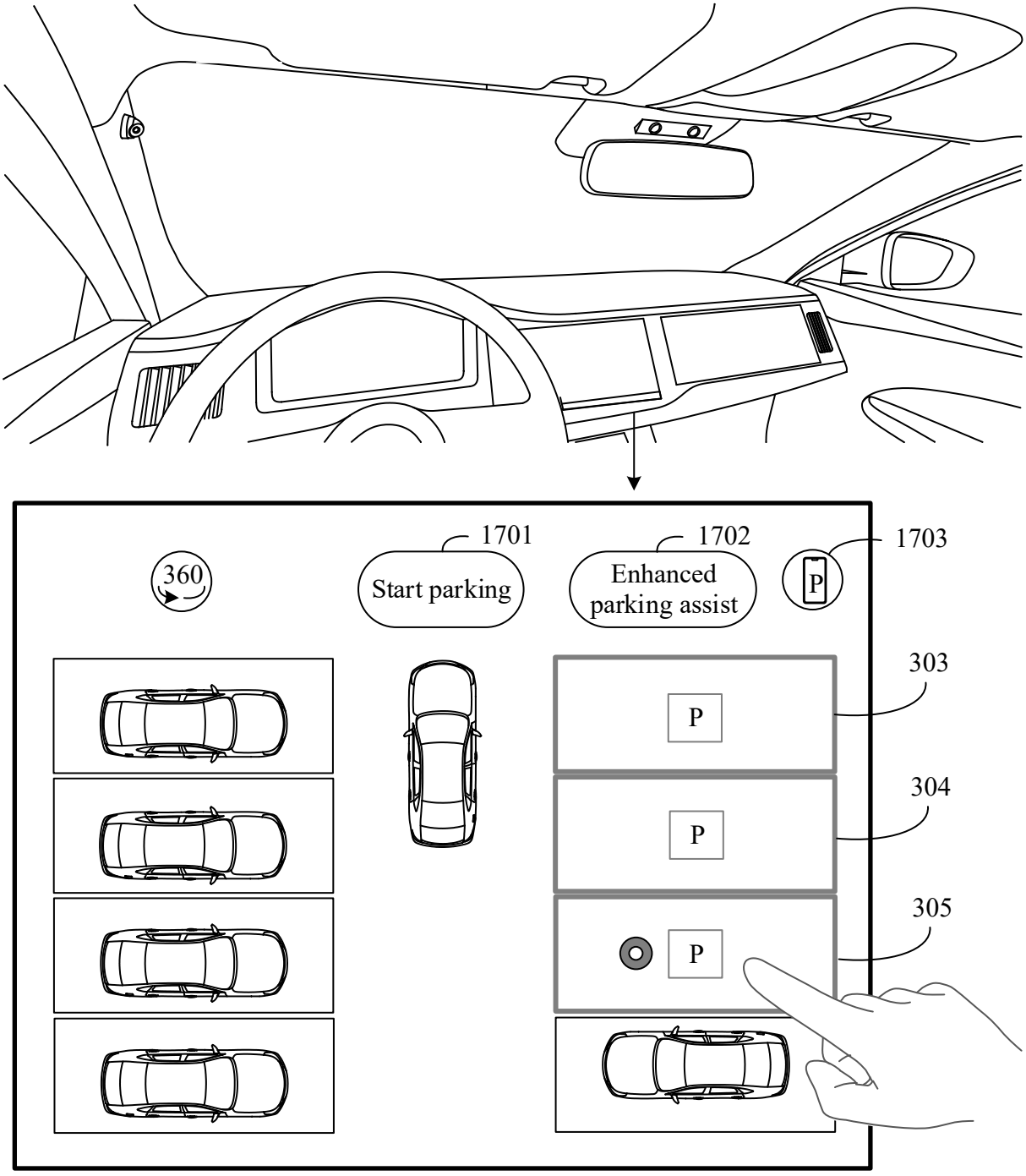

360
1701
Start parking
1702
Enhanced parking assist
1703
P
303
304
305
P
P
P

FIG. 35

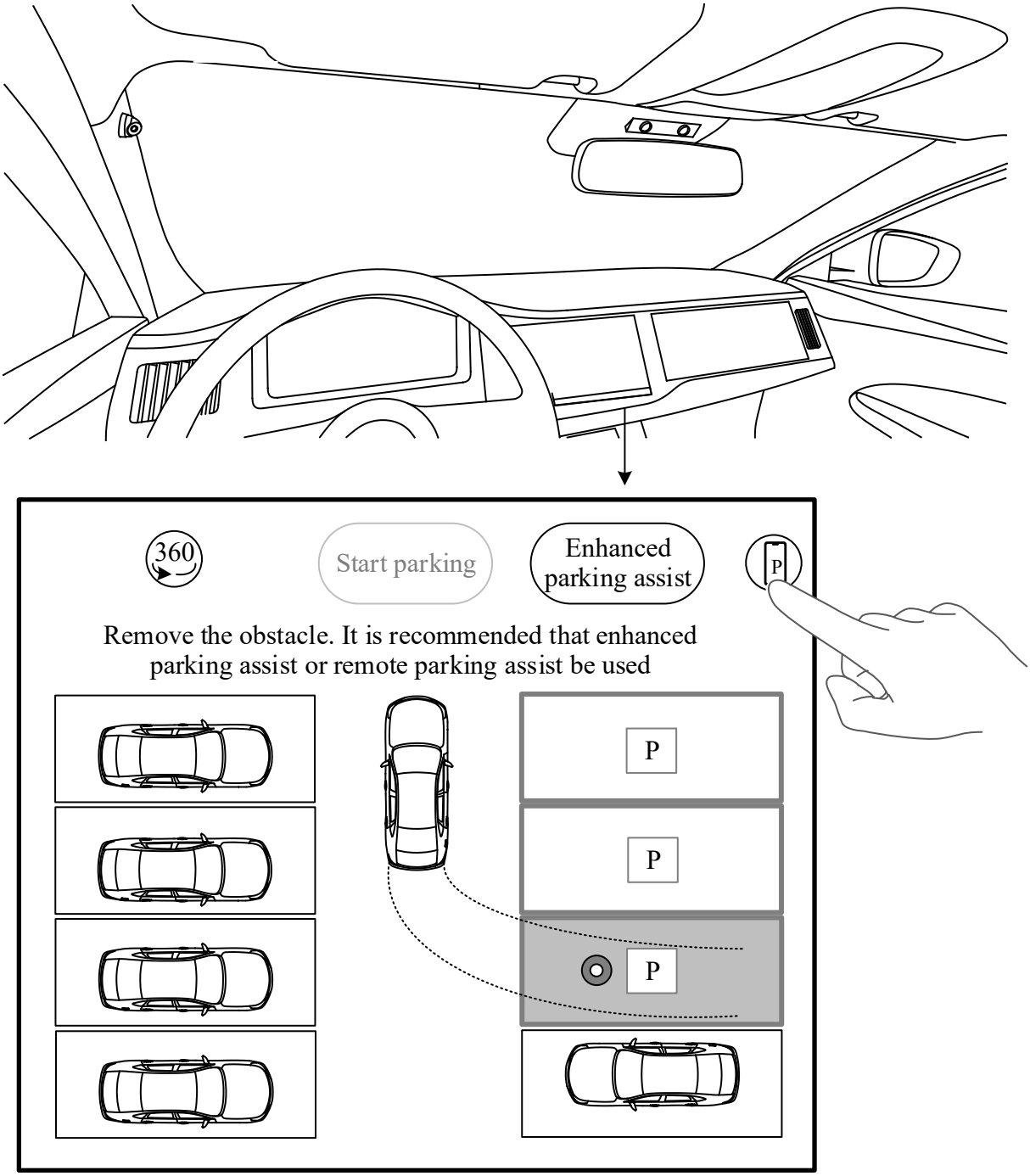
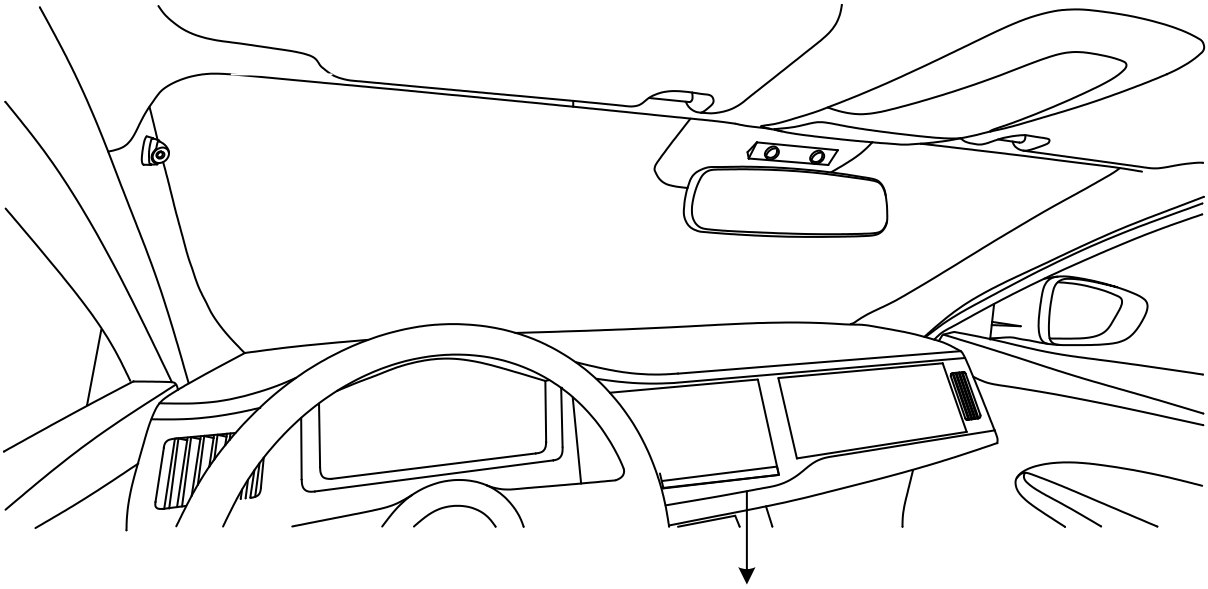

360
Start parking
Enhanced parking assist
P
Remove the obstacle. It is recommended that enhanced parking assist or remote parking assist be used
P
P
P

FIG. 36



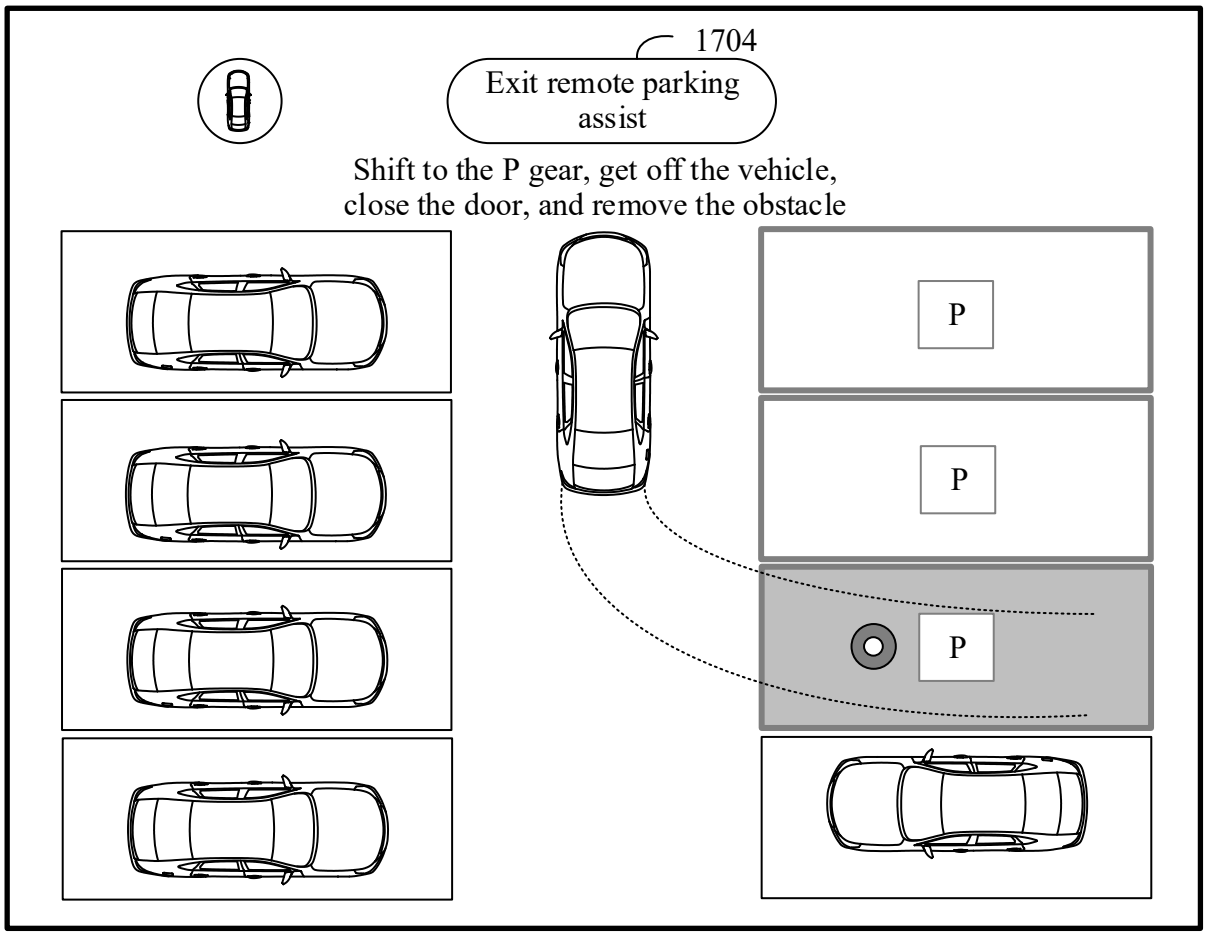

1704
Exit remote parking assist
Shift to the P gear, get off the vehicle, close the door, and remove the obstacle
P
P
P

FIG. 37

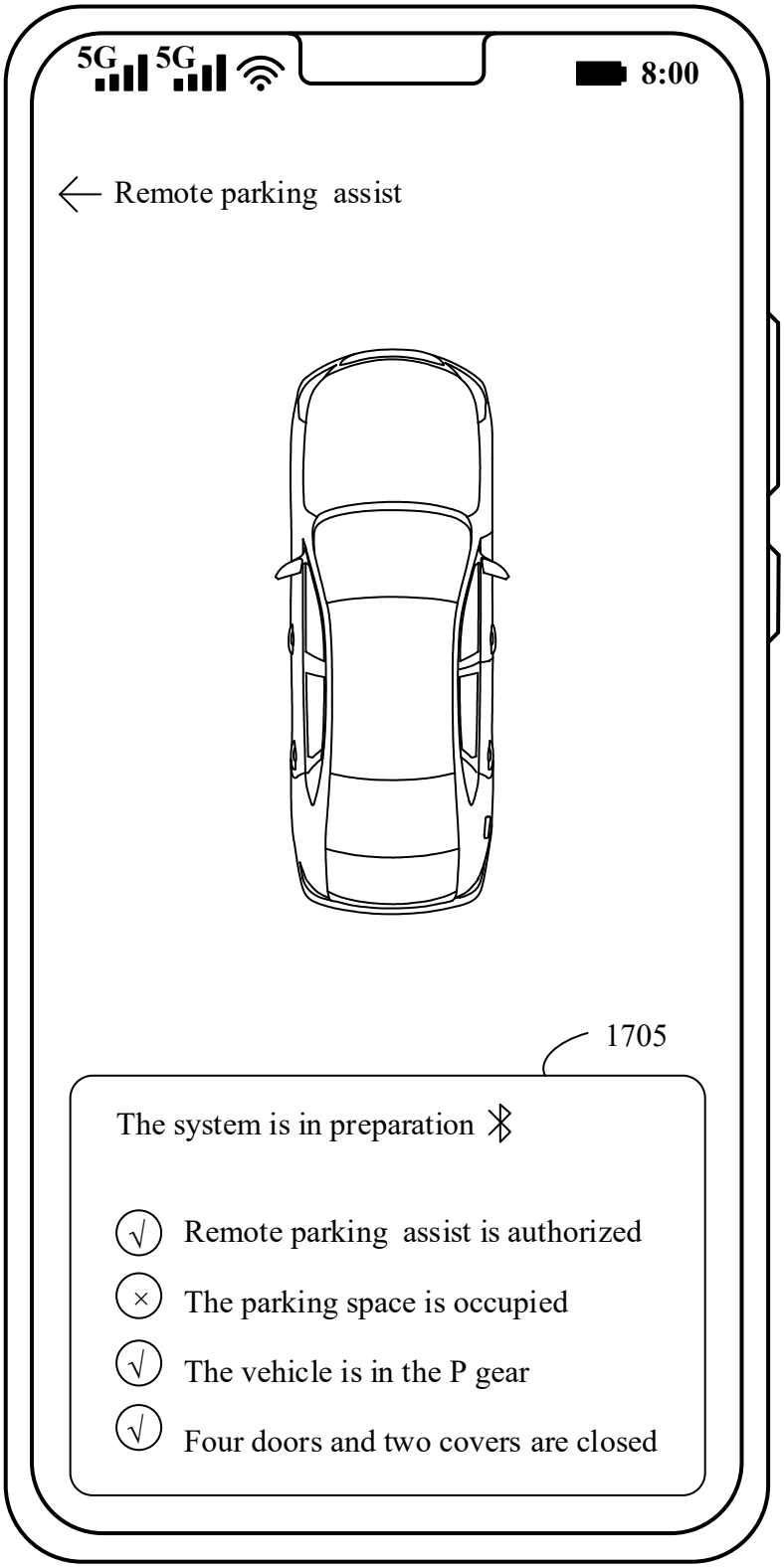

5G
5G
8:00
Remote parking assist
1705
The system is in preparation
Remote parking assist is authorized
The parking space is occupied
The vehicle is in the P gear
Four doors and two covers are closed

FIG. 38

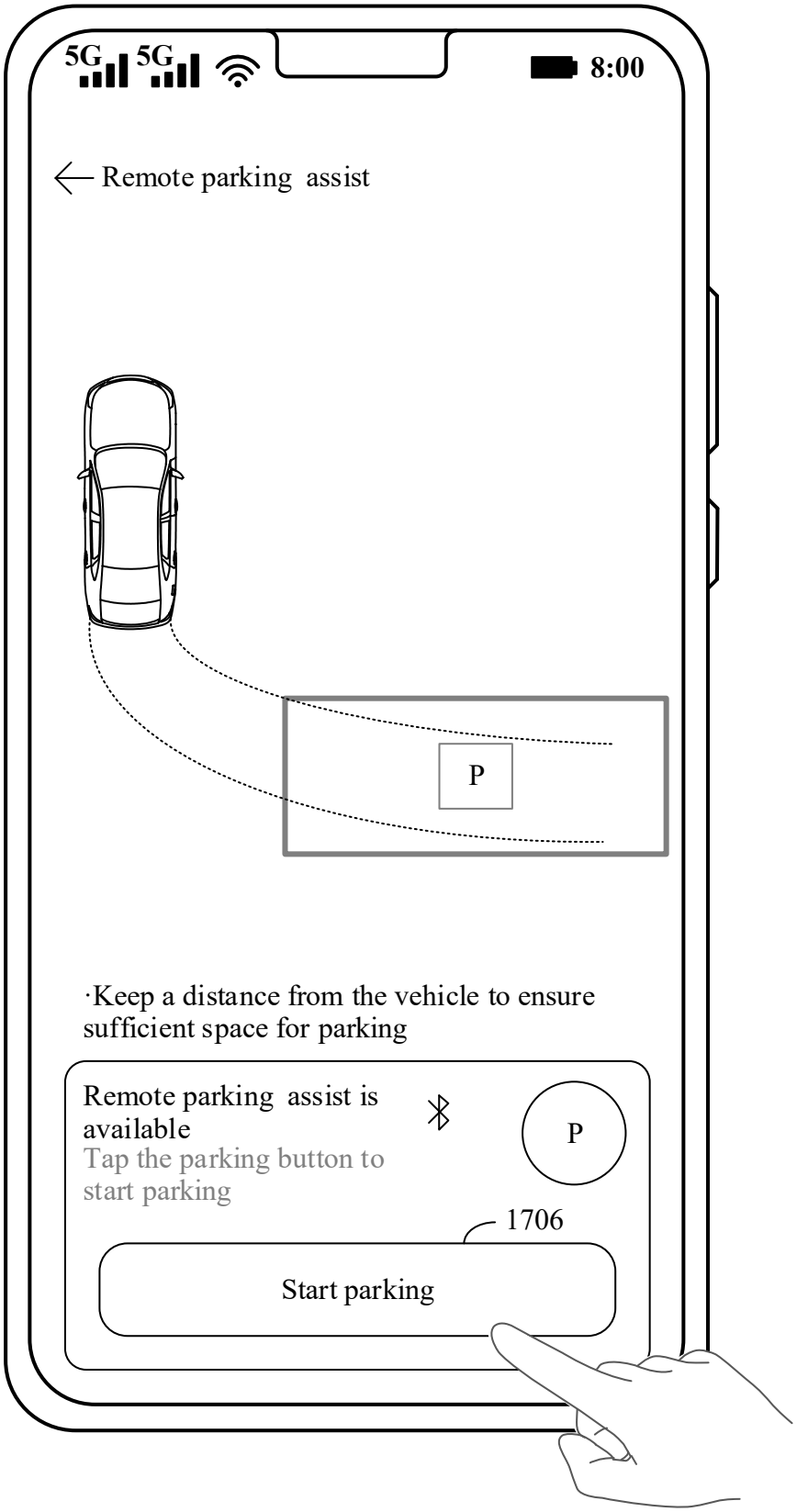

5G
5G
8:00
Remote parking assist
P
·Keep a distance from the vehicle to ensure sufficient space for parking
Remote parking assist is available
Tap the parking button to start parking
P
1706
Start parking

FIG. 39

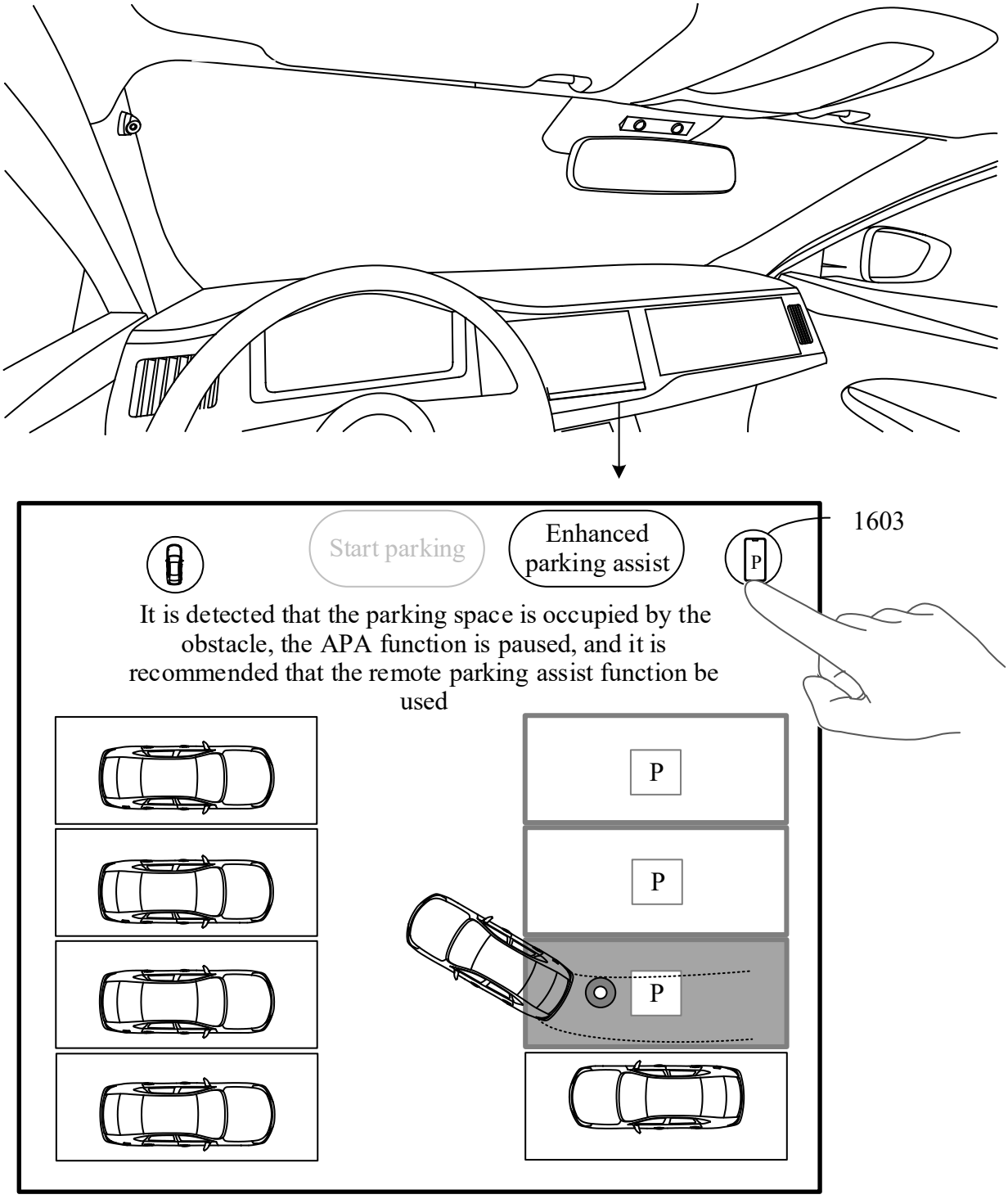
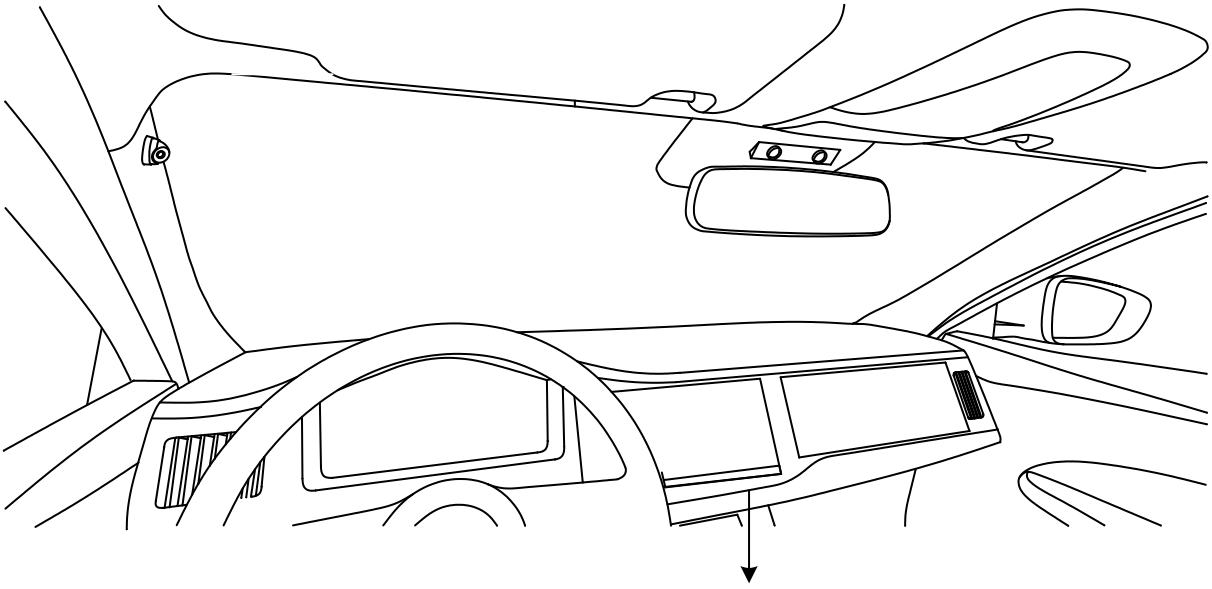

Start parking
Enhanced parking assist
P
1603
It is detected that the parking space is occupied by the obstacle, the APA function is paused, and it is recommended that the remote parking assist function be used
P
P
P

FIG. 40



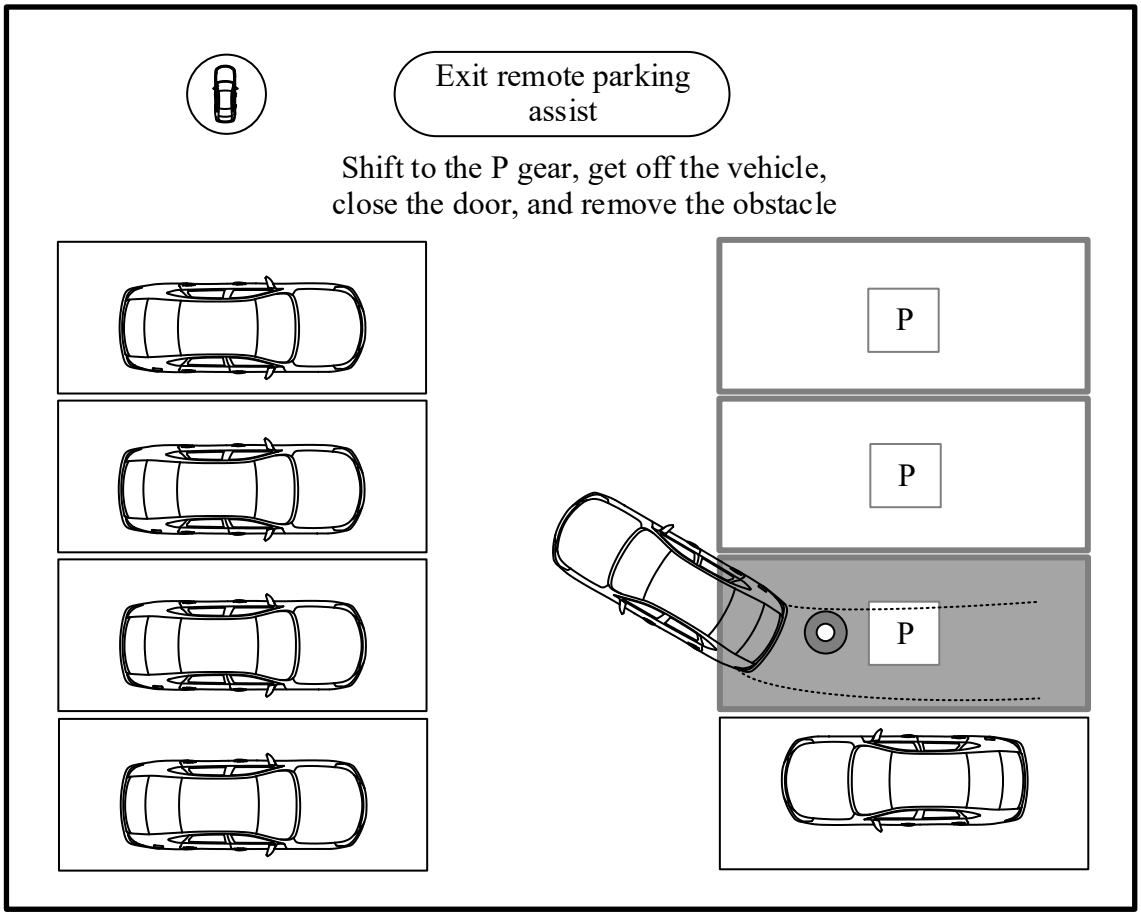

Exit remote parking assist
Shift to the P gear, get off the vehicle, close the door, and remove the obstacle
P
P
P

FIG. 41

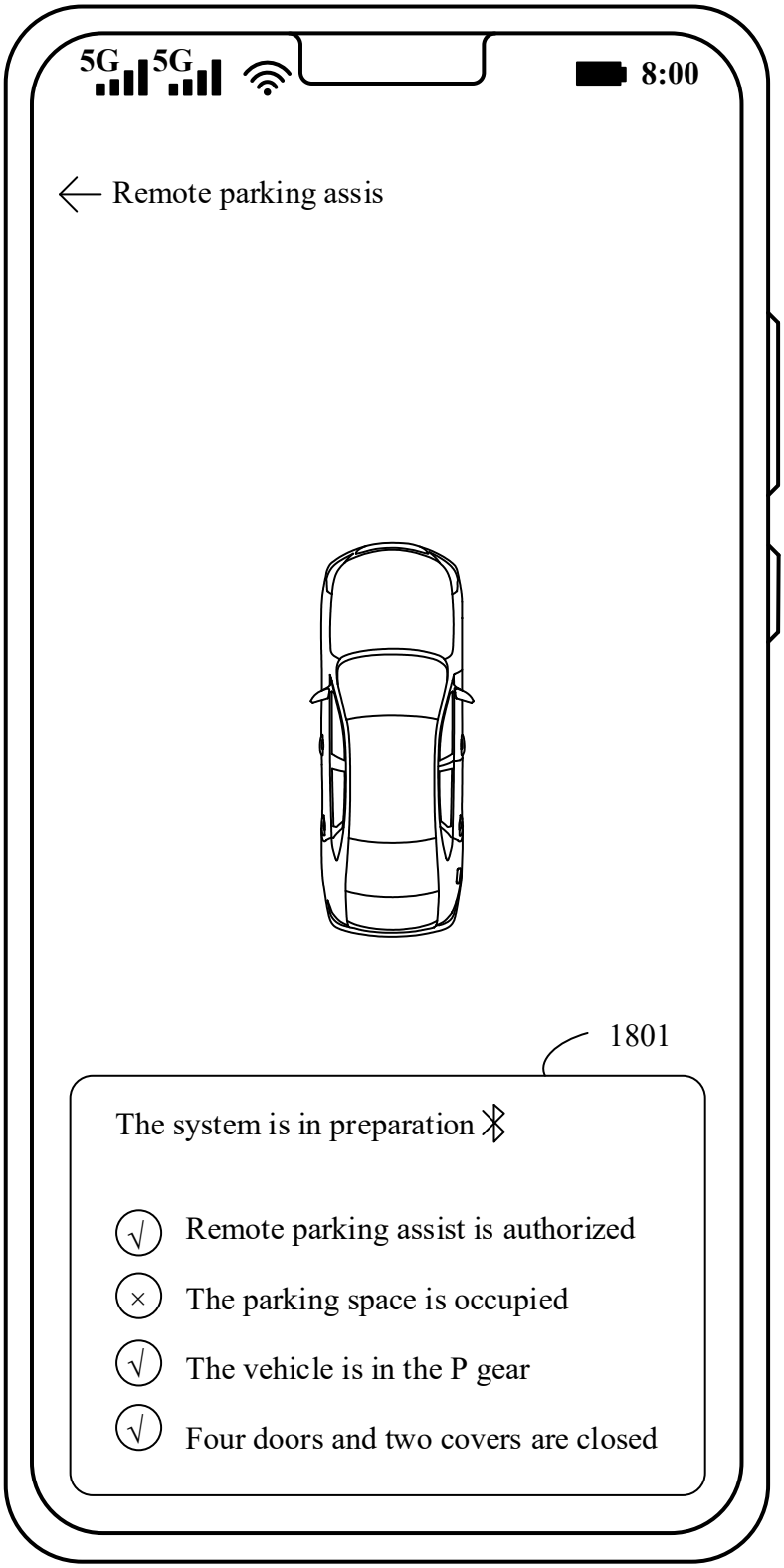

5G
5G
8:00
Remote parking assis
1801
The system is in preparation
Remote parking assist is authorized
The parking space is occupied
The vehicle is in the P gear
Four doors and two covers are closed

FIG. 42

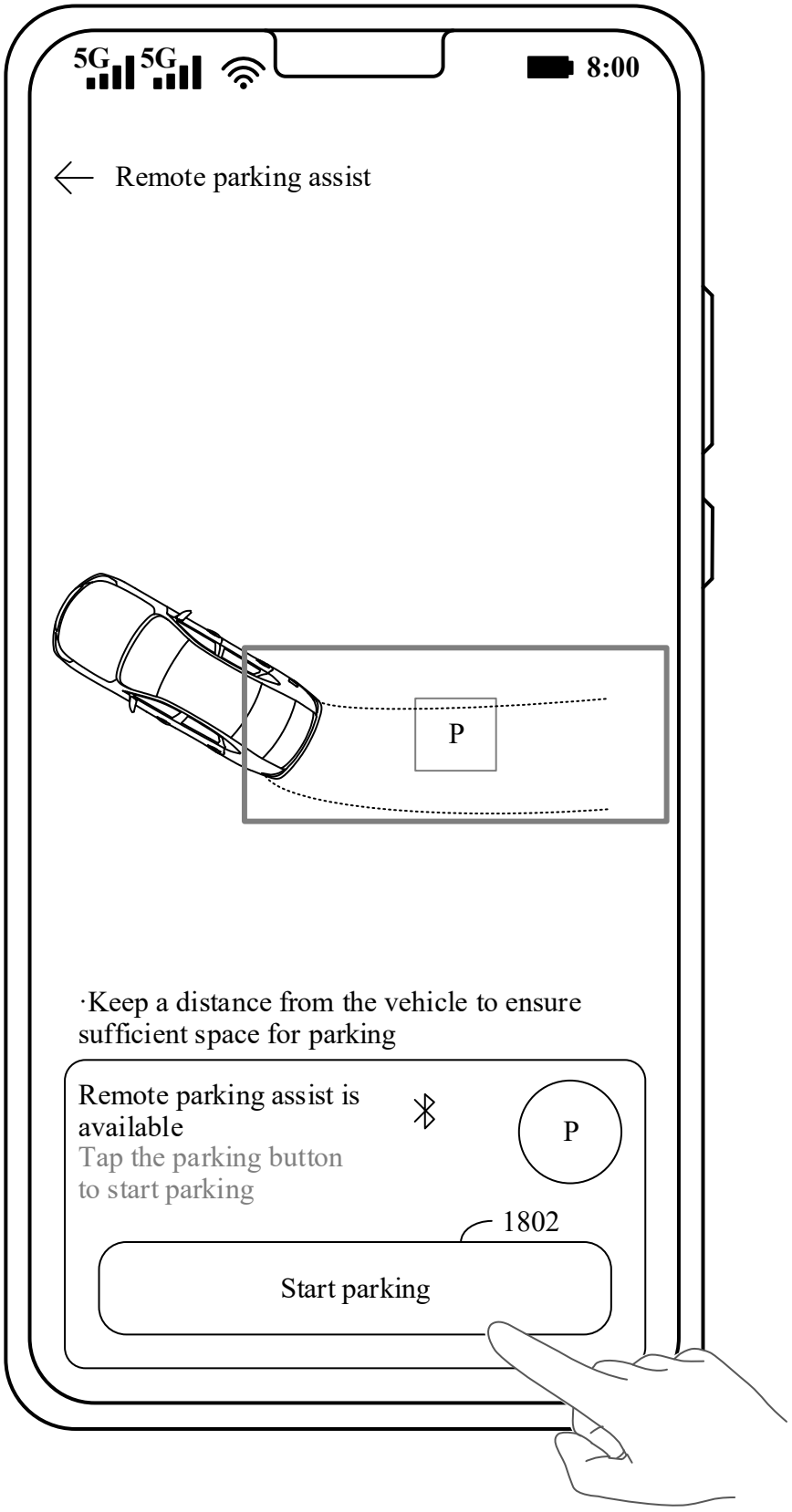

5G
5G
8:00
Remote parking assist
P
·Keep a distance from the vehicle to ensure sufficient space for parking
Remote parking assist is available
Tap the parking button to start parking
P
1802
Start parking

FIG. 43

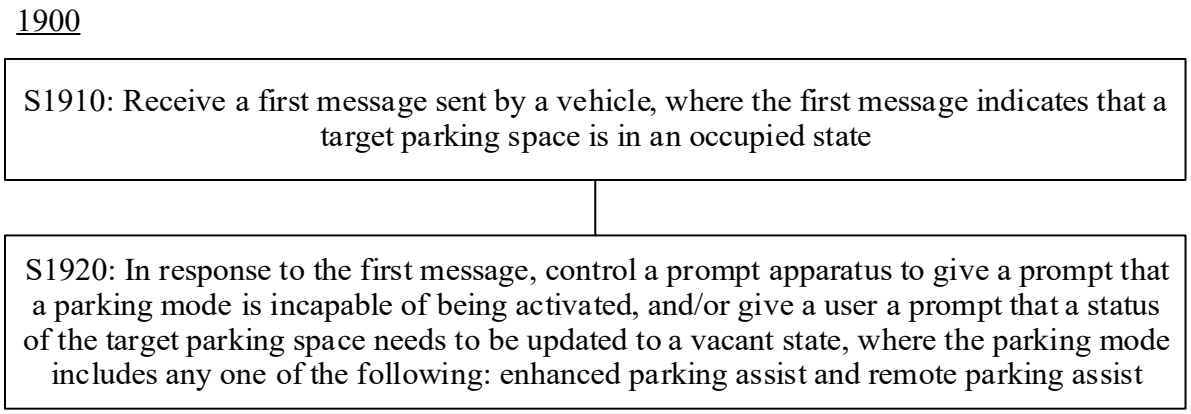

1900
S1910: Receive a first message sent by a vehicle, where the first message indicates that a target parking space is in an occupied state
S1920: In response to the first message, control a prompt apparatus to give a prompt that a parking mode is incapable of being activated, and/or give a user a prompt that a status of the target parking space needs to be updated to a vacant state, where the parking mode includes any one of the following: enhanced parking assist and remote parking assist

FIG. 44

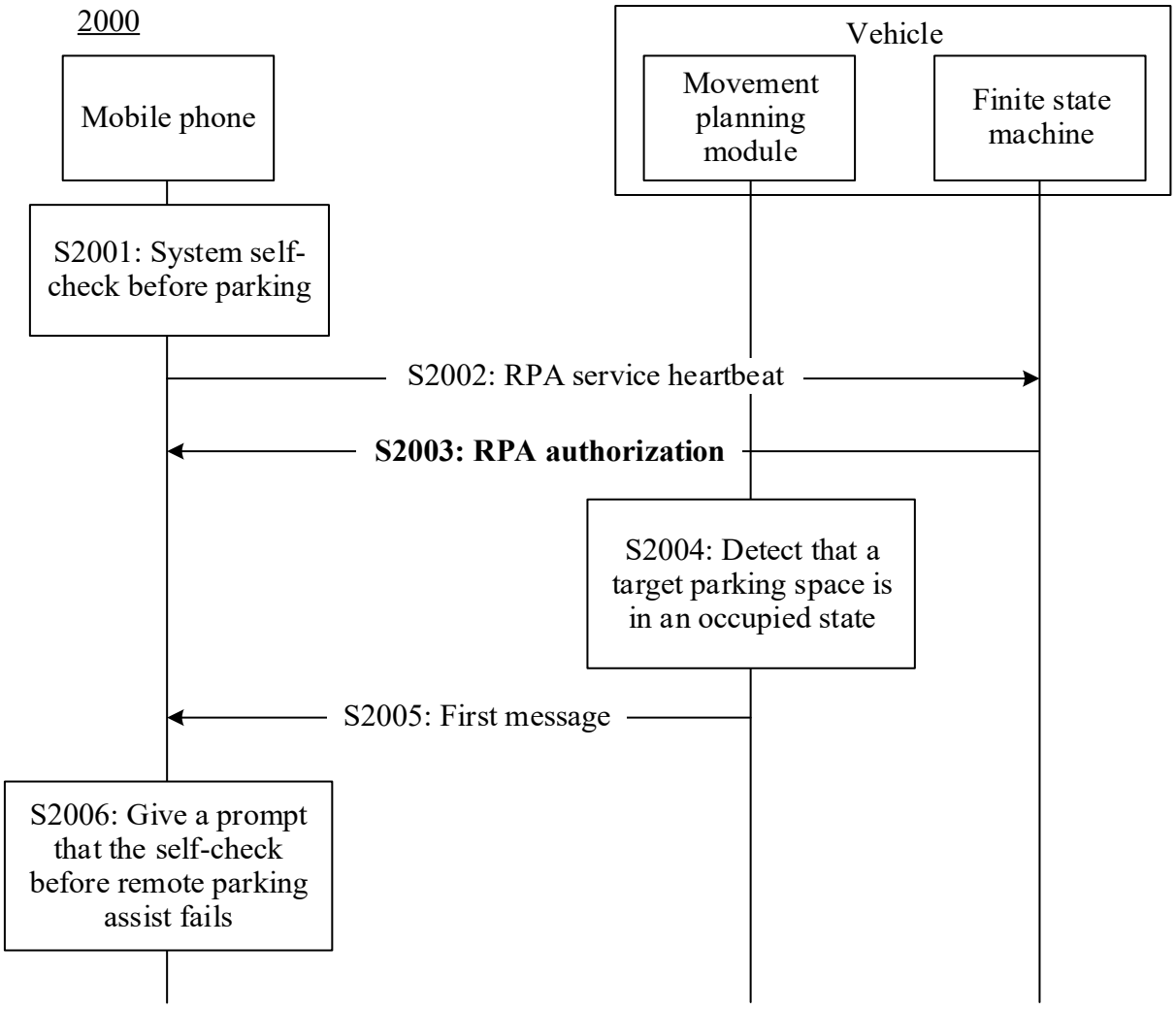

2000
Mobile phone
Vehicle
Movement planning module
Finite state machine
S2001: System self-check before parking
S2002: RPA service heartbeat
S2003: RPA authorization
S2004: Detect that a target parking space is in an occupied state
S2005: First message
S2006: Give a prompt that the self-check before remote parking assist fails

FIG. 45

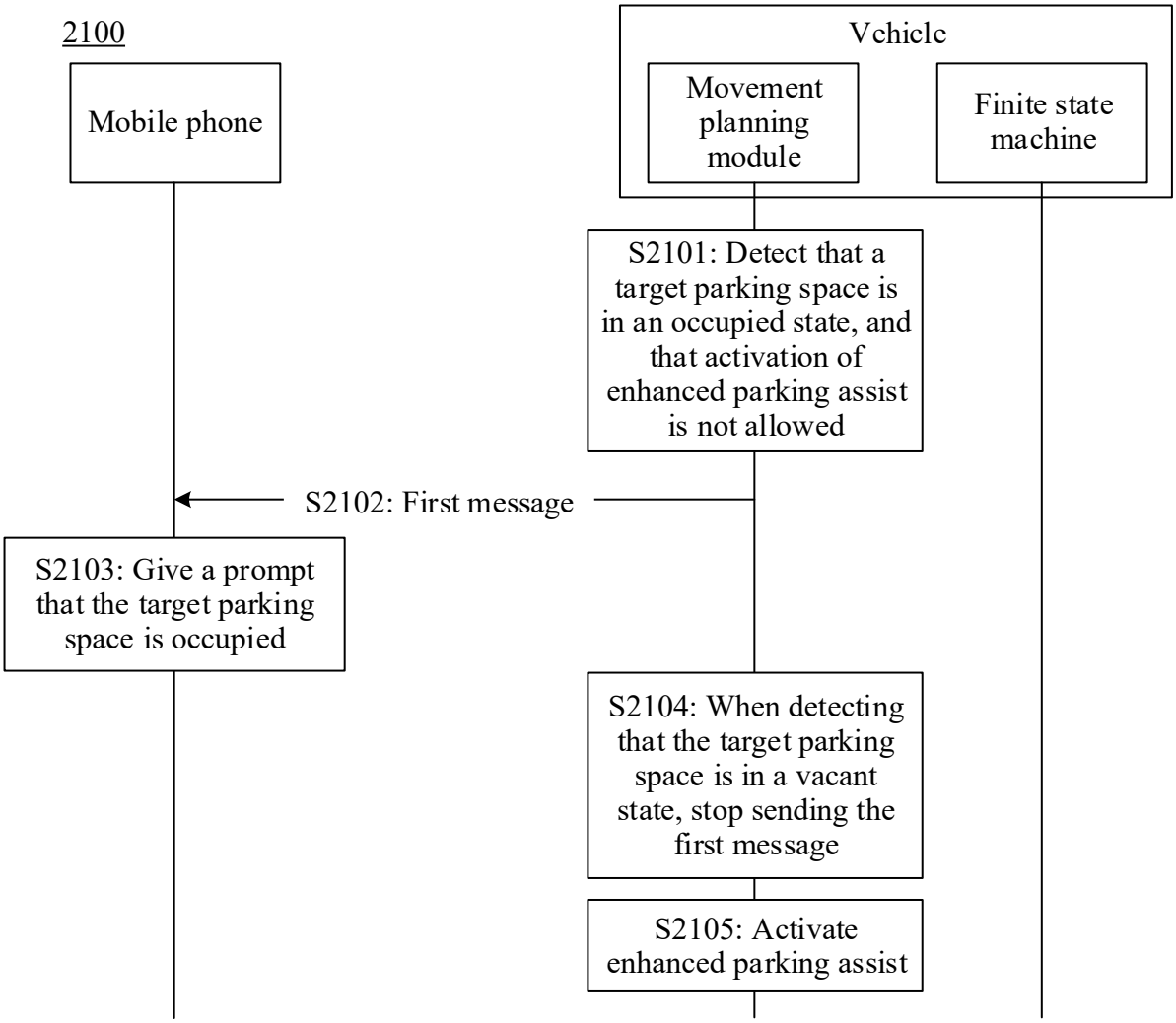

2100
Mobile phone
Vehicle
Movement planning module
Finite state machine
S2101: Detect that a target parking space is in an occupied state, and that activation of enhanced parking assist is not allowed
S2102: First message
S2103: Give a prompt that the target parking space is occupied
S2104: When detecting that the target parking space is in a vacant state, stop sending the first message
S2105: Activate enhanced parking assist

FIG. 46

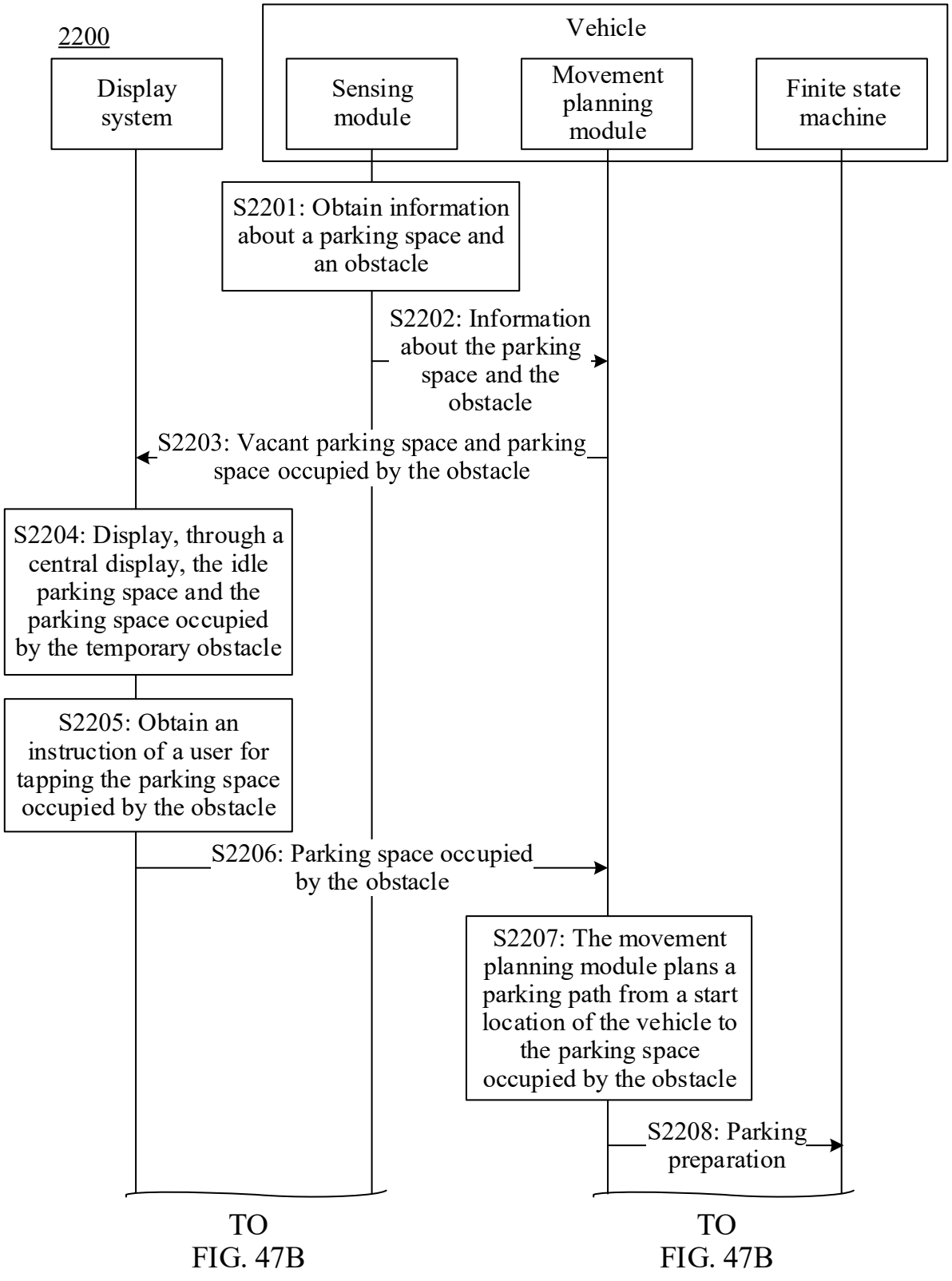

2200
Vehicle
Display system
Sensing module
Movement planning module
Finite state machine
S2201: Obtain information about a parking space and an obstacle
S2202: Information about the parking space and the obstacle
S2203: Vacant parking space and parking space occupied by the obstacle
S2204: Display, through a central display, the idle parking space and the parking space occupied by the temporary obstacle
S2205: Obtain an instruction of a user for tapping the parking space occupied by the obstacle
S2206: Parking space occupied by the obstacle
S2207: The movement planning module plans a parking path from a start location of the vehicle to the parking space occupied by the obstacle
S2208: Parking preparation
TO FIG. 47B
TO FIG. 47B

FIG. 47A

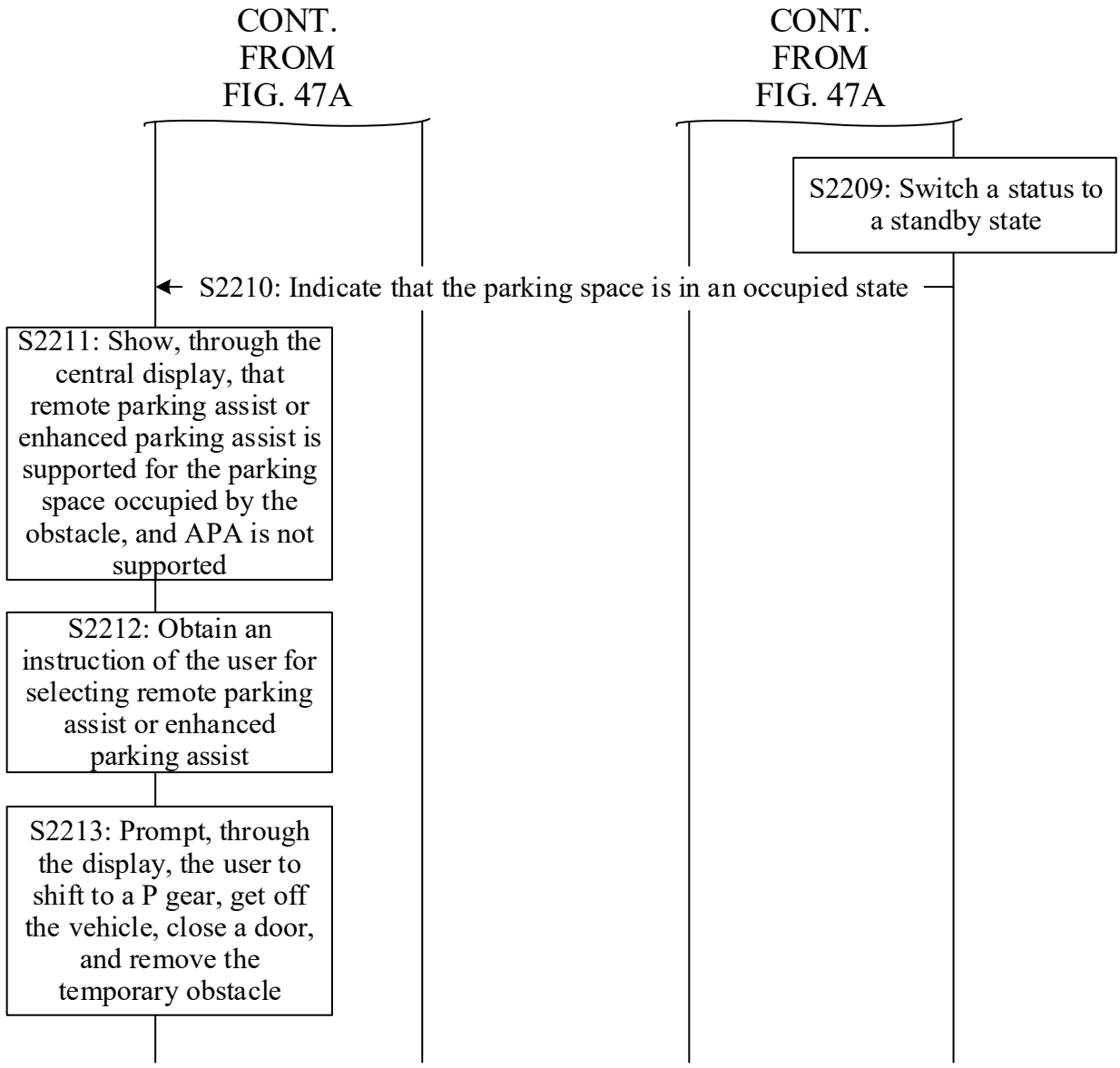

CONT. FROM FIG. 47A
CONT. FROM FIG. 47A
S2209: Switch a status to a standby state
S2210: Indicate that the parking space is in an occupied state
S2211: Show, through the central display, that remote parking assist or enhanced parking assist is supported for the parking space occupied by the obstacle, and APA is not supported
S2212: Obtain an instruction of the user for selecting remote parking assist or enhanced parking assist
S2213: Prompt, through the display, the user to shift to a P gear, get off the vehicle, close a door, and remove the temporary obstacle

FIG. 47B

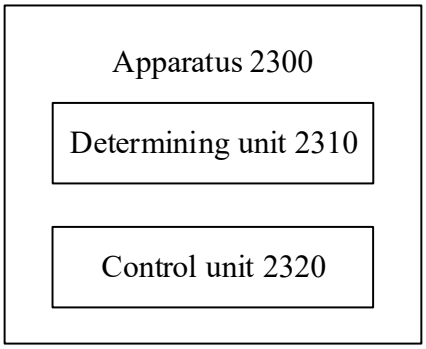

Apparatus 2300
Determining unit 2310
Control unit 2320

FIG. 48

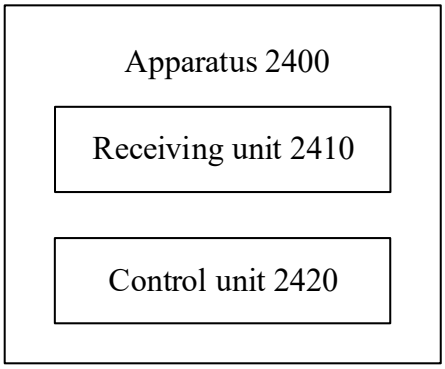

Apparatus 2400
Receiving unit 2410
Control unit 2420

FIG. 49