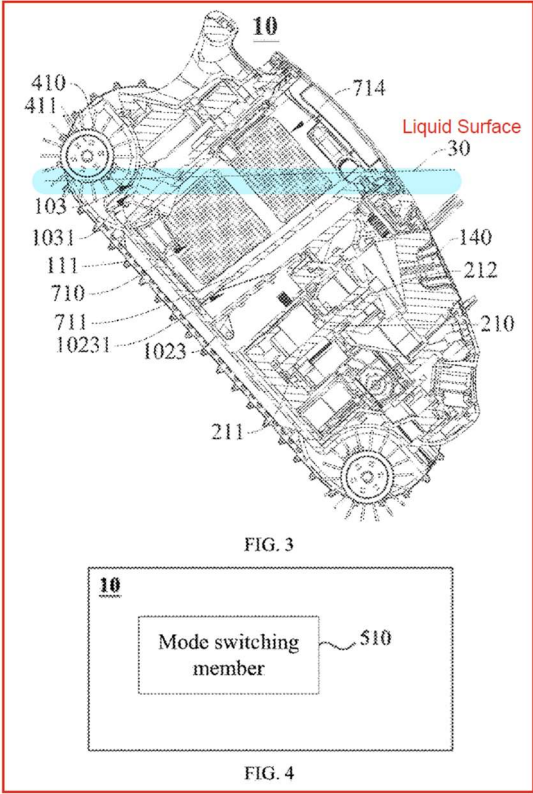
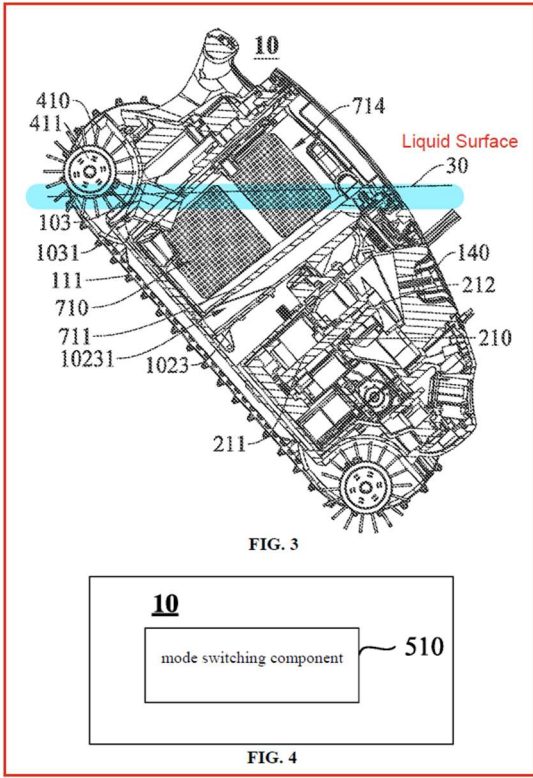
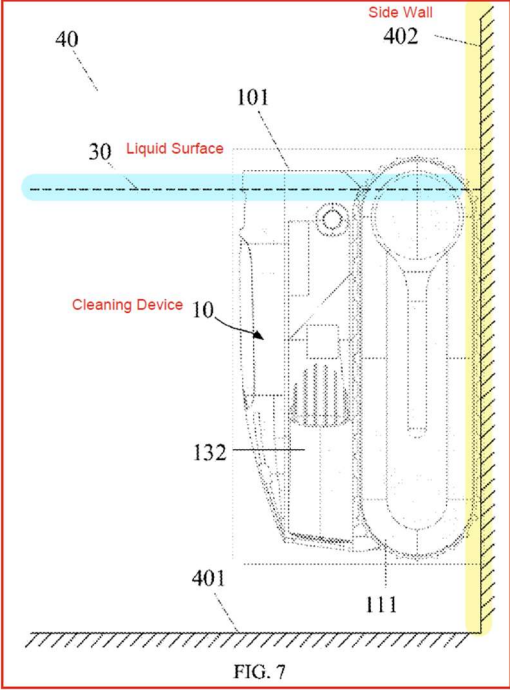
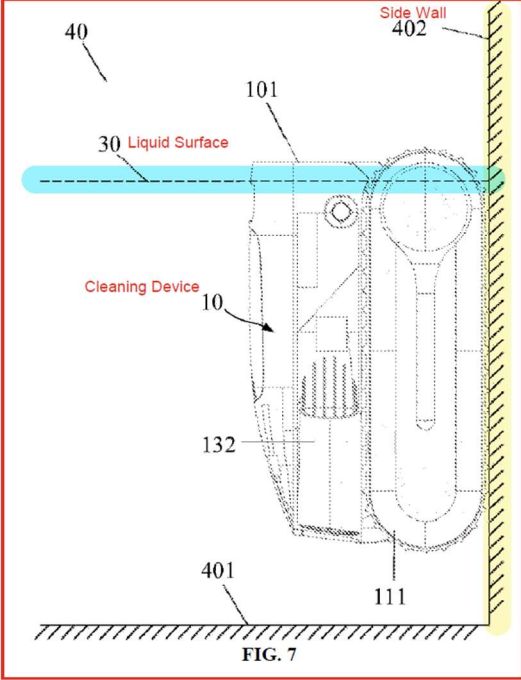


Exhibit 1008: Chart of subject matter of Wang as supported by Wang '040

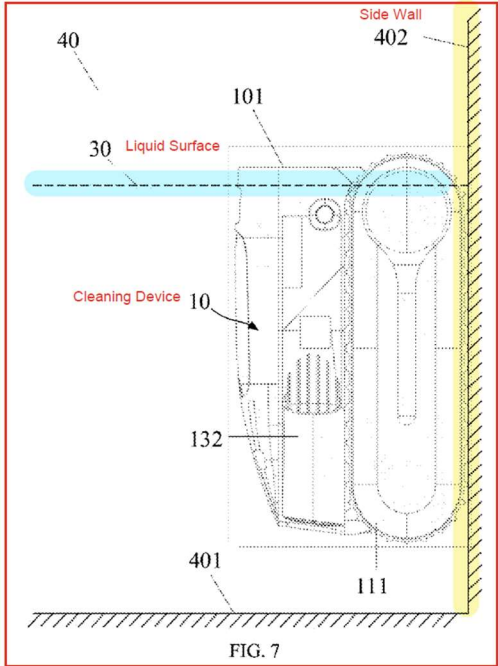
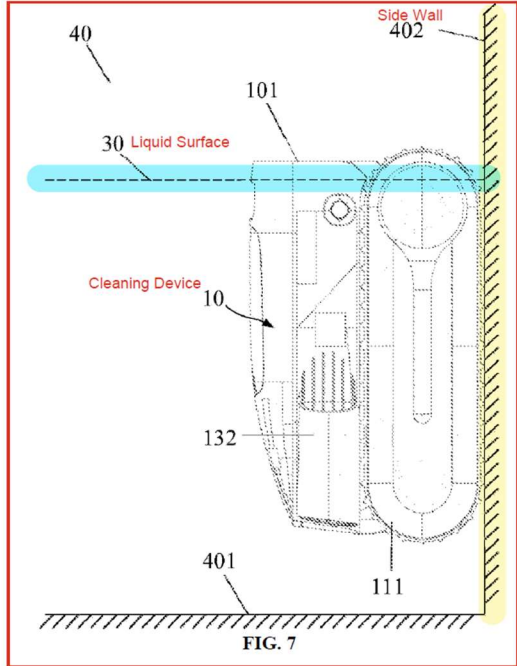
Claim No.	Claim Language	Relevant Disclosure of Wang	Relevant Disclosure of Wang'040 supporting Wang
1pre	A controllable sinking and floating swimming pool robot, comprising:	Wang at [0064]: “The cleaning device 10 of the present disclosure can be flexibly switched between a position on a liquid surface 30 and a position under the liquid surface 30 , so that the cleaning device 10 can comprehensively clean the target region 40.”	Wang '040 at p.6:63-65: “The cleaning apparatus 10 of the present disclosure is capable of flexibly switching positions between above and below the liquid level 30 so that the cleaning apparatus 10 can carry out a full range of cleaning of the target area 40, thereby improving the efficiency and application range of liquid cleaning in the target area 40 and reducing the cleaning cost of the target area 40.”
1a	a sinking and floating control unit configured to control a swimming pool robot to float and sink;	Wang at [0067]: “With reference to FIG. 1 to FIG. 3, the cleaning device body 101 includes a mode switching member 510. The mode switching member 510 is configured for the cleaning device 10 to be switched between the position on the liquid surface 30 and the position under the liquid surface 30. ”	Wang '040 at p.7:20-22: “In conjunction with FIGS. 1-3, the cleaning apparatus main body 101 comprises a mode switching component 510. The mode switching component 510 may be used to enable switching of the position of the cleaning apparatus 10 above and below the liquid level 30. ”
		Wang at [0098]: “In some embodiments, the action force received by the cleaning device 10 in the vertical direction may include a buoyancy force applied to the cleaning device 10 in the vertical direction. When the action force includes the buoyancy force applied to the cleaning device 10 in the vertical direction, the mode switching member 510 may include a buoyancy adjustment assembly 511. The buoyancy adjustment assembly 511 is configured to adjust a magnitude of the buoyancy force applied to the cleaning	Wang '040 at p.10:76-p.11:4: “In some embodiments, the force received by the cleaning apparatus 10 in the vertical direction may include the buoyancy acting on the cleaning apparatus 10 in the vertical direction. When the aforementioned force includes the buoyancy acting on the cleaning apparatus 10 in the vertical direction, the mode switching component 510 may include a buoyancy adjustment assembly 511. The buoyancy adjustment assembly 511 can be used to adjust the magnitude of the buoyancy acting on the cleaning

Claim No.	Claim Language	Relevant Disclosure of Wang	Relevant Disclosure of Wang'040 supporting Wang
		device 10 in the vertical direction.”	apparatus 10 in the vertical direction.”
		Wang at [0099]: “In some embodiments, the buoyancy adjustment assembly 511 may include a buoyancy cavity 5111 and a buoyancy adjustment part. The buoyancy cavity 5111 is configured to accommodate liquid and/or gas.”	Wang '040 at p.11:5-6: “In some embodiments, the buoyancy adjustment assembly 511 may include a buoyancy chamber 5111 and a buoyancy adjustment member. The buoyancy chamber 5111 may be used to accommodate liquid and/or gas.”
		Wang at [0117]: “In some embodiments, when the cleaning device 10 needs to be switched from the position under the liquid surface 30 to the position on the liquid surface 30, the processor 52 may obtain the detection result of whether the air inlet 5113 of the buoyancy cavity 5111 is exposed to the air. When the detection result indicates that the air inlet 5113 is exposed to the air, the buoyancy adjustment part is controlled to increase the volume of the gas in the buoyancy cavity 5111 to switch the cleaning device 10 from the position under the liquid surface 30 to the position on the liquid surface 30.”	Wang '040 at p.13:3-7: “In some embodiments, when the cleaning apparatus 10 needs to switch from below the liquid level 30 to above the liquid level 30, the processor 52 may obtain a detection result indicating whether the air inlet 5113 of the buoyancy chamber 5111 is in air. When the detection result indicates that the air inlet 5113 is in air, the processor controls the buoyancy adjustment member to increase the volume of gas in the buoyancy chamber 5111, thereby enabling the cleaning apparatus 10 to switch from below the liquid level 30 to above the liquid level 30.”
		Wang at [0118]: “When the cleaning device 10 needs to be switched from the position on the liquid surface 30 to the position under the liquid surface 30, the processor 52 may control the buoyancy adjustment part to reduce the volume of the gas in the buoyancy cavity 5111.”	Wang '040 at p.13:10-11: “When the cleaning apparatus 10 needs to switch from above the liquid level 30 to below the liquid level 30, the processor 52 can control the buoyancy adjustment member to reduce the volume of the gas in the buoyancy chamber 5111.”

Claim No.	Claim Language	Relevant Disclosure of Wang	Relevant Disclosure of Wang'040 supporting Wang
		 FIG. 3 FIG. 4 Figs. 3 and 4 of Wang (Annotated)	 FIG. 3 FIG. 4 Figs. 3 and 4 of Wang'040 (Annotated)

Claim No.	Claim Language	Relevant Disclosure of Wang	Relevant Disclosure of Wang'040 supporting Wang
		 Fig. 7 of Wang (Annotated)	 Fig. 7 of Wang'040 (Annotated)

Claim No.	Claim Language	Relevant Disclosure of Wang	Relevant Disclosure of Wang'040 supporting Wang
	swimming pool where the swimming pool robot is located; and	10 in the liquid.” Wang at [0114]: “When the cleaning device 10 needs to be switched from the position under the liquid surface 30 to the position on the liquid surface 30, the processor 52 may obtain the position of the cleaning device 10 in real time from the first sensor. When the position of the cleaning device 10 meets a preset condition, the processor 52 may control the buoyancy adjustment part to increase the volume of the gas in the buoyancy cavity 5111. The preset condition may be that the position of the cleaning device 10 is higher than a preset height. When a depth of the liquid in the target region 40 is fixed, the processor 52 may determine whether the position of the cleaning device 10 meets the preset condition to determine whether the air inlet 5113 of the cleaning device 10 is above the liquid surface 30. When the position of the cleaning device 10 shown in FIG. 7 meets the preset condition, the processor 52 may determine that the air inlet 5113 of the cleaning device 10 is above the liquid surface 30, the processor 52 may control the buoyancy cavity pump 5112 to drain the liquid from the buoyancy cavity 5111, and air may enter the buoyancy cavity 5111 through the air inlet 5113, to increase the volume of the gas in the buoyancy cavity 5111 and increase the buoyancy force applied to the cleaning device 10.”	Wang '040 at p.12:49-59: “When the cleaning apparatus 10 needs to switch from below the liquid level 30 to above the liquid level 30, the processor 52 can obtain the position of the cleaning apparatus 10 in real time from the first sensor. When the position of the cleaning apparatus 10 meets the preset conditions, the processor 52 can control the buoyancy adjustment member to increase the volume of the gas in the buoyancy chamber 5111. The preset condition may include the position of the cleaning apparatus 10 being higher than a preset height. When the depth of the liquid in the target area 40 is fixed, the processor 52 may determine whether the position of the cleaning apparatus 10 meets the preset condition to determine whether the air inlet 5113 of the cleaning apparatus 10 is above the liquid level 30. When the position of the cleaning apparatus 10, as shown in FIG. 7, satisfies a preset condition, the processor 52 may determine that the air inlet 5113 on the cleaning apparatus 10 is above the liquid level 30. The processor 52 may control the buoyancy chamber pump 5112 to discharge the liquid from the buoyancy chamber 5111, allowing air to enter the buoyancy chamber 5111 through the air inlet 5113, thereby increasing the volume of gas within the buoyancy chamber 5111 and enhancing the buoyancy of the cleaning apparatus 10.”

Claim No.	Claim Language	Relevant Disclosure of Wang	Relevant Disclosure of Wang'040 supporting Wang
		Wang at [0115]: “In some embodiments, the cleaning device 10 may further include a second sensor (not shown in the figure). The second sensor may be configured to detect in real time whether the air inlet 5113 of the buoyancy cavity 5111 is exposed to the air. For example, the second sensor may be an ultrasonic sensor.”  Fig. 7 of Wang (Annotated)	Wang '040 at p.12:62-64: “In some embodiments, the cleaning apparatus 10 may further include a second sensor (not shown). The second sensor may be used to detect in real time whether the air inlet 5113 of the buoyancy chamber 5111 is located in air. For example, the second sensor may be an ultrasonic sensor.”  Fig. 7 of Wang'040 (Annotated)

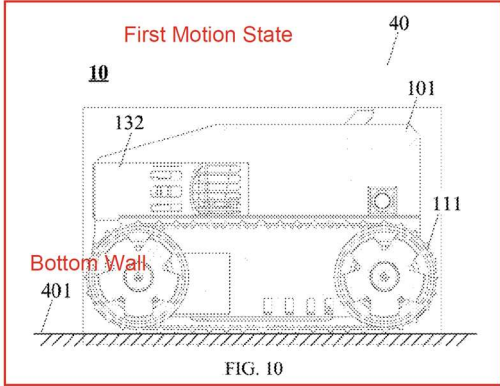
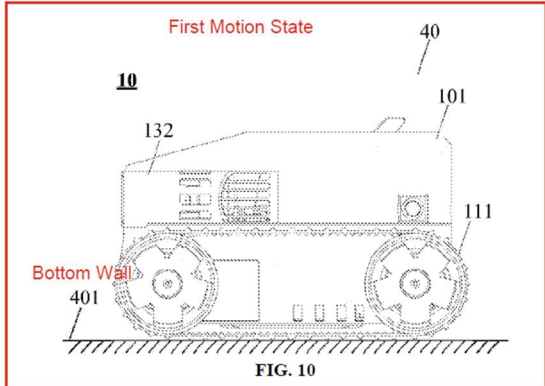
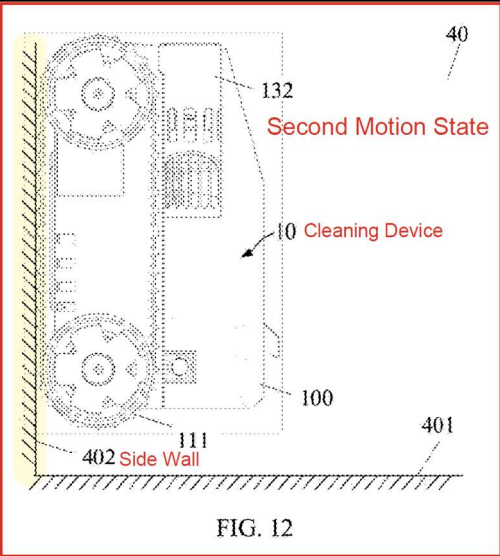
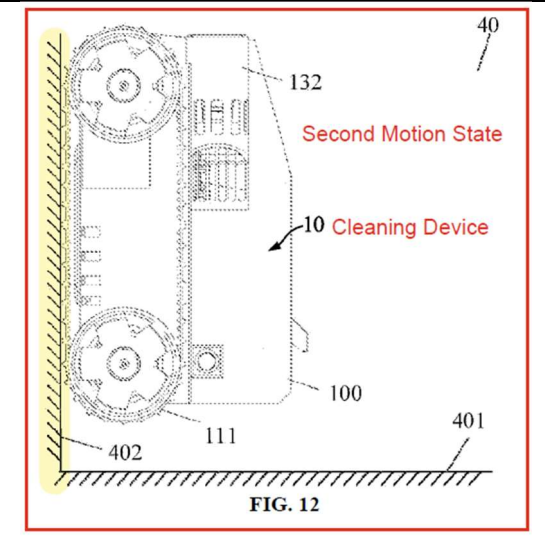
Claim No.	Claim Language	Relevant Disclosure of Wang	Relevant Disclosure of Wang'040 supporting Wang
1c	a main control unit configured to control a working state of the sinking and floating control unit,	Wang at [0114]: “In some embodiments, the cleaning device 10 may further include a processor 52 (not shown in the figure). The processor 52 may be a micro-controller, an embedded processor 52, an application-specific integrated circuit (ASIC), or the like. The processor 52 may obtain various pieces of data information of the cleaning device 10 and analyze the obtained data information to control various components of the cleaning device 10. When the cleaning device 10 needs to be switched from the position under the liquid surface 30 to the position on the liquid surface 30, the processor 52 may obtain the position of the cleaning device 10 in real time from the first sensor. When the position of the cleaning device 10 meets a preset condition, the processor 52 may control the buoyancy adjustment part to increase the volume of the gas in the buoyancy cavity 5111. The preset condition may be that the position of the cleaning device 10 is higher than a preset height. When a depth of the liquid in the target region 40 is fixed, the processor 52 may determine whether the position of the cleaning device 10 meets the preset condition to determine whether the air inlet 5113 of the cleaning device 10 is above the liquid surface 30. When the position of the cleaning device 10 shown in FIG. 7 meets the preset condition, the processor 52 may determine that the air inlet 5113 of the cleaning device 10 is above the liquid surface 30, the processor 52 may control the buoyancy cavity pump 5112 to drain the liquid from the buoyancy	Wang '040 at p.12:46-61: “In some embodiments, the cleaning apparatus 10 may further include a processor 52 (not shown). The processor 52 may be a microcontroller, embedded processor 52, or application-specific integrated circuit (ASIC), among others. The processor 52 may acquire various data information of the cleaning apparatus 10 and analyze and process it to control various components in the cleaning apparatus 10. When the cleaning apparatus 10 needs to switch from below the liquid level 30 to above the liquid level 30, the processor 52 can obtain the position of the cleaning apparatus 10 in real time from the first sensor. When the position of the cleaning apparatus 10 meets the preset conditions, the processor 52 can control the buoyancy adjustment member to increase the volume of the gas in the buoyancy chamber 5111. The preset condition may include the position of the cleaning apparatus 10 being higher than a preset height. When the depth of the liquid in the target area 40 is fixed, the processor 52 may determine whether the position of the cleaning apparatus 10 meets the preset condition to determine whether the air inlet 5113 of the cleaning apparatus 10 is above the liquid level 30. When the position of the cleaning apparatus 10, as shown in FIG. 7, satisfies a preset condition, the processor 52 may determine that the air inlet 5113 on the cleaning apparatus 10 is above the liquid level 30. The processor 52 may control the buoyancy chamber pump 5112 to discharge the liquid from the buoyancy chamber 5111, allowing air to enter

Claim No.	Claim Language	Relevant Disclosure of Wang	Relevant Disclosure of Wang'040 supporting Wang
		cavity 5111 , and air may enter the buoyancy cavity 5111 through the air inlet 5113, to increase the volume of the gas in the buoyancy cavity 5111 and increase the buoyancy force applied to the cleaning device 10. When the buoyancy force applied to the cleaning device 10 in the vertical direction is greater than gravity of the cleaning device 10, the cleaning device 10 shown in FIG. 7 is switched to the cleaning device 10 shown in FIG. 8.”	the buoyancy chamber 5111 through the air inlet 5113, thereby increasing the volume of gas within the buoyancy chamber 5111 and enhancing the buoyancy of the cleaning apparatus 10. When the buoyancy of the cleaning apparatus 10 in the vertical direction is greater than its gravity, the cleaning apparatus 10 as shown in FIG. 7 may be switched to the cleaning apparatus 10 as shown in FIG. 8.”
		Wang at [0117]: “In some embodiments, when the cleaning device 10 needs to be switched from the position under the liquid surface 30 to the position on the liquid surface 30, the processor 52 may obtain the detection result of whether the air inlet 5113 of the buoyancy cavity 5111 is exposed to the air. When the detection result indicates that the air inlet 5113 is exposed to the air, the buoyancy adjustment part is controlled to increase the volume of the gas in the buoyancy cavity 5111 to switch the cleaning device 10 from the position under the liquid surface 30 to the position on the liquid surface 30. ”	Wang'040 at p.13:3-7: “In some embodiments, when the cleaning apparatus 10 needs to switch from below the liquid level 30 to above the liquid level 30, the processor 52 may obtain a detection result indicating whether the air inlet 5113 of the buoyancy chamber 5111 is in air. When the detection result indicates that the air inlet 5113 is in air, the processor controls the buoyancy adjustment member to increase the volume of gas in the buoyancy chamber 5111, thereby enabling the cleaning apparatus 10 to switch from below the liquid level 30 to above the liquid level 30. ”
		Wang at [0118]: “When the cleaning device 10 needs to be switched from the position on the liquid surface 30 to the position under the liquid surface 30, the processor 52 may control the buoyancy adjustment part to reduce the volume of the gas in the buoyancy cavity 5111. ”	Wang '040 at p.13:10-11: “When the cleaning apparatus 10 needs to switch from above the liquid level 30 to below the liquid level 30, the processor 52 can control the buoyancy adjustment member to reduce the volume of the gas in the buoyancy chamber 5111. ”

Claim No.	Claim Language	Relevant Disclosure of Wang	Relevant Disclosure of Wang'040 supporting Wang
1d	wherein the main control unit is capable of controlling the swimming pool robot to find a side wall or a slope based on operational requirement information of the swimming pool robot and enabling the swimming pool robot to crawl along the side wall or the slope;	Wang at [0182]: “Step 1010: Obtain a target task of cleaning a target swimming pool.”	Wang '040 at p.19:21: “Step 1010: Obtain a target task for cleaning a target swimming pool.”
		Wang at [0183]: “The target swimming pool may be a to-be-cleaned swimming pool. The target task may be a task of cleaning the target swimming pool. The target task may include water surface cleaning and/or underwater cleaning . The water surface cleaning may mean cleaning a water surface of the target swimming pool. The underwater cleaning may mean cleaning an underwater part of the target swimming pool (such as water in the swimming pool and a wall of the swimming pool). In some embodiments, the target task may further include a specific to-be-cleaned part. For example, the underwater cleaning may further include, but is not limited to, cleaning the water, cleaning the bottom of the pool, cleaning each wall of the pool, and the like. ”	Wang '040 at p.19:22-27: “The target task refers to the cleaning task to be performed on the target swimming pool. The target task may include surface cleaning and/or underwater cleaning , where surface cleaning refers to cleaning the water surface of the target pool, and underwater cleaning refers to cleaning underwater areas (e.g., water body, pool wall, etc.) of the target pool . In some embodiments, the target task may further specify particular cleaning locations 4311. For example, underwater cleaning may include, but is not limited to, cleaning the water body, pool bottom, and various pool walls. ”
		Wang at [0184]: “The control member may obtain the target task in various manners. For example, the control member may obtain the target task input by a user . For another example, the control member may be configured to perform the target task periodically, such as perform water surface cleaning once every three days and perform underwater cleaning once every two days.”	Wang '040 at p.19:28-30: “The control component may acquire the target task in various ways. For example, the control component may receive user input specifying the target task . Alternatively, the control component may be configured to execute the target task periodically, such as performing surface cleaning every three days and underwater cleaning every two days.”
		Wang at [0185]: “Step 1020: Determine an adjustment parameter of a moving mechanism	Wang '040 at p.19:41-42: “At step 1020, based on the target task and the current position of the cleaning

Claim No.	Claim Language	Relevant Disclosure of Wang	Relevant Disclosure of Wang'040 supporting Wang
		based on the target task and a current position of the cleaning device 10.”	apparatus 10, an adjustment parameter of the cleaning apparatus 10 is determined.”
		Wang at [0187]: “The adjustment parameter may include information of a route from the current position to a position, in the target swimming pool, at which the target task needs to be performed and route information required to complete the target task.”	Wang '040 at p.19:45-46: “The adjustment parameters may include route information for moving from the current position to the location in the target pool where the target task is to be performed, as well as the route information required to complete the target task.”
		Wang at [0188]: “The control member may determine, based on the target task, a starting position, in the target swimming pool, at which the target task needs to be performed; determine, based on the starting position and the current position, the information of the route of the cleaning device 10 from the current position to the position, in the target swimming pool, at which the target task needs to be performed; and determine, based on the target task for the target swimming pool, the route information required to complete the target task, to determine the adjustment parameter of the moving mechanism.”	Wang '040 at p.19:47-50: “The control component may, based on the target task, determine the starting position in the target pool for performing the target task, then determine the route information for moving from the current position to the starting position, and further determine the route information required to complete the target task, thereby determining the adjustment parameters for the cleaning apparatus 10. ”
		Wang at [0068]: “With reference to FIG. 7, FIG. 8, FIG. 10, FIG. 11, and FIG. 12, a first motion state is defined as a state in which the cleaning device 10 moves on the bottom wall 401, or an angle between the bottom wall 401 and an overall direction of the cleaning device 10 is less than 90° and the cleaning device 10 is away from the	Wang '040 at p.7:29-38: “In conjunction with FIG. 7, FIG. 8, FIG. 10, FIG. 11, and FIG. 12, when the cleaning apparatus 10 moves on the target bottom wall 401 or the overall direction of the cleaning apparatus 10 is at an angle less than 90° to the target bottom wall 401 and is away from the liquid level 30, this is defined as the first movement state.

Claim No.	Claim Language	Relevant Disclosure of Wang	Relevant Disclosure of Wang'040 supporting Wang
		liquid surface 30. As shown in FIG. 10, that the cleaning device 10 is away from the liquid surface 30 may be understood as that the cleaning device 10 cleans the bottom of the pool or performs an action underwater. A second motion state is defined as a state in which the cleaning device 10 moves on the side wall 402, or the overall direction of the cleaning device 10 is substantially parallel to the side wall 402, as shown in FIG. 7 and FIG. 12. A third motion state is defined as a state in which the cleaning device 10 moves on the liquid surface 30, or the cleaning device 10 is at least partially exposed at the liquid surface 30, or the cleaning device 10 is entirely located under the liquid surface 30 and close to the liquid surface 30.”	As shown in FIG. 10, away from the liquid level 30 can be understood as the cleaning apparatus 10 cleaning the pool bottom, performing actions in the water, etc. When the cleaning apparatus 10 moves on the target side wall 402 or the overall direction of the cleaning apparatus 10 is substantially parallel to the target side wall 402, this is defined as the second movement state, as shown in FIG. 7 and FIG. 12. When the cleaning apparatus 10 is moving on the liquid level 30, or the cleaning apparatus 10 is at least partially exposed from the liquid level 30, or the cleaning apparatus 10 is located as a whole below the liquid level 30 and close to the liquid level 30, this is defined as the third movement state, where being close to the liquid level 30 can be understood as the distance between the cleaning apparatus 10 and the liquid level 30 being less than a threshold value, and it can perform water surface cleaning work etc. ”

Claim No.	Claim Language	Relevant Disclosure of Wang	Relevant Disclosure of Wang'040 supporting Wang
		 FIG. 10 of Wang (Annotated)	 FIG. 10 of Wang'040 (Annotated)
		 FIG. 12 of Wang (Annotated)	 FIG. 12 of Wang'040 (Annotated)

Claim No.	Claim Language	Relevant Disclosure of Wang	Relevant Disclosure of Wang'040 supporting Wang
		Wang at [0070]: “In some embodiments, the cleaning device 10 further has the second motion state. The cleaning device can clean a pool wall or a waterline in the second motion state. Switching of the cleaning device 10 between the first motion state and the third motion state may include or exclude switching of the second motion state. In other words, the cleaning device may have the first motion state and the third motion state, or the cleaning device may have the first motion state, the second motion state, and the third motion state.”	Wang '040 at p.7:46-49: “In some embodiments, the cleaning apparatus 10 further comprises a second movement state. The cleaning apparatus may perform wall or waterline cleaning tasks in the second movement state. The switching of the cleaning apparatus 10 between the first and third movement states includes or does not include a second movement state. That is, the cleaning apparatus may comprise a first movement state and a third movement state.”
		Wang at [0138]: “In some embodiments, the two first wheels 1121 are disposed at the front end of the bottom of the cleaning device body 101. The two second wheels 1122 are disposed at the rear end of the bottom of the cleaning device body 101. The first wheels 1121 and the second wheels 1122 can drive the cleaning device 10 to move in the horizontal direction. When the cleaning device 10 is located on the target bottom wall 401 of the target region 40, the first wheels 1121 and the second wheels 1122 can operate to drive the cleaning device 10 to move on the target bottom wall 401 and the target side wall 402 and move from the target bottom wall 401 to the target side wall 402.”	Wang '040 at p.15:25-30: “In some embodiments, the two first wheels 1121 are disposed at the front end of the bottom of the cleaning apparatus main body 101, and the two second wheels 1122 are arranged at the rear end of the bottom of the cleaning apparatus main body 101. The first and second wheels 1121 and 1122 may drive the cleaning apparatus 10 to move in a horizontal direction. When the cleaning apparatus 10 is located on the target bottom wall 401 of the target area 40, the operation of the first and second wheels 1121 and 1122 may drive the cleaning apparatus 10 to move on the target bottom wall 401 and on the target side wall 402 and to transition from the target bottom wall 401 to the target side wall 402.”
		Wang at [0139]: “In some embodiments, the track 111 enables the cleaning device 10 to move from the target bottom wall 401 to the target side wall 402.	Wang '040 at p.15:40-46: “In some embodiments, the track 111 may also enable transition of the travel area of the cleaning apparatus 10 from the target

Claim No.	Claim Language	Relevant Disclosure of Wang	Relevant Disclosure of Wang'040 supporting Wang
		As shown in FIG. 11, when the track 111 moves to an intersection between the target bottom wall 401 and the target side wall 402, a part of the track 111 moves on the target side wall 402, and the other part of the track 111 moves on the target bottom wall 401. The part of the track 111 on the target side wall 402 can drive the cleaning device 10 to move upward until the cleaning device moves from the target bottom wall 401 to the target side wall 402. After the cleaning device 10 moves from the target bottom wall 401 to the target side wall 402, the cleaning device 10 may be driven by the track 111 to move on the target side wall 402.”	bottom wall 401 to the target side wall 402. As shown in FIG. 11, when the track 111 moves to the junction between the target bottom wall 401 and the target side wall 402, a portion of the track 111 moves on the target side wall 402, while another portion moves on the target bottom wall 401. The portion of the track 111 at the target side wall 402 may drive the cleaning apparatus 10 upward until the travel area of the cleaning apparatus 10 switches from the target bottom wall 401 to the target side wall 402. When the travel area of the cleaning apparatus 10 is switched from the target bottom wall 401 to the target side wall 402, the cleaning apparatus 10 can move on the target side wall 402 driven by the track 111.”
		Wang at [0068]-[0070]. [0068] With reference to FIG. 7, FIG. 8, FIG. 10, FIG. 11, and FIG. 12, a first motion state is defined as a state in which the cleaning device 10 moves on the bottom wall 401, or an angle between the bottom wall 401 and an overall direction of the cleaning device 10 is less than 90° and the cleaning device 10 is away from the liquid surface 30. As shown in FIG. 10, that the cleaning device 10 is away from the liquid surface 30 may be understood as that the cleaning device 10 cleans the bottom of the pool or performs an action under- water. A second motion state is defined as a state in which the cleaning device 10 moves on the side wall 402, or the overall direction	Wang' 040 at p.7:29-51. In conjunction with FIG. 7, FIG. 8, FIG. 10, FIG. 11, and FIG. 12, when the cleaning apparatus 10 moves on the target bottom wall 401 or the overall direction of the cleaning apparatus 10 is at an angle less than 90° to the target bottom wall 401 and is away from the liquid level 30, this is defined as the first movement state. As shown in FIG. 10, away from the liquid level 30 can be understood as the cleaning apparatus 10 cleaning the pool bottom, performing actions in the water, etc. When the cleaning apparatus 10 moves on the target side wall 402 or the overall direction of the cleaning apparatus 10 is substantially parallel to the target side wall 402, this is defined as

Claim No.	Claim Language	Relevant Disclosure of Wang	Relevant Disclosure of Wang'040 supporting Wang
		of the cleaning device 10 is substantially parallel to the side wall 402, as shown in FIG. 7 and FIG. 12. A third motion state is defined as a state in which the cleaning device 10 moves on the liquid surface 30, or the cleaning device 10 is at least partially exposed at the liquid surface 30, or the cleaning device 10 is entirely located under the liquid surface 30 and close to the liquid surface 30. That the cleaning device 10 is close to the liquid surface 30 may be understood as that a distance between the cleaning device 10 and the liquid surface 30 is less than a threshold and the cleaning device 10 can perform water surface cleaning. The overall direction of the cleaning device 10 is defined as a direction of a plane in which a movement propulsion mechanism 100 of the cleaning device 10, for example, a track 111 or a wheel 112, is in contact with a to-be-cleaned surface. [0069] Therefore, under the action of the mode switching member 510, the cleaning device 10 can be switched between the position on the liquid surface 30 and the position under the liquid surface 30, so that the cleaning device 10 is switched between the first motion state and the third motion state. The cleaning device can perform under- water cleaning in the first motion state. The cleaning device can perform water surface cleaning in the third motion state. Therefore, the cleaning device 10 can be adjusted to perform at least two operating conditions: underwater cleaning	the second movement state, as shown in FIG. 7 and FIG. 12. When the cleaning apparatus 10 is moving on the liquid level 30, or the cleaning apparatus 10 is at least partially exposed from the liquid level 30, or the cleaning apparatus 10 is located as a whole below the liquid level 30 and close to the liquid level 30, this is defined as the third movement state, where being close to the liquid level 30 can be understood as the distance between the cleaning apparatus 10 and the liquid level 30 being less than a threshold value, and it can perform water surface cleaning work etc. In the above description, the plane where the propulsion mechanism 100 of the cleaning apparatus 10, such as the track 111 or the wheel 112, contacts the surface to be cleaned can be defined as the overall direction of the cleaning apparatus 10. As such, under the action of the mode switching component 510, the cleaning apparatus 10 can be switched between positions above and below the liquid level 30, enabling the switching of the cleaning apparatus 10 between the first movement state and the third movement state. The cleaning apparatus may perform underwater cleaning tasks in the first movement state. The cleaning apparatus can perform water surface cleaning tasks in the third movement state, and the cleaning apparatus 10 can be adjusted to perform at least two working conditions: underwater cleaning and water surface cleaning, thereby meeting different usage needs.

Claim No.	Claim Language	Relevant Disclosure of Wang	Relevant Disclosure of Wang'040 supporting Wang
		and water surface cleaning, thereby meeting various use requirements. [0070] In some embodiments, the cleaning device 10 further has the second motion state. The cleaning device can clean a pool wall or a waterline in the second motion state. Switching of the cleaning device 10 between the first motion state and the third motion state may include or exclude switching of the second motion state. In other words, the cleaning device may have the first motion state and the third motion state, or the cleaning device may have the first motion state, the second motion state, and the third motion state. The second motion state may be selected based on an actual requirement. This is not limited herein.	In some embodiments, the cleaning apparatus 10 further comprises a second movement state. The cleaning apparatus may perform wall or waterline cleaning tasks in the second movement state. The switching of the cleaning apparatus 10 between the first and third movement states includes or does not include a second movement state. That is, the cleaning apparatus may comprise a first movement state and a third movement state. Alternatively, the cleaning apparatus may comprise a first movement state, a second movement state, and a third movement state. Wherein, the second movement state may be selected according to actual needs and is not limited here.
		Wang at [0138]-[0139]. [0138] In some embodiments, the two first wheels 1121 are disposed at the front end of the bottom of the cleaning device body 101. The two second wheels 1122 are disposed at the rear end of the bottom of the cleaning device body 101. The first wheels 1121 and the second wheels 1122 can drive the cleaning device 10 to move in the horizontal direction. When the cleaning device 10 is located on the target bottom wall 401 of the target region 40, the first wheels 1121 and the second wheels 1122 can operate to drive the cleaning device 10 to move on the target bottom wall 401 and the target side wall 402 and move from the target bottom wall 401 to the target side wall 402. In	Wang' 040 at p.15:25-62. In some embodiments, the two first wheels 1121 are disposed at the front end of the bottom of the cleaning apparatus main body 101, and the two second wheels 1122 are arranged at the rear end of the bottom of the cleaning apparatus main body 101. The first and second wheels 1121 and 1122 may drive the cleaning apparatus 10 to move in a horizontal direction. When the cleaning apparatus 10 is located on the target bottom wall 401 of the target area 40, the operation of the first and second wheels 1121 and 1122 may drive the cleaning apparatus 10 to move on the target bottom wall 401 and on the target side wall 402 and to transition from the target

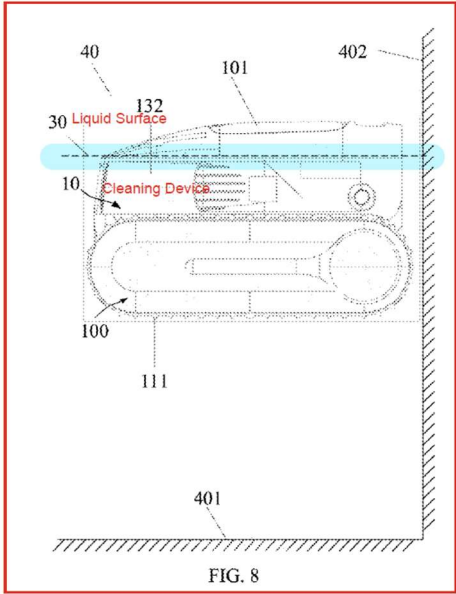
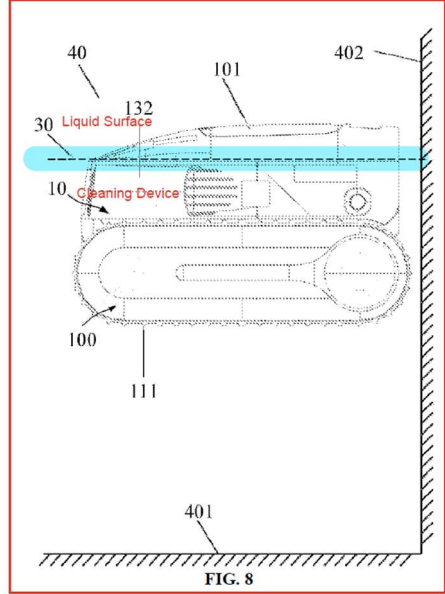
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		some embodiments, the movement propulsion mechanism 100 includes a track 111. The first wheel 1121 and the second wheel 1122 are connected to each other through the track 111. In other words, the first wheel 1121 and the second wheel 1122 rotate as the track 111 rotates. The track 111 can operate to drive the cleaning device 10 to move. The track 111 can drive the cleaning device 10 to move in the horizontal direction. As shown in FIG. 10, when the cleaning device 10 is located on the target bottom wall 401 of the target region 40, the track 111 can operate to drive the cleaning device 10 to move on the target bottom wall 401. The track 111 can further drive the cleaning device 10 to move in the vertical direction. As shown in FIG. 7 and FIG. 12, when the cleaning device 10 is tightly attached to the target side wall 402 of the target region 40, the track 111 can operate to drive the cleaning device 10 to move on the target side wall 402. For details about how the cleaning device 10 is tightly attached to and moves on the target side wall 402 of the target region 40, refer to the following description. [0139] In some embodiments, the track 111 enables the cleaning device 10 to move from the target bottom wall 401 to the target side wall 402. As shown in FIG. 11, when the track 111 moves to an intersection between the target bottom wall 401 and the target side wall 402, a part of the track 111 moves on the target side wall 402, and the other part of the track 111 moves on the target bottom wall 401. The part of the	bottom wall 401 to the target side wall 402. In some embodiments, the traveling propulsion mechanism 100 includes a track 111. The first wheels 1121 and second wheels 1122 are connected by the track 111. That is, the first wheels 1121 and the second wheels 1122 rotate with the rotation of the track 111. The operation of the track 111 may drive the cleaning apparatus 10 to move. The track 111 may drive the cleaning apparatus 10 to move in a horizontal direction. As shown in FIG. 10, when the cleaning apparatus 10 is located on the target bottom wall 401 of the target area 40, the operation of the track 111 may drive the cleaning apparatus 10 to move on the target bottom wall 401. The track 111 can also drive the cleaning apparatus 10 to move in the vertical direction. As shown in FIG. 7 and FIG. 13, when the cleaning apparatus 10 is in close contact with the target side wall 402 of the target area 40, the operation of the track 111 may further drive the cleaning apparatus 10 to move on the target side wall 402. Wherein, more details on how the cleaning apparatus 10 is brought into close contact with the target side wall 402 of the target area 40 are described below. In some embodiments, the track 111 may also enable transition of the travel area of the cleaning apparatus 10 from the target bottom wall 401 to the target side wall 402. As shown in FIG. 11, when the track 111 moves to the junction between the target bottom wall 401 and the target side wall 402, a portion of the

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		track 111 on the target side wall 402 can drive the cleaning device 10 to move upward until the cleaning device moves from the target bottom wall 401 to the target side wall 402. After the cleaning device 10 moves from the target bottom wall 401 to the target side wall 402, the cleaning device 10 may be driven by the track 111 to move on the target side wall 402. The cleaning device 10 can move on the target side wall 402 under the action of the second driving force provided by the second propeller 132 after the second propeller 132 performs steering. The cleaning device 10 can move on the target side wall 402 under the action of a third driving force provided by the main water pump 210. For details about the main water pump 210 and the third driving force provided by the main water pump 210, refer to the following description. The track 111 is disposed, so that the cleaning device 10 can move at various positions in the liquid, and the cleaning device 10 can move from the target bottom wall 401 to the target side wall 402. In some embodiments, the cleaning device 10 may further include the main water pump 210. The main water pump 210 may be configured to drive the cleaning device 10 to suck the liquid from the liquid inlet portion 103 and drain the liquid from the liquid outlet portion 104. The liquid inlet portion 103 may include one or more inlets for liquid to enter the cleaning device 10, such as the first water inlet 1031 and the second water inlet 1032. The liquid inlet portion 103 includes a main pump water inlet 213. As shown in FIG. 9, FIG. 13, FIG. 14, and FIG. 15, the	track 111 moves on the target side wall 402, while another portion moves on the target bottom wall 401. The portion of the track 111 at the target side wall 402 may drive the cleaning apparatus 10 upward until the travel area of the cleaning apparatus 10 switches from the target bottom wall 401 to the target side wall 402. When the travel area of the cleaning apparatus 10 is switched from the target bottom wall 401 to the target side wall 402, the cleaning apparatus 10 can move on the target side wall 402 driven by the track 111. The cleaning apparatus 10 can further move on the target side wall 402 under the action of the second driving force provided by the second thruster 132 after turning, and the cleaning apparatus 10 can further move on the target side wall 402 based on the action of the third driving force provided by the main water pump 210. For more details regarding the main water pump 210 and the third driving force it provides, please refer to the subsequent sections. By providing the tracker 111, the cleaning apparatus 10 can be easily moved to various positions in the liquid, and the travel area of the cleaning apparatus 10 can be switched from the target bottom wall 401 to the target side wall 402. In some embodiments, the cleaning apparatus 10 may further include a main water pump 210. The main water pump 210 may be used to drive the cleaning apparatus 10 to draw liquid from the liquid inlet section 103 and discharge it from the liquid outlet section 104. The liquid inlet section 103 may include one or more entries into which liquid enters the cleaning apparatus 10, such as

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		main pump water inlet 213 of the cleaning device 10 may serve as an inlet for liquid to enter the cleaning device 10. The main pump water inlet 213 may be the first water inlet 1031 or the second water inlet 1032. The liquid outlet portion 104 includes one or more outlets for liquid to be drained from the cleaning device 10 into the target region 40. The liquid outlet portion 104 includes a main pump water outlet 214. The main pump water outlet 214 may be the first water outlet. As shown in FIG. 9, FIG. 13, FIG. 14, and FIG. 15, the main pump water outlet 214 of the cleaning device 10 may serve as an outlet for the liquid in the cleaning device 10 to be drained from the cleaning device 10 into the target region 40.	a first water inlet 1031, a second water inlet 1032, etc. The liquid inlet section 103 includes a main water pump inlet 213. As shown in FIG. 9, FIG. 13, FIG. 14, and FIG. 15, the main water pump inlet 213 in the cleaning apparatus 10 may serve as an inlet for liquid into the cleaning apparatus 10, wherein the main water pump inlet 213 may be the first water inlet 1031 or the second water inlet 1032. The liquid outlet section 104 may include one or more outlets where liquid within the cleaning apparatus 10 exits the cleaning apparatus 10 into the target area 40. The liquid outlet section 104 includes a main water pump outlet 214. The main water pump outlet 214 may be a first water outlet. As shown in FIG. 9, FIG. 13, FIG. 14, and FIG. 15, the main water pump outlet 214 in the cleaning apparatus 10 may serve as an outlet for the liquid in the cleaning apparatus 10 to leave the cleaning apparatus 10 and enter the target area 40.
1e	controlling the waterline detection unit to detect the positional relationship between the swimming pool robot and the waterline of the liquid surface of the swimming pool where the	Wang at [0114]: “In some embodiments, the cleaning device 10 may further include a processor 52 (not shown in the figure) When the cleaning device 10 needs to be switched from the position under the liquid surface 30 to the position on the liquid surface 30, the processor 52 may obtain the position of the cleaning device 10 in real time from the first sensor. When the position of the cleaning device 10 meets a preset condition , the processor 52 may control the buoyancy adjustment part to increase the volume of the gas in the buoyancy cavity 5111. The preset condition may	Wang '040 at p.12:46-55: “In some embodiments, the cleaning apparatus 10 may further include a processor 52 (not shown). The processor 52 may be a microcontroller, embedded processor 52, or application-specific integrated circuit (ASIC), among others. The processor 52 may acquire various data information of the cleaning apparatus 10 and analyze and process it to control various components in the cleaning apparatus 10. When the cleaning apparatus 10 needs to switch from below the liquid level 30 to above the liquid level 30, the processor 52 can obtain the position of the cleaning apparatus 10 in

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	swimming pool robot is located; and	be that the position of the cleaning device 10 is higher than a preset height. When a depth of the liquid in the target region 40 is fixed, the processor 52 may determine whether the position of the cleaning device 10 meets the preset condition to determine whether the air inlet 5113 of the cleaning device 10 is above the liquid surface 30."	real time from the first sensor. When the position of the cleaning apparatus 10 meets the preset conditions, the processor 52 can control the buoyancy adjustment member to increase the volume of the gas in the buoyancy chamber 5111. The preset condition may include the position of the cleaning apparatus 10 being higher than a preset height. When the depth of the liquid in the target area 40 is fixed, the processor 52 may determine whether the position of the cleaning apparatus 10 meets the preset condition to determine whether the air inlet 5113 of the cleaning apparatus 10 is above the liquid level 30."
1f	controlling the sinking and floating control unit to enter a floating working state based on detection results to realize a floating of the swimming pool robot,	Wang at [0114]: "When the cleaning device 10 needs to be switched from the position under the liquid surface 30 to the position on the liquid surface 30, the processor 52 may obtain the position of the cleaning device 10 in real time from the first sensor. When the position of the cleaning device 10 meets a preset condition, the processor 52 may control the buoyancy adjustment part to increase the volume of the gas in the buoyancy cavity 5111. The preset condition may be that the position of the cleaning device 10 is higher than a preset height. When a depth of the liquid in the target region 40 is fixed, the processor 52 may determine whether the position of the cleaning device 10 meets the preset condition to determine whether the air inlet 5113 of the cleaning device 10 is above the liquid surface 30. When the position of the	Wang '040 at p.12:49-61: "When the cleaning apparatus 10 needs to switch from below the liquid level 30 to above the liquid level 30, the processor 52 can obtain the position of the cleaning apparatus 10 in real time from the first sensor. When the position of the cleaning apparatus 10 meets the preset conditions, the processor 52 can control the buoyancy adjustment member to increase the volume of the gas in the buoyancy chamber 5111. The preset condition may include the position of the cleaning apparatus 10 being higher than a preset height. When the depth of the liquid in the target area 40 is fixed, the processor 52 may determine whether the position of the cleaning apparatus 10 meets the preset condition to determine whether the air inlet 5113 of the cleaning apparatus 10 is above the liquid level 30. When the position of the

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		cleaning device 10 shown in FIG. 7 meets the preset condition, the processor 52 may determine that the air inlet 5113 of the cleaning device 10 is above the liquid surface 30, the processor 52 may control the buoyancy cavity pump 5112 to drain the liquid from the buoyancy cavity 5111, and air may enter the buoyancy cavity 5111 through the air inlet 5113, to increase the volume of the gas in the buoyancy cavity 5111 and increase the buoyancy force applied to the cleaning device 10. When the buoyancy force applied to the cleaning device 10 in the vertical direction is greater than gravity of the cleaning device 10, the cleaning device 10 shown in FIG. 7 is switched to the cleaning device 10 shown in FIG. 8.”	cleaning apparatus 10, as shown in FIG. 7, satisfies a preset condition, the processor 52 may determine that the air inlet 5113 on the cleaning apparatus 10 is above the liquid level 30. The processor 52 may control the buoyancy chamber pump 5112 to discharge the liquid from the buoyancy chamber 5111, allowing air to enter the buoyancy chamber 5111 through the air inlet 5113, thereby increasing the volume of gas within the buoyancy chamber 5111 and enhancing the buoyancy of the cleaning apparatus 10. When the buoyancy of the cleaning apparatus 10 in the vertical direction is greater than its gravity, the cleaning apparatus 10 as shown in FIG. 7 may be switched to the cleaning apparatus 10 as shown in FIG. 8.”
		Wang at [0117]: “In some embodiments, when the cleaning device 10 needs to be switched from the position under the liquid surface 30 to the position on the liquid surface 30, the processor 52 may obtain the detection result of whether the air inlet 5113 of the buoyancy cavity 5111 is exposed to the air. When the detection result indicates that the air inlet 5113 is exposed to the air, the buoyancy adjustment part is controlled to increase the volume of the gas in the buoyancy cavity 5111 to switch the cleaning device 10 from the position under the liquid surface 30 to the position on the liquid surface 30.”	Wang '040 at p.13:3-7: “In some embodiments, when the cleaning apparatus 10 needs to switch from below the liquid level 30 to above the liquid level 30, the processor 52 may obtain a detection result indicating whether the air inlet 5113 of the buoyancy chamber 5111 is in air. When the detection result indicates that the air inlet 5113 is in air, the processor controls the buoyancy adjustment member to increase the volume of gas in the buoyancy chamber 5111, thereby enabling the cleaning apparatus 10 to switch from below the liquid level 30 to above the liquid level 30.”

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		 FIG. 8 of Wang (annotated)	 Fig. 8 of Wang'040 (Annotated)
		Wang at [0109]: “When the air inlet 5113 does not communicate with the gas, a one-way valve may be disposed at the air inlet 5113. The one-way valve can prevent external water of the cleaning device body 101 from entering the buoyancy cavity 5111 through the air inlet 5113...The buoyancy adjustment part may be any structure that can adjust the gas and/or the liquid in the buoyancy cavity 5111. As shown in FIG. 6, the buoyancy adjustment part may include a buoyancy cavity pump 5112. The buoyancy cavity pump 5112 can drive the buoyancy cavity 5111 to drain the liquid therefrom. The	Wang '040 at p.11:68-p.12:5: “When the air inlet 5113 is not connected to the gas, a one-way valve may be provided at the air inlet 5113. The one-way valve can prevent external water from the cleaning apparatus main body 101 from entering the buoyancy chamber 5111 through the air inlet 5113... The buoyancy adjustment member may be any structure capable of adjusting the volume of gas and/or liquid within the buoyancy chamber 5111. As shown in FIG. 6, the buoyancy adjustment member may include a buoyancy chamber pump 5112, which can drive the discharge of liquid from the

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		buoyancy cavity pump 5112 may be, but is not limited to, a pneumatic pump, a hydraulic pump, or an electric pump. In an operating state, the buoyancy cavity pump 5112 can adjust the liquid and/or the gas in the buoyancy cavity 5111. In a non-operating state, the buoyancy cavity pump 5112 can prevent any external liquid and/or gas of the cleaning device 10 from entering the buoyancy cavity 5111, so that the buoyancy cavity 5111 is not affected by the external liquid and/or gas.”	buoyancy chamber 5111. The buoyancy chamber pump 5112 may include, but is not limited to, pneumatic pumps, hydraulic pumps, or electric pumps , among others. When the buoyancy chamber pump 5112 is in the operating state, it is able to adjust the liquid and/or gas within the buoyancy chamber 5111. When the buoyancy chamber pump 5112 is in the non-working state, liquid and/or liquid outside the cleaning apparatus 10 can be prevented from entering the buoyancy chamber 5111 so that the buoyancy chamber 5111 is not affected by external liquid and/or gas.”
		Wang at [0120]: “When the buoyancy cavity 5111 adjusts the buoyancy force by using gas, and the air inlet 5113 or an air outlet of the buoyancy cavity 5111 is located above the liquid surface, the buoyancy cavity pump 5112 is started to adjust the volume of the gas in the buoyancy cavity 5111.”	Wang '040 at p.13:25-27: “In the case where the buoyancy chamber 5111 uses gas to adjust the buoyancy, when the air inlet 5113 or the air outlet of the buoyancy chamber 5111 is located above the liquid level, the buoyancy chamber pump 5112 is started to adjust the amount of gas in the buoyancy chamber 5111.”
1g	wherein the sinking and floating control unit is controlled to stop working after the sinking and floating control unit enters the floating working state for a	Wang at [0117]: “In some embodiments, when the cleaning device 10 needs to be switched from the position under the liquid surface 30 to the position on the liquid surface 30, the processor 52 may obtain the detection result of whether the air inlet 5113 of the buoyancy cavity 5111 is exposed to the air. When the detection result indicates that the air inlet 5113 is exposed to the air, the buoyancy adjustment part is controlled to increase the volume of the gas in the buoyancy cavity 5111 to	Wang '040 at p.13:3-7: “In some embodiments, when the cleaning apparatus 10 needs to switch from below the liquid level 30 to above the liquid level 30, the processor 52 may obtain a detection result indicating whether the air inlet 5113 of the buoyancy chamber 5111 is in air. When the detection result indicates that the air inlet 5113 is in air, the processor controls the buoyancy adjustment member to increase the volume of gas in the buoyancy chamber 5111, thereby enabling the cleaning apparatus 10 to

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	predetermined time.	switch the cleaning device 10 from the position under the liquid surface 30 to the position on the liquid surface 30.”	switch from below the liquid level 30 to above the liquid level 30.”
		Wang at [0122]: “When the buoyancy cavity 5111 adjusts the buoyancy force by using gas, the volume of the gas in the buoyancy cavity 5111 is set to be a gas volume threshold, so that a balanced force is applied to the cleaning device 10 in the vertical direction. In this way, when the cleaning device 10 cleans the wall of the pool, the cleaning device 10 can be attached to the wall of the pool in the vertical direction and better clean the wall of the pool. When the cleaning device 10 is in the third motion state, there is a first volume of the gas in the buoyancy cavity 5111. When the cleaning device 10 is in the first motion state, there is a second volume of the gas in the buoyancy cavity 5111. The gas volume threshold is a value between the second gas volume and the first gas volume.”	Wang '040 at p.13:47-52: “When the buoyancy chamber 5111 uses gas to adjust the buoyancy, the amount of gas in the buoyancy chamber 5111 is adjusted to a gas threshold value so that the cleaning apparatus 10 is subjected to balanced force in the vertical direction. When the cleaning apparatus 10 is cleaning the pool wall, it is not in the vertical direction so that the cleaning apparatus 10 can fit the pool wall and can better clean the pool wall. When the cleaning apparatus 10 is in the third movement state, the buoyancy chamber 5111 has a first gas amount within it. When the cleaning apparatus 10 is in the first movement state, the buoyancy chamber 5111 has a second gas amount within it. Wherein, the gas threshold value is between the second gas amount and the first gas amount. ”
		Wang at [0099]: “The buoyancy cavity 5111 is configured to accommodate liquid and/or gas. The buoyancy cavity 5111 may be, but is not limited to, an inflatable buoyancy cavity, a liquid-containing buoyancy cavity, a partitioned buoyancy cavity, or the like. A volume of the buoyancy cavity 5111 may be preset. The buoyancy cavity 5111 may be made of a flexible material and/or a rigid material. The flexible material may include, but is not limited to, polyvinyl alcohol resin, polyethylene glycol	Wang '040 at p.11:5-13: “The buoyancy chamber 5111 may be used to accommodate liquid and/or gas. The buoyancy chamber 5111 may include, but is not limited to, an inflatable buoyancy chamber, a liquid container-type buoyancy chamber, a partitioned buoyancy chamber, etc. The volume of the buoyancy chamber 5111 may be preset. The buoyancy chamber 5111 may be made of flexible materials and/or rigid materials. The flexible materials may include, but are not limited to,

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		terephthalate, rubber, and the like. The rigid material may include, but is not limited to, glass, ceramic, phenolic plastic, polyurethane plastic, epoxy plastic, unsaturated polyester plastic, and the like. For example, the buoyancy cavity 5111 may be of a two-layer structure: an inner layer and an outer layer. The inner layer may be made of the flexible material and is configured to accommodate liquid and/or gas. The outer layer is a rigid protective housing and may be configured to provide protection and stability for the inner layer.”	polyvinyl alcohol resin, polyethylene terephthalate, rubber, etc. The rigid materials may include, but are not limited to, glass, ceramics, phenolic plastics, polyurethane plastics, epoxy plastics, unsaturated polyester plastics, etc. For example, the buoyancy chamber 5111 may be a double-layer structure comprising an inner layer and an outer layer. The inner layer may be made of a flexible material for containing gas and/or liquid, while the outer layer is a rigid protective shell, providing protection and stability for the inner layer.”
2a	The controllable sinking and floating swimming pool robot according to claim 1, further comprising: a posture detection unit configured to detect a posture of the swimming pool robot,	Wang at [0256]: “In some embodiments, the preset rotation angle may be obtained by analyzing a received operation instruction by the cleaning device 10, and the second trigger sensor may be a gyroscope sensor . The gyroscope sensor may detect the actual rotation angle of the cleaning device 10 after the cleaning device 10 receives the operation instruction and send the detected actual rotation angle to a central processing unit 52 of the cleaning device 10 to compare the detected actual rotation angle with the preset rotation angle. If a deviation exists between the detected actual rotation angle and the preset rotation angle and exceeds the preset deviation, the central processing unit 52 determines that the cleaning device 10 is currently trapped.”	Wang '040 p.25:45-50: “In some embodiments, the preset rotation angle may be obtained after the cleaning apparatus 10 analyzes the received operating instructions, and the second trigger sensor may be a gyroscope sensor . Through the gyroscope sensor, the actual rotation angle of the cleaning apparatus 10 after receiving the operating instructions may be detected, and the actual rotation angle may be sent to the central processor 52 unit of the cleaning apparatus 10 for comparison with the preset rotation angle. If there is a deviation and the deviation exceeds the preset deviation, the central processor 52 unit determines that the cleaning apparatus 10 is currently trapped.”

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		Wang at [0120]: “In addition, an attitude sensor disposed on the cleaning device 10 may cooperate with a controller to control the attitude of the cleaning device 10 to be stable during state switching.”	Wang '040 at p.13:34-36: “At the same time, the posture sensor provided on the cleaning apparatus 10 can be combined with the controller to control the posture stability of the cleaning apparatus 10 during the state switching process.”
2b	wherein the main control unit controls the waterline detection unit to start detecting the positional relationship in response to the posture meeting a first predetermined condition.	Wang at [0068]-[0070]. [0068] With reference to FIG. 7, FIG. 8, FIG. 10, FIG. 11, and FIG. 12, a first motion state is defined as a state in which the cleaning device 10 moves on the bottom wall 401, or an angle between the bottom wall 401 and an overall direction of the cleaning device 10 is less than 90° and the cleaning device 10 is away from the liquid surface 30. As shown in FIG. 10, that the cleaning device 10 is away from the liquid surface 30 may be understood as that the cleaning device 10 cleans the bottom of the pool or performs an action under- water. A second motion state is defined as a state in which the cleaning device 10 moves on the side wall 402, or the overall direction of the cleaning device 10 is substantially parallel to the side wall 402, as shown in FIG. 7 and FIG. 12. A third motion state is defined as a state in which the cleaning device 10 moves on the liquid surface 30, or the cleaning device 10 is at least partially exposed at the liquid surface 30, or the cleaning device 10 is entirely located under the liquid surface 30 and close to the liquid surface 30. That the cleaning device 10 is close to the liquid surface 30 may be understood as that a distance between the cleaning device 10 and the	Wang' 040 at p.7:29-51. In conjunction with FIG. 7, FIG. 8, FIG. 10, FIG. 11, and FIG. 12, when the cleaning apparatus 10 moves on the target bottom wall 401 or the overall direction of the cleaning apparatus 10 is at an angle less than 90° to the target bottom wall 401 and is away from the liquid level 30, this is defined as the first movement state. As shown in FIG. 10, away from the liquid level 30 can be understood as the cleaning apparatus 10 cleaning the pool bottom, performing actions in the water, etc. When the cleaning apparatus 10 moves on the target side wall 402 or the overall direction of the cleaning apparatus 10 is substantially parallel to the target side wall 402, this is defined as the second movement state, as shown in FIG. 7 and FIG. 12. When the cleaning apparatus 10 is moving on the liquid level 30, or the cleaning apparatus 10 is at least partially exposed from the liquid level 30, or the cleaning apparatus 10 is located as a whole below the liquid level 30 and close to the liquid level 30, this is defined as the third movement state, where being close to the liquid level 30 can be understood as the distance between the cleaning apparatus 10 and the liquid level 30 being less than a threshold value,

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		liquid surface 30 is less than a threshold and the cleaning device 10 can perform water surface cleaning. The overall direction of the cleaning device 10 is defined as a direction of a plane in which a movement propulsion mechanism 100 of the cleaning device 10, for example, a track 111 or a wheel 112, is in contact with a to-be-cleaned surface. [0069] Therefore, under the action of the mode switching member 510, the cleaning device 10 can be switched between the position on the liquid surface 30 and the position under the liquid surface 30, so that the cleaning device 10 is switched between the first motion state and the third motion state. The cleaning device can perform under- water cleaning in the first motion state. The cleaning device can perform water surface cleaning in the third motion state. Therefore, the cleaning device 10 can be adjusted to perform at least two operating conditions: underwater cleaning and water surface cleaning, thereby meeting various use requirements. [0070] In some embodiments, the cleaning device 10 further has the second motion state. The cleaning device can clean a pool wall or a waterline in the second motion state. Switching of the cleaning device 10 between the first motion state and the third motion state may include or exclude switching of the second motion state. In other words, the cleaning device may have the first motion state and the third motion state, or the cleaning device may have the first motion state,	and it can perform water surface cleaning work etc. In the above description, the plane where the propulsion mechanism 100 of the cleaning apparatus 10, such as the track 111 or the wheel 112, contacts the surface to be cleaned can be defined as the overall direction of the cleaning apparatus 10. As such, under the action of the mode switching component 510, the cleaning apparatus 10 can be switched between positions above and below the liquid level 30, enabling the switching of the cleaning apparatus 10 between the first movement state and the third movement state. The cleaning apparatus may perform underwater cleaning tasks in the first movement state. The cleaning apparatus can perform water surface cleaning tasks in the third movement state, and the cleaning apparatus 10 can be adjusted to perform at least two working conditions: underwater cleaning and water surface cleaning, thereby meeting different usage needs. In some embodiments, the cleaning apparatus 10 further comprises a second movement state. The cleaning apparatus may perform wall or waterline cleaning tasks in the second movement state. The switching of the cleaning apparatus 10 between the first and third movement states includes or does not include a second movement state. That is, the cleaning apparatus may comprise a first movement state and a third movement state. Alternatively, the cleaning apparatus may comprise a first movement

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		the second motion state, and the third motion state. The second motion state may be selected based on an actual requirement. This is not limited herein.	state, a second movement state, and a third movement state. Wherein, the second movement state may be selected according to actual needs and is not limited here.
		Wang at [0138]-[0139]. [0138] In some embodiments, the two first wheels 1121 are disposed at the front end of the bottom of the cleaning device body 101. The two second wheels 1122 are disposed at the rear end of the bottom of the cleaning device body 101. The first wheels 1121 and the second wheels 1122 can drive the cleaning device 10 to move in the horizontal direction. When the cleaning device 10 is located on the target bottom wall 401 of the target region 40, the first wheels 1121 and the second wheels 1122 can operate to drive the cleaning device 10 to move on the target bottom wall 401 and the target side wall 402 and move from the target bottom wall 401 to the target side wall 402. In some embodiments, the movement propulsion mechanism 100 includes a track 111. The first wheel 1121 and the second wheel 1122 are connected to each other through the track 111. In other words, the first wheel 1121 and the second wheel 1122 rotate as the track 111 rotates. The track 111 can operate to drive the cleaning device 10 to move. The track 111 can drive the cleaning device 10 to move in the horizontal direction. As shown in FIG. 10, when the cleaning device 10 is located on the target bottom wall 401 of the target region 40, the track 111 can	Wang' 040 at p.15:25-62. In some embodiments, the two first wheels 1121 are disposed at the front end of the bottom of the cleaning apparatus main body 101, and the two second wheels 1122 are arranged at the rear end of the bottom of the cleaning apparatus main body 101. The first and second wheels 1121 and 1122 may drive the cleaning apparatus 10 to move in a horizontal direction. When the cleaning apparatus 10 is located on the target bottom wall 401 of the target area 40, the operation of the first and second wheels 1121 and 1122 may drive the cleaning apparatus 10 to move on the target bottom wall 401 and on the target side wall 402 and to transition from the target bottom wall 401 to the target side wall 402. In some embodiments, the traveling propulsion mechanism 100 includes a track 111. The first wheels 1121 and second wheels 1122 are connected by the track 111. That is, the first wheels 1121 and the second wheels 1122 rotate with the rotation of the track 111. The operation of the track 111 may drive the cleaning apparatus 10 to move. The track 111 may drive the cleaning apparatus 10 to move in a horizontal direction. As shown in FIG. 10, when the cleaning apparatus 10 is located on the target bottom wall 401

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		operate to drive the cleaning device 10 to move on the target bottom wall 401. The track 111 can further drive the cleaning device 10 to move in the vertical direction. As shown in FIG. 7 and FIG. 12, when the cleaning device 10 is tightly attached to the target side wall 402 of the target region 40, the track 111 can operate to drive the cleaning device 10 to move on the target side wall 402. For details about how the cleaning device 10 is tightly attached to and moves on the target side wall 402 of the target region 40, refer to the following description. [0139] In some embodiments, the track 111 enables the cleaning device 10 to move from the target bottom wall 401 to the target side wall 402. As shown in FIG. 11, when the track 111 moves to an intersection between the target bottom wall 401 and the target side wall 402, a part of the track 111 moves on the target side wall 402, and the other part of the track 111 moves on the target bottom wall 401. The part of the track 111 on the target side wall 402 can drive the cleaning device 10 to move upward until the cleaning device moves from the target bottom wall 401 to the target side wall 402. After the cleaning device 10 moves from the target bottom wall 401 to the target side wall 402, the cleaning device 10 may be driven by the track 111 to move on the target side wall 402. The cleaning device 10 can move on the target side wall 402 under the action of the second driving force provided by the second propeller 132 after the second propeller 132 performs steering. The cleaning device	of the target area 40, the operation of the track 111 may drive the cleaning apparatus 10 to move on the target bottom wall 401. The track 111 can also drive the cleaning apparatus 10 to move in the vertical direction. As shown in FIG. 7 and FIG. 13, when the cleaning apparatus 10 is in close contact with the target side wall 402 of the target area 40, the operation of the track 111 may further drive the cleaning apparatus 10 to move on the target side wall 402. Wherein, more details on how the cleaning apparatus 10 is brought into close contact with the target side wall 402 of the target area 40 are described below. In some embodiments, the track 111 may also enable transition of the travel area of the cleaning apparatus 10 from the target bottom wall 401 to the target side wall 402. As shown in FIG. 11, when the track 111 moves to the junction between the target bottom wall 401 and the target side wall 402, a portion of the track 111 moves on the target side wall 402, while another portion moves on the target bottom wall 401. The portion of the track 111 at the target side wall 402 may drive the cleaning apparatus 10 upward until the travel area of the cleaning apparatus 10 switches from the target bottom wall 401 to the target side wall 402. When the travel area of the cleaning apparatus 10 is switched from the target bottom wall 401 to the target side wall 402, the cleaning apparatus 10 can move on the target side wall 402 driven by the track 111. The cleaning apparatus 10 can further

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		10 can move on the target side wall 402 under the action of a third driving force provided by the main water pump 210. For details about the main water pump 210 and the third driving force provided by the main water pump 210, refer to the following description. The track 111 is disposed, so that the cleaning device 10 can move at various positions in the liquid, and the cleaning device 10 can move from the target bottom wall 401 to the target side wall 402. In some embodiments, the cleaning device 10 may further include the main water pump 210. The main water pump 210 may be configured to drive the cleaning device 10 to suck the liquid from the liquid inlet portion 103 and drain the liquid from the liquid outlet portion 104. The liquid inlet portion 103 may include one or more inlets for liquid to enter the cleaning device 10, such as the first water inlet 1031 and the second water inlet 1032. The liquid inlet portion 103 includes a main pump water inlet 213. As shown in FIG. 9, FIG. 13, FIG. 14, and FIG. 15, the main pump water inlet 213 of the cleaning device 10 may serve as an inlet for liquid to enter the cleaning device 10. The main pump water inlet 213 may be the first water inlet 1031 or the second water inlet 1032. The liquid outlet portion 104 includes one or more outlets for liquid to be drained from the cleaning device 10 into the target region 40. The liquid outlet portion 104 includes a main pump water outlet 214. The main pump water outlet 214 may be the first water outlet. As shown in FIG. 9, FIG. 13, FIG. 14, and FIG. 15, the main pump water outlet 214 of the	move on the target side wall 402 under the action of the second driving force provided by the second thruster 132 after turning, and the cleaning apparatus 10 can further move on the target side wall 402 based on the action of the third driving force provided by the main water pump 210. For more details regarding the main water pump 210 and the third driving force it provides, please refer to the subsequent sections. By providing the tracker 111, the cleaning apparatus 10 can be easily moved to various positions in the liquid, and the travel area of the cleaning apparatus 10 can be switched from the target bottom wall 401 to the target side wall 402. In some embodiments, the cleaning apparatus 10 may further include a main water pump 210. The main water pump 210 may be used to drive the cleaning apparatus 10 to draw liquid from the liquid inlet section 103 and discharge it from the liquid outlet section 104. The liquid inlet section 103 may include one or more entries into which liquid enters the cleaning apparatus 10, such as a first water inlet 1031, a second water inlet 1032, etc. The liquid inlet section 103 includes a main water pump inlet 213. As shown in FIG. 9, FIG. 13, FIG. 14, and FIG. 15, the main water pump inlet 213 in the cleaning apparatus 10 may serve as an inlet for liquid into the cleaning apparatus 10, wherein the main water pump inlet 213 may be the first water inlet 1031 or the second water inlet 1032. The liquid outlet section 104 may include one or more outlets where liquid within the cleaning apparatus 10 exits the cleaning apparatus 10 into the target area 40. The

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		cleaning device 10 may serve as an outlet for the liquid in the cleaning device 10 to be drained from the cleaning device 10 into the target region 40.	liquid outlet section 104 includes a main water pump outlet 214. The main water pump outlet 214 may be a first water outlet. As shown in FIG. 9, FIG. 13, FIG. 14, and FIG. 15, the main water pump outlet 214 in the cleaning apparatus 10 may serve as an outlet for the liquid in the cleaning apparatus 10 to leave the cleaning apparatus 10 and enter the target area 40.
		Wang at [0068]: “A second motion state is defined as a state in which the cleaning device 10 moves on the side wall 402, or the overall direction of the cleaning device 10 is substantially parallel to the side wall 402.”	Wang '040 at p.7:29-38: “When the cleaning apparatus 10 moves on the target side wall 402 or the overall direction of the cleaning apparatus 10 is substantially parallel to the target side wall 402, this is defined as the second movement state, as shown in FIG. 7 and FIG. 12.”
		Wang at [0120]: “When the buoyancy cavity 5111 adjusts the buoyancy force by using gas, and the air inlet 5113 or an air outlet of the buoyancy cavity 5111 is located above the liquid surface, the buoyancy cavity pump 5112 is started to adjust the volume of the gas in the buoyancy cavity 5111. In this case, the cleaning device 10 may be from the first motion state to the second motion state until the air inlet 5113 is exposed at the water surface. Then, the attitude of the cleaning device 10 is adjusted to be in the third motion state. In this way, the cleaning device 10 is switched from the position under the liquid surface to the position on the liquid surface.”	Wang '040 at p.13:25-30: “In the case where the buoyancy chamber 5111 uses gas to adjust the buoyancy, when the air inlet 5113 or the air outlet of the buoyancy chamber 5111 is located above the liquid level, the buoyancy chamber pump 5112 is started to adjust the amount of gas in the buoyancy chamber 5111. In this case, the mode switching of the cleaning apparatus 10 may be switching from the first movement state to the third movement state until the air inlet 5113 is exposed from the water surface, and then the posture of the cleaning apparatus 10 is adjusted to the third movement state, thereby completing the switching from below the liquid level to above the liquid level.”

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		Wang at [0113]-[0115]. [0113] In some embodiments, the cleaning device 10 may include a first sensor (not shown in the figure). The first sensor may be configured to determine a position of the cleaning device 10 in real time. The position may be a vertical position (or referred to as a depth) of the cleaning device 10 in the liquid. For example, the first sensor may be disposed at a central position of the cleaning device 10, and the position may be a depth of the central position of the cleaning device 10 in the liquid. The first sensor may be, but is not limited to, a pressure sensor, an ultrasonic sensor, or an optical sensor. The first sensor and the mode switching member 510 may further control the cleaning device 10 to move at a predetermined depth. For example, the cleaning device 10 performs underwater cleaning at the predetermined depth or moves at the predetermined depth towards a charging apparatus disposed at the wall of the pool. [0114] In some embodiments, the cleaning device 10 may further include a processor 52 (not shown in the figure). The processor 52 may be a micro-controller, an embedded processor 52, an application-specific integrated circuit (ASIC), or the like. The processor 52 may obtain various pieces of data information of the cleaning device 10 and analyze the obtained data information to control various components of the cleaning device 10. When the cleaning device 10	Wang '040 at p.12:39-65. In some embodiments, the cleaning apparatus 10 may include a first sensor (not shown). The first sensor may be used to determine the location of the cleaning apparatus 10 in real time. The position may include the vertical position (or depth) of the cleaning apparatus 10 in the liquid. For example, the first sensor may be provided at the center position of the cleaning apparatus 10, and the position may be the depth of the center position of the cleaning apparatus 10 in the liquid. The first sensor may include, but is not limited to, a pressure sensor, an ultrasonic sensor, or an optical sensor, among others. Through the first sensor and the mode switching component 510, the cleaning apparatus 10 can also be controlled to move at a preset depth, for example, to perform underwater cleaning at a preset depth, or to move toward a charging device provided at the pool wall at a preset depth. In some embodiments, the cleaning apparatus 10 may further include a processor 52 (not shown). The processor 52 may be a microcontroller, embedded processor 52, or application-specific integrated circuit (ASIC), among others. The processor 52 may acquire various data information of the cleaning apparatus 10 and analyze and process it to control various components in the cleaning apparatus 10. When the cleaning apparatus 10 needs to switch from below the liquid level 30 to above the liquid level 30,

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		needs to be switched from the position under the liquid surface 30 to the position on the liquid surface 30, the processor 52 may obtain the position of the cleaning device 10 in real time from the first sensor. When the position of the cleaning device 10 meets a preset condition, the processor 52 may control the buoyancy adjustment part to increase the volume of the gas in the buoyancy cavity 5111. The preset condition may be that the position of the cleaning device 10 is higher than a preset height. When a depth of the liquid in the target region 40 is fixed, the processor 52 may determine whether the position of the cleaning device 10 meets the preset condition to determine whether the air inlet 5113 of the cleaning device 10 is above the liquid surface 30. When the position of the cleaning device 10 shown in FIG. 7 meets the preset condition, the processor 52 may determine that the air inlet 5113 of the cleaning device 10 is above the liquid surface 30, the processor 52 may control the buoyancy cavity pump 5112 to drain the liquid from the buoyancy cavity 5111, and air may enter the buoyancy cavity 5111 through the air inlet 5113, to increase the volume of the gas in the buoyancy cavity 5111 and increase the buoyancy force applied to the cleaning device 10. When the buoyancy force applied to the cleaning device 10 in the vertical direction is greater than gravity of the cleaning device 10, the cleaning device 10 shown in FIG. 7 is switched to the cleaning device 10 shown in FIG. 8.	the processor 52 can obtain the position of the cleaning apparatus 10 in real time from the first sensor. When the position of the cleaning apparatus 10 meets the preset conditions, the processor 52 can control the buoyancy adjustment member to increase the volume of the gas in the buoyancy chamber 5111. The preset condition may include the position of the cleaning apparatus 10 being higher than a preset height. When the depth of the liquid in the target area 40 is fixed, the processor 52 may determine whether the position of the cleaning apparatus 10 meets the preset condition to determine whether the air inlet 5113 of the cleaning apparatus 10 is above the liquid level 30. When the position of the cleaning apparatus 10, as shown in FIG. 7, satisfies a preset condition, the processor 52 may determine that the air inlet 5113 on the cleaning apparatus 10 is above the liquid level 30. The processor 52 may control the buoyancy chamber pump 5112 to discharge the liquid from the buoyancy chamber 5111, allowing air to enter the buoyancy chamber 5111 through the air inlet 5113, thereby increasing the volume of gas within the buoyancy chamber 5111 and enhancing the buoyancy of the cleaning apparatus 10. When the buoyancy of the cleaning apparatus 10 in the vertical direction is greater than its gravity, the cleaning apparatus 10 as shown in FIG. 7 may be switched to the cleaning apparatus 10 as shown in FIG. 8. In some embodiments, the cleaning apparatus 10 may further include a second sensor (not shown). The

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		[0115] In some embodiments, the cleaning device 10 may further include a second sensor (not shown in the figure). The second sensor may be configured to detect in real time whether the air inlet 5113 of the buoyancy cavity 5111 is exposed to the air. For example, the second sensor may be an ultrasonic sensor. The second sensor may be disposed at the air inlet 5113 of the buoyancy cavity 5111.	second sensor may be used to detect in real time whether the air inlet 5113 of the buoyancy chamber 5111 is located in air. For example, the second sensor may be an ultrasonic sensor. The second sensor may be provided at the location of the air inlet 5113 of the buoyancy chamber 5111.
3	The controllable sinking and floating swimming pool robot according to claim 1, wherein the operational requirement information comprises remote control command information sent by a user, clock information, operational task progress information, fault information, power	Wang at [0182]: “Step 1010: Obtain a target task of cleaning a target swimming pool.”	Wang '040 at p.19:21: “Step 1010: Obtain a target task for cleaning a target swimming pool.”
		Wang at [0183]: “The target swimming pool may be a to-be-cleaned swimming pool. The target task may be a task of cleaning the target swimming pool. The target task may include water surface cleaning and/or underwater cleaning. The water surface cleaning may mean cleaning a water surface of the target swimming pool. The underwater cleaning may mean cleaning an underwater part of the target swimming pool (such as water in the swimming pool and a wall of the swimming pool). In some embodiments, the target task may further include a specific to-be-cleaned part. For example, the underwater cleaning may further include, but is not limited to, cleaning the water, cleaning the bottom of the pool, cleaning each wall of the pool, and the like.”	Wang '040 at p.19:22-27: “The target task refers to the cleaning task to be performed on the target swimming pool. The target task may include surface cleaning and/or underwater cleaning, where surface cleaning refers to cleaning the water surface of the target pool, and underwater cleaning refers to cleaning underwater areas (e.g., water body, pool wall, etc.) of the target pool. In some embodiments, the target task may further specify particular cleaning locations 4311. For example, underwater cleaning may include, but is not limited to, cleaning the water body, pool bottom, and various pool walls.”

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	information or swimming pool bottom environment information.	Wang at [0184]: “The control member may obtain the target task in various manners. For example, the control member may obtain the target task input by a user. For another example, the control member may be configured to perform the target task periodically , such as perform water surface cleaning once every three days and perform underwater cleaning once every two days.”	Wang '040 at p.19:28-30: “The control component may acquire the target task in various ways. For example, the control component may receive user input specifying the target task. Alternatively, the control component may be configured to execute the target task periodically , such as performing surface cleaning every three days and underwater cleaning every two days.”
4	The controllable sinking and floating swimming pool robot according to claim 1, further comprising a distance measurement unit or a map storage unit, wherein the main control unit controls the swimming pool robot to find the nearest side wall or the nearest slope based on distance measurement results of the distance	Wang at [0068]: “A second motion state is defined as a state in which the cleaning device 10 moves on the side wall 402, or the overall direction of the cleaning device 10 is substantially parallel to the side wall 402 , as shown in FIG. 7 and FIG. 12.”	Wang '040 at p.7:29-38: “When the cleaning apparatus 10 moves on the target side wall 402 or the overall direction of the cleaning apparatus 10 is substantially parallel to the target side wall 402, this is defined as the second movement state , as shown in FIG. 7 and FIG. 12.”
		Wang at [0185]: “Step 1020: Determine an adjustment parameter of a moving mechanism based on the target task and a current position of the cleaning device 10.”	Wang '040 at p.19:41-42: “At step 1020, based on the target task and the current position of the cleaning apparatus 10, an adjustment parameter of the cleaning apparatus 10 is determined. ”
		Wang at [0186]: “The control member may obtain the current position of the cleaning device 10. For more details about obtaining the current position of the cleaning device 10, refer to the above description of the first sensor.”	Wang '040 at p.19:43-44: “The control component can obtain the current position of the cleaning apparatus 10. For more information on obtaining the current position of the cleaning apparatus 10, please refer to the relevant content for the first sensor above.”
		Wang at [0187]: “The adjustment parameter may include information of a route from the current position to a position, in the target swimming pool, at	Wang '040 at p.19:45-46: “The adjustment parameters may include route information for moving from the current position to the location in

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	measurement unit or map data in the map storage unit.	which the target task needs to be performed and route information required to complete the target task.”	the target pool where the target task is to be performed, as well as the route information required to complete the target task.”
		Wang at [0188]: “The control member may determine, based on the target task, a starting position , in the target swimming pool, at which the target task needs to be performed ; determine, based on the starting position and the current position , the information of the route of the cleaning device 10 from the current position to the position, in the target swimming pool, at which the target task needs to be performed; and determine, based on the target task for the target swimming pool, the route information required to complete the target task, to determine the adjustment parameter of the moving mechanism.”	Wang '040 at p.19:47-50: “The control component may, based on the target task, determine the starting position in the target pool for performing the target task, then determine the route information for moving from the current position to the starting position , and further determine the route information required to complete the target task , thereby determining the adjustment parameters for the cleaning apparatus 10.”
		Wang at [0189]: “Step 1030: Control , based on the adjustment parameter , the moving mechanism to drive the cleaning device 10 to move and perform cleaning to complete the target task.”	Wang '040 at p.19:51-52: “At step 1030, based on the adjustment parameters , the cleaning apparatus 10 is controlled to drive the cleaning apparatus 10 to move and perform cleaning to complete the target task.”
		Wang at [0068]-[0070]. [0068] With reference to FIG. 7, FIG. 8, FIG. 10, FIG. 11, and FIG. 12, a first motion state is defined as a state in which the cleaning device 10 moves on the bottom wall 401, or an angle between the bottom wall 401 and an overall direction of the cleaning device 10 is less than 90° and the cleaning device 10	Wang '040 at p.7:29-51. In conjunction with FIG. 7, FIG. 8, FIG. 10, FIG. 11, and FIG. 12, when the cleaning apparatus 10 moves on the target bottom wall 401 or the overall direction of the cleaning apparatus 10 is at an angle less than 90° to the target bottom wall 401 and is away from the liquid level 30, this is defined as the first

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		is away from the liquid surface 30. As shown in FIG. 10, that the cleaning device 10 is away from the liquid surface 30 may be understood as that the cleaning device 10 cleans the bottom of the pool or performs an action under- water. A second motion state is defined as a state in which the cleaning device 10 moves on the side wall 402, or the overall direction of the cleaning device 10 is substantially parallel to the side wall 402, as shown in FIG. 7 and FIG. 12. A third motion state is defined as a state in which the cleaning device 10 moves on the liquid surface 30, or the cleaning device 10 is at least partially exposed at the liquid surface 30, or the cleaning device 10 is entirely located under the liquid surface 30 and close to the liquid surface 30. That the cleaning device 10 is close to the liquid surface 30 may be understood as that a distance between the cleaning device 10 and the liquid surface 30 is less than a threshold and the cleaning device 10 can perform water surface cleaning. The overall direction of the cleaning device 10 is defined as a direction of a plane in which a movement propulsion mechanism 100 of the cleaning device 10, for example, a track 111 or a wheel 112, is in contact with a to-be-cleaned surface. [0069] Therefore, under the action of the mode switching member 510, the cleaning device 10 can be switched between the position on the liquid surface 30 and the position under the liquid surface 30, so that the cleaning device 10 is switched between the first motion state and the third motion state. The cleaning	movement state. As shown in FIG. 10, away from the liquid level 30 can be understood as the cleaning apparatus 10 cleaning the pool bottom, performing actions in the water, etc. When the cleaning apparatus 10 moves on the target side wall 402 or the overall direction of the cleaning apparatus 10 is substantially parallel to the target side wall 402, this is defined as the second movement state, as shown in FIG. 7 and FIG. 12. When the cleaning apparatus 10 is moving on the liquid level 30, or the cleaning apparatus 10 is at least partially exposed from the liquid level 30, or the cleaning apparatus 10 is located as a whole below the liquid level 30 and close to the liquid level 30, this is defined as the third movement state, where being close to the liquid level 30 can be understood as the distance between the cleaning apparatus 10 and the liquid level 30 being less than a threshold value, and it can perform water surface cleaning work etc. In the above description, the plane where the propulsion mechanism 100 of the cleaning apparatus 10, such as the track 111 or the wheel 112, contacts the surface to be cleaned can be defined as the overall direction of the cleaning apparatus 10. As such, under the action of the mode switching component 510, the cleaning apparatus 10 can be switched between positions above and below the liquid level 30, enabling the switching of the cleaning apparatus 10 between the first movement state and the third movement state. The cleaning apparatus may perform underwater cleaning tasks in the first

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		device can perform under- water cleaning in the first motion state. The cleaning device can perform water surface cleaning in the third motion state. Therefore, the cleaning device 10 can be adjusted to perform at least two operating conditions: underwater cleaning and water surface cleaning, thereby meeting various use requirements. [0070] In some embodiments, the cleaning device 10 further has the second motion state. The cleaning device can clean a pool wall or a waterline in the second motion state. Switching of the cleaning device 10 between the first motion state and the third motion state may include or exclude switching of the second motion state. In other words, the cleaning device may have the first motion state and the third motion state, or the cleaning device may have the first motion state, the second motion state, and the third motion state. The second motion state may be selected based on an actual requirement. This is not limited herein.	movement state. The cleaning apparatus can perform water surface cleaning tasks in the third movement state, and the cleaning apparatus 10 can be adjusted to perform at least two working conditions: underwater cleaning and water surface cleaning, thereby meeting different usage needs. In some embodiments, the cleaning apparatus 10 further comprises a second movement state. The cleaning apparatus may perform wall or waterline cleaning tasks in the second movement state. The switching of the cleaning apparatus 10 between the first and third movement states includes or does not include a second movement state. That is, the cleaning apparatus may comprise a first movement state and a third movement state. Alternatively, the cleaning apparatus may comprise a first movement state, a second movement state, and a third movement state. Wherein, the second movement state may be selected according to actual needs and is not limited here.
5	The controllable sinking and floating swimming pool robot according to claim 1, wherein the waterline detection unit comprises an outlet water	Wang at [0115]: “In some embodiments, the cleaning device 10 may further include a second sensor (not shown in the figure). The second sensor may be configured to detect in real time whether the air inlet 5113 of the buoyancy cavity 5111 is exposed to the air. ”	Wang '040 at p.12:62-63: “In some embodiments, the cleaning apparatus 10 may further include a second sensor (not shown). The second sensor may be used to detect in real time whether the air inlet 5113 of the buoyancy chamber 5111 is located in air. ”

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	detection subunit configured to detect whether at least a part of the swimming pool robot has come out of water.		
6	The controllable sinking and floating swimming pool robot according to claim 1, wherein the waterline detection unit further comprises a proximity waterline detection subunit configured to detect whether the swimming pool robot has crawled to a distance less than or equal to a predetermined	Wang at [0113]: “In some embodiments, the cleaning device 10 may include a first sensor (not shown in the figure). The first sensor may be configured to determine a position of the cleaning device 10 in real time. The position may be a vertical position (or referred to as a depth) of the cleaning device 10 in the liquid. For example, the first sensor may be disposed at a central position of the cleaning device 10, and the position may be a depth of the central position of the cleaning device 10 in the liquid. The first sensor may be, but is not limited to, a pressure sensor, an ultrasonic sensor, or an optical sensor. The first sensor and the mode switching member 510 may further control the cleaning device 10 to move at a predetermined depth. For example, the cleaning device 10 performs underwater cleaning at the predetermined depth or moves at the predetermined depth towards a charging apparatus disposed at the wall of the pool.”	Wang '040 at p.12:39-45: “In some embodiments, the cleaning apparatus 10 may include a first sensor (not shown). The first sensor may be used to determine the location of the cleaning apparatus 10 in real time. The position may include the vertical position (or depth) of the cleaning apparatus 10 in the liquid. For example, the first sensor may be provided at the center position of the cleaning apparatus 10, and the position may be the depth of the center position of the cleaning apparatus 10 in the liquid. The first sensor may include, but is not limited to, a pressure sensor, an ultrasonic sensor, or an optical sensor, among others. Through the first sensor and the mode switching component 510, the cleaning apparatus 10 can also be controlled to move at a preset depth, for example, to perform underwater cleaning at a preset depth, or to move toward a charging device provided at the pool wall at a preset depth.”

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	distance from the waterline.	Wang at [0114]: “When the cleaning device 10 needs to be switched from the position under the liquid surface 30 to the position on the liquid surface 30, the processor 52 may obtain the position of the cleaning device 10 in real time from the first sensor. When the position of the cleaning device 10 meets a preset condition, the processor 52 may control the buoyancy adjustment part to increase the volume of the gas in the buoyancy cavity 5111. The preset condition may be that the position of the cleaning device 10 is higher than a preset height. When a depth of the liquid in the target region 40 is fixed, the processor 52 may determine whether the position of the cleaning device 10 meets the preset condition to determine whether the air inlet 5113 of the cleaning device 10 is above the liquid surface 30. When the position of the cleaning device 10 shown in FIG. 7 meets the preset condition, the processor 52 may determine that the air inlet 5113 of the cleaning device 10 is above the liquid surface 30, the processor 52 may control the buoyancy cavity pump 5112 to drain the liquid from the buoyancy cavity 5111, and air may enter the buoyancy cavity 5111 through the air inlet 5113, to increase the volume of the gas in the buoyancy cavity 5111 and increase the buoyancy force applied to the cleaning device 10.”	Wang '040 at p.12:49-59: “When the cleaning apparatus 10 needs to switch from below the liquid level 30 to above the liquid level 30, the processor 52 can obtain the position of the cleaning apparatus 10 in real time from the first sensor. When the position of the cleaning apparatus 10 meets the preset conditions, the processor 52 can control the buoyancy adjustment member to increase the volume of the gas in the buoyancy chamber 5111. The preset condition may include the position of the cleaning apparatus 10 being higher than a preset height. When the depth of the liquid in the target area 40 is fixed, the processor 52 may determine whether the position of the cleaning apparatus 10 meets the preset condition to determine whether the air inlet 5113 of the cleaning apparatus 10 is above the liquid level 30. When the position of the cleaning apparatus 10, as shown in FIG. 7, satisfies a preset condition, the processor 52 may determine that the air inlet 5113 on the cleaning apparatus 10 is above the liquid level 30. The processor 52 may control the buoyancy chamber pump 5112 to discharge the liquid from the buoyancy chamber 5111, allowing air to enter the buoyancy chamber 5111 through the air inlet 5113, thereby increasing the volume of gas within the buoyancy chamber 5111 and enhancing the buoyancy of the cleaning apparatus 10.”

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7a	The controllable sinking and floating swimming pool robot according to claim 5, wherein the sinking and floating control unit comprises an inflation and deflation subunit and a switch subunit,	Wang at [0109]: “When the air inlet 5113 does not communicate with the gas, a one-way valve may be disposed at the air inlet 5113. The one-way valve can prevent external water of the cleaning device body 101 from entering the buoyancy cavity 5111 through the air inlet 5113... The buoyancy adjustment part may be any structure that can adjust the gas and/or the liquid in the buoyancy cavity 5111. As shown in FIG. 6, the buoyancy adjustment part may include a buoyancy cavity pump 5112. The buoyancy cavity pump 5112 can drive the buoyancy cavity 5111 to drain the liquid therefrom. The buoyancy cavity pump 5112 may be, but is not limited to, a pneumatic pump, a hydraulic pump, or an electric pump. In an operating state, the buoyancy cavity pump 5112 can adjust the liquid and/or the gas in the buoyancy cavity 5111. In a non-operating state, the buoyancy cavity pump 5112 can prevent any external liquid and/or gas of the cleaning device 10 from entering the buoyancy cavity 5111, so that the buoyancy cavity 5111 is not affected by the external liquid and/or gas.”	Wang '040 at p.11:68-p.12:5: “When the air inlet 5113 is not connected to the gas, a one-way valve may be provided at the air inlet 5113. The one-way valve can prevent external water from the cleaning apparatus main body 101 from entering the buoyancy chamber 5111 through the air inlet 5113... The buoyancy adjustment member may be any structure capable of adjusting the volume of gas and/or liquid within the buoyancy chamber 5111. As shown in FIG. 6, the buoyancy adjustment member may include a buoyancy chamber pump 5112, which can drive the discharge of liquid from the buoyancy chamber 5111. The buoyancy chamber pump 5112 may include, but is not limited to, pneumatic pumps, hydraulic pumps, or electric pumps, among others. When the buoyancy chamber pump 5112 is in the operating state, it is able to adjust the liquid and/or gas within the buoyancy chamber 5111. When the buoyancy chamber pump 5112 is in the non-working state, liquid and/or liquid outside the cleaning apparatus 10 can be prevented from entering the buoyancy chamber 5111 so that the buoyancy chamber 5111 is not affected by external liquid and/or gas.”
		Wang at [0111]: “As shown in FIG. 6, the buoyancy adjustment part 511 may include two buoyancy cavities 5111, the buoyancy cavity pump 5112, the air inlet 5113, and the connection duct 5114. The buoyancy cavities 5111 may be connected to the buoyancy cavity pump 5112	Wang '040 at p.12:19-26: “As shown in FIG. 6, the buoyancy adjustment assembly 511 may include two buoyancy chambers 5111, a buoyancy chamber pump 5112, an air inlet 5113, and a connecting pipeline 5114. The buoyancy chambers 5111 may be connected to the buoyancy chamber pump 5112

Claim No.	Claim Language	Relevant Disclosure of Wang	Relevant Disclosure of Wang'040 supporting Wang
		through the connection duct 5114. The buoyancy cavity pump 5112 may be connected to the air inlet 5113 through the connection duct 5114. In the non-operating state, the buoyancy cavity pump 5112 has the same function as the one-way valve and can prevent the external liquid and/or gas from entering the buoyancy cavity 5111 through the air inlet 5113. In some other embodiments, when the buoyancy adjustment part is a centrifugal pump or the like, the one-way valve is disposed at the connection duct 5114 to prevent the external liquid and/or gas from entering the buoyancy cavity 5111 through the air inlet 5113. "	via the connecting pipeline 5114, and the buoyancy chamber pump 5112 may be connected to the air inlet 5113 via the connecting pipeline 5114. When the buoyancy chamber pump 5112 is in a non-working state, it acts like the one-way valve, and can prevent external liquid and/or liquid from entering the buoyancy chambers 5111 through the air inlet 5113. In some other embodiments, when the buoyancy adjustment member is a structure such as a centrifugal pump, a one-way valve is provided at the connecting pipeline 5114 to prevent external liquid and/or liquid from entering the buoyancy chamber 5111 through the air inlet 5113. "
7b	wherein in response to the outlet water detection subunit detecting that at least a part of the swimming pool robot has come out of the water, the inflation and deflation subunit is controlled to start sucking air and the switch subunit is controlled to open , so that the sinking	Wang at [0112]: "As shown in FIG. 5 and FIG. 6, when the cleaning device 10 needs to be switched from the position under the liquid surface 30 to the position on the liquid surface 30, the cleaning device 10 may move to a position close to the liquid surface 30 and determine when to control the buoyancy cavity pump 5112 to inject gas into the buoyancy cavity 5111. "	Wang '040 at p.12:27-29: "Based on the cleaning apparatus 10 shown in FIGS. 5 and 6, when the cleaning apparatus 10 needs to switch from below the liquid level 30 to above the liquid level 30, it can move to a position near the liquid level 30 and determine when to control the buoyancy chamber pump 5112 to inject gas into the buoyancy chamber 5111. "
		Wang at [0115]: "In some embodiments, the cleaning device 10 may further include a second sensor (not shown in the figure). The second sensor may be configured to detect in real time whether the air inlet 5113 of the buoyancy cavity 5111 is exposed to the air. For example, the second sensor may be an ultrasonic sensor."	Wang '040 at p.12:62-64: "In some embodiments, the cleaning apparatus 10 may further include a second sensor (not shown). The second sensor may be used to detect in real time whether the air inlet 5113 of the buoyancy chamber 5111 is located in air. For example, the second sensor may be an ultrasonic sensor."

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	and floating control unit enters the floating working state.	Wang at [0117]: “In some embodiments, when the cleaning device 10 needs to be switched from the position under the liquid surface 30 to the position on the liquid surface 30, the processor 52 may obtain the detection result of whether the air inlet 5113 of the buoyancy cavity 5111 is exposed to the air. When the detection result indicates that the air inlet 5113 is exposed to the air, the buoyancy adjustment part is controlled to increase the volume of the gas in the buoyancy cavity 5111 to switch the cleaning device 10 from the position under the liquid surface 30 to the position on the liquid surface 30. For details about content that the processor 52 controls the buoyancy adjustment part to increase the volume of the gas in the buoyancy cavity 5111 to switch the cleaning device 10 from the position under the liquid surface 30 to the position on the liquid surface 30, refer to the above description.”	Wang '040 at p.13:3-9: “In some embodiments, when the cleaning apparatus 10 needs to switch from below the liquid level 30 to above the liquid level 30, the processor 52 may obtain a detection result indicating whether the air inlet 5113 of the buoyancy chamber 5111 is in air. When the detection result indicates that the air inlet 5113 is in air, the processor controls the buoyancy adjustment member to increase the volume of gas in the buoyancy chamber 5111, thereby enabling the cleaning apparatus 10 to switch from below the liquid level 30 to above the liquid level 30. Further details regarding the processor 52 controlling the buoyancy adjustment member to increase the gas volume in the buoyancy chamber 5111, thereby enabling the cleaning apparatus 10 to switch from below to above the liquid level 30, can be found in the foregoing sections.”
		Wang at [0118]: “When the cleaning device 10 needs to be switched from the position on the liquid surface 30 to the position under the liquid surface 30, the processor 52 may control the buoyancy adjustment part to reduce the volume of the gas in the buoyancy cavity 5111. ... As shown in FIG. 5 and FIG. 6, the buoyancy cavity pump 5111 may drain the gas from the buoyancy cavity 5111 through the connection duct 5114 to reduce the volume of the gas in the buoyancy cavity 5111 to reduce the buoyancy force, to switch the cleaning device 10 from the position on the liquid surface 30	Wang '040 at p.13:10-15: “When the cleaning apparatus 10 needs to switch from above the liquid level 30 to below the liquid level 30, the processor 52 can control the buoyancy adjustment member to reduce the volume of the gas in the buoyancy chamber 5111. For details on when the cleaning apparatus 10 needs to switch from above the liquid level 30 to below the liquid level 30, refer to FIG. 17 and the related description. As shown in FIGS. 5 and 6, the buoyancy chamber 5111 may discharge gas from the buoyancy chamber 5111 via the connecting pipeline 5114, thereby reducing the gas volume in the

Claim No.	Claim Language	Relevant Disclosure of Wang	Relevant Disclosure of Wang'040 supporting Wang
		to the position under the liquid surface 30.”	buoyancy chamber 5111 to decrease buoyancy, so that the cleaning apparatus 10 switches from above the liquid level 30 to below the liquid level 30.”
		Wang at [0120]: “When the buoyancy cavity 5111 adjusts the buoyancy force by using gas, and the air inlet 5113 or an air outlet of the buoyancy cavity 5111 is located above the liquid surface, the buoyancy cavity pump 5112 is started to adjust the volume of the gas in the buoyancy cavity 5111. In this case, the cleaning device 10 may be from the first motion state to the second motion state until the air inlet 5113 is exposed at the water surface. Then, the attitude of the cleaning device 10 is adjusted to be in the third motion state. In this way, the cleaning device 10 is switched from the position under the liquid surface to the position on the liquid surface.”	Wang '040 at p.13:25-30: “In the case where the buoyancy chamber 5111 uses gas to adjust the buoyancy, when the air inlet 5113 or the air outlet of the buoyancy chamber 5111 is located above the liquid level, the buoyancy chamber pump 5112 is started to adjust the amount of gas in the buoyancy chamber 5111. In this case, the mode switching of the cleaning apparatus 10 may be switching from the first movement state to the third movement state until the air inlet 5113 is exposed from the water surface, and then the posture of the cleaning apparatus 10 is adjusted to the third movement state, thereby completing the switching from below the liquid level to above the liquid level.”
8a	The controllable sinking and floating swimming pool robot according to claim 5, wherein the sinking and floating control unit comprises an inflation and deflation subunit	<i>See, e.g.,</i> relevant disclosures for limitation [7a] above.	<i>See, e.g.,</i> relevant disclosures for limitation [7a] above.

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	and a switch subunit,		
8b	wherein in response to the proximity waterline detection subunit detecting that the swimming pool robot has crawled to the distance less than or equal to the predetermined distance from the waterline, the inflation and deflation subunit is controlled to start sucking air ,	Wang at [0114]: “When the cleaning device 10 needs to be switched from the position under the liquid surface 30 to the position on the liquid surface 30, the processor 52 may obtain the position of the cleaning device 10 in real time from the first sensor. When the position of the cleaning device 10 meets a preset condition , the processor 52 may control the buoyancy adjustment part to increase the volume of the gas in the buoyancy cavity 5111. The preset condition may be that the position of the cleaning device 10 is higher than a preset height. When a depth of the liquid in the target region 40 is fixed, the processor 52 may determine whether the position of the cleaning device 10 meets the preset condition to determine whether the air inlet 5113 of the cleaning device 10 is above the liquid surface 30. When the position of the cleaning device 10 shown in FIG. 7 meets the preset condition , the processor 52 may determine that the air inlet 5113 of the cleaning device 10 is above the liquid surface 30, the processor 52 may control the buoyancy cavity pump 5112 to drain the liquid from the buoyancy cavity 5111, and air may enter the buoyancy cavity 5111 through the air inlet 5113, to increase the volume of the gas in the buoyancy cavity 5111 and increase the buoyancy force applied to the cleaning device 10.”	Wang '040 at p.12:49-59: “When the cleaning apparatus 10 needs to switch from below the liquid level 30 to above the liquid level 30, the processor 52 can obtain the position of the cleaning apparatus 10 in real time from the first sensor. When the position of the cleaning apparatus 10 meets the preset conditions , the processor 52 can control the buoyancy adjustment member to increase the volume of the gas in the buoyancy chamber 5111. The preset condition may include the position of the cleaning apparatus 10 being higher than a preset height. When the depth of the liquid in the target area 40 is fixed, the processor 52 may determine whether the position of the cleaning apparatus 10 meets the preset condition to determine whether the air inlet 5113 of the cleaning apparatus 10 is above the liquid level 30. When the position of the cleaning apparatus 10, as shown in FIG. 7, satisfies a preset condition , the processor 52 may determine that the air inlet 5113 on the cleaning apparatus 10 is above the liquid level 30. The processor 52 may control the buoyancy chamber pump 5112 to discharge the liquid from the buoyancy chamber 5111, allowing air to enter the buoyancy chamber 5111 through the air inlet 5113, thereby increasing the volume of gas within the buoyancy chamber 5111 and enhancing the buoyancy of the cleaning apparatus 10.”

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		Wang at [0107]: “For a third source of the gas, a gas generation assembly (not shown) is disposed inside the cleaning device 10. The gas generation assembly can generate gas to change the volume of the gas in the buoyancy cavity 5111. In this way, the cleaning device 10 is prevented from climbing the wall from the target region 40 to the liquid surface 30 before changing the volume of the gas in the buoyancy cavity 5111. This improves convenience. The gas generation assembly may generate gas through a chemical reaction, electrolysis, water boiling, and the like to increase or reduce the volume of the gas in the buoyancy cavity 5111.”	Wang '040 at p.11:47-52: “The third gas source is to set a gas-generating assembly (not shown) in the cleaning apparatus 10. The gas-generating assembly can generate a certain amount of gas, which changes the volume of the gas in the buoyancy chamber 5111, thereby avoiding the cleaning apparatus 10 climbing the wall from the target area 40 to the liquid level 30 before changing the volume of the gas in the buoyancy chamber 5111 and improving convenience. The above gas-generating assembly may generate gas by itself through chemical reaction, electrolysis, boiling water, etc., thereby increasing the volume of gas in the buoyancy chamber 5111 or reducing the volume of liquid in the buoyancy chamber 5111.”
8c	and in response to the outlet water detection subunit detecting that at least a part of the swimming pool robot has come out of the water, the switch subunit is controlled to open, so that the sinking and floating control unit enters the	<i>See, e.g.,</i> relevant disclosures for limitation [7b] above.	<i>See, e.g.,</i> relevant disclosures for limitation [7b] above.

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	floating working state.		
9a	The controllable sinking and floating swimming pool robot according to claim 7, wherein the sinking and floating control unit further comprises an airbag subunit connected to the inflation and deflation subunit, wherein the airbag subunit is connected to or disconnected from outside atmosphere through the inflation and deflation subunit and the switch subunit,	Wang at [0099]: “In some embodiments, the buoyancy adjustment assembly 511 may include a buoyancy cavity 5111 and a buoyancy adjustment part. The buoyancy cavity 5111 is configured to accommodate liquid and/or gas. The buoyancy cavity 5111 may be, but is not limited to, an inflatable buoyancy cavity, a liquid-containing buoyancy cavity, a partitioned buoyancy cavity, or the like. A volume of the buoyancy cavity 5111 may be preset. The buoyancy cavity 5111 may be made of a flexible material and/or a rigid material. The flexible material may include, but is not limited to, polyvinyl alcohol resin, polyethylene glycol terephthalate, rubber, and the like. The rigid material may include, but is not limited to, glass, ceramic, phenolic plastic, polyurethane plastic, epoxy plastic, unsaturated polyester plastic, and the like.”	Wang '040 at p.11:5-11: “In some embodiments, the buoyancy adjustment assembly 511 may include a buoyancy chamber 5111 and a buoyancy adjustment member. The buoyancy chamber 5111 may be used to accommodate liquid and/or gas. The buoyancy chamber 5111 may include, but is not limited to, an inflatable buoyancy chamber, a liquid container-type buoyancy chamber, a partitioned buoyancy chamber, etc. The volume of the buoyancy chamber 5111 may be preset. The buoyancy chamber 5111 may be made of flexible materials and/or rigid materials. The flexible materials may include, but are not limited to, polyvinyl alcohol resin, polyethylene terephthalate, rubber, etc. The rigid materials may include, but are not limited to, glass, ceramics, phenolic plastics, polyurethane plastics, epoxy plastics, unsaturated polyester plastics, etc.”
		Wang at [0109]-[0111]. Wang at [0109]: “When the air inlet 5113 does not communicate with the gas, a one-way valve may be disposed at the air inlet 5113. The one-way valve can prevent external water of the cleaning device body 101 from entering the buoyancy cavity 5111 through the air inlet 5113. The air inlet 5113 may alternatively communicate with the gas. For example, the air inlet 5113 may communicate with gas on	Wang '040 at p.11:60-p.12:26. Wang '040 at p.11:60-p.12:5: “When the air inlet 5113 is not connected to the gas, a one-way valve may be provided at the air inlet 5113. The one-way valve can prevent external water from the cleaning apparatus main body 101 from entering the buoyancy chamber 5111 through the air inlet 5113. The air inlet 5113 may also be connected to the gas. For example, the air inlet 5113 can be

Claim No.	Claim Language	Relevant Disclosure of Wang	Relevant Disclosure of Wang'040 supporting Wang
		the liquid surface 30 ... The buoyancy adjustment part may be any structure that can adjust the gas and/or the liquid in the buoyancy cavity 5111. As shown in FIG. 6, the buoyancy adjustment part may include a buoyancy cavity pump 5112. The buoyancy cavity pump 5112 can drive the buoyancy cavity 5111 to drain the liquid therefrom. The buoyancy cavity pump 5112 may be, but is not limited to, a pneumatic pump, a hydraulic pump, or an electric pump. In an operating state, the buoyancy cavity pump 5112 can adjust the liquid and/or the gas in the buoyancy cavity 5111. In a non-operating state, the buoyancy cavity pump 5112 can prevent any external liquid and/or gas of the cleaning device 10 from entering the buoyancy cavity 5111, so that the buoyancy cavity 5111 is not affected by the external liquid and/or gas.” Wang at [0110]: “In some embodiments, the buoyancy adjustment assembly 511 may further include the air inlet 5113. The air inlet 5113 is configured for gas to enter the buoyancy cavity 5111. In some embodiments, the air inlet 5113 may further be configured for the gas to leave the buoyancy cavity 5111 or for liquid to enter or leave the buoyancy cavity 5111. In some embodiments, the buoyancy adjustment assembly 511 may further include another inlet and outlet for the gas to leave or for the liquid to enter or leave the buoyancy	connected to the gas above the liquid level 30 ... The buoyancy adjustment member may be any structure capable of adjusting the volume of gas and/or liquid within the buoyancy chamber 5111. As shown in FIG. 6, the buoyancy adjustment member may include a buoyancy chamber pump 5112, which can drive the discharge of liquid from the buoyancy chamber 5111. The buoyancy chamber pump 5112 may include, but is not limited to, pneumatic pumps, hydraulic pumps, or electric pumps, among others. When the buoyancy chamber pump 5112 is in the operating state, it is able to adjust the liquid and/or gas within the buoyancy chamber 5111. When the buoyancy chamber pump 5112 is in the non-working state, liquid and/or liquid outside the cleaning apparatus 10 can be prevented from entering the buoyancy chamber 5111 so that the buoyancy chamber 5111 is not affected by external liquid and/or gas.” Wang '040 at p.12:8-16: “In some embodiments, the buoyancy adjustment assembly 511 may further include an air inlet 5113. The aforementioned air inlet 5113 is used to allow gas to enter the buoyancy chamber 5111. In some embodiments, the air inlet 5113 may also be used for gas to exit the buoyancy chamber 5111 or for liquid to enter or exit the buoyancy chamber 5111. In some embodiments, the buoyancy adjustment assembly 511 may further include other inlets and outlets to facilitate the entry or exit of gas or liquid. The air inlet 5113 may be

Claim No.	Claim Language	Relevant Disclosure of Wang	Relevant Disclosure of Wang'040 supporting Wang
		cavity 5111. The air inlet 5113 is directly provided on the buoyancy cavity 5111 or independent of the buoyancy cavity 5111. The air inlet 5113 may be provided on a housing of the cleaning device 10 to communicate with the outside (such as external liquid or air) for gas and/or liquid exchanging. As shown in FIG. 5, the air inlet 5113 may be provided at the top of a front tail part of the cleaning device 10, so that the air inlet 5113 can more quickly communicate with the external air above the liquid surface 30 during floating of the cleaning device 10.” Wang at [0111]: “As shown in FIG. 6, the buoyancy adjustment part 511 may include two buoyancy cavities 5111, the buoyancy cavity pump 5112, the air inlet 5113, and the connection duct 5114. The buoyancy cavities 5111 may be connected to the buoyancy cavity pump 5112 through the connection duct 5114. The buoyancy cavity pump 5112 may be connected to the air inlet 5113 through the connection duct 5114. In the non-operating state, the buoyancy cavity pump 5112 has the same function as the one-way valve and can prevent the external liquid and/or gas from entering the buoyancy cavity 5111 through the air inlet 5113. In some other embodiments, when the buoyancy adjustment part is a centrifugal pump or the like, the one-way valve is disposed at the connection duct 5114 to prevent the external liquid and/or gas from entering the	provided directly on the buoyancy chamber 5111, or it may be independent of the buoyancy chamber 5111. The air inlet 5113 may be provided on the housing of the cleaning apparatus 10 to facilitate communication with the external environment (e.g., external liquid or external air) for gas and/or liquid exchange. As shown in FIG. 5, the air inlet 5113 may be provided above the front end rear portion of the cleaning apparatus 10, so that during the ascent of the cleaning apparatus 10, the air inlet 5113 can more quickly communicate with the external air above the liquid level 30.” Wang '040 at p.12:19-26: “As shown in FIG. 6, the buoyancy adjustment assembly 511 may include two buoyancy chambers 5111, a buoyancy chamber pump 5112, an air inlet 5113, and a connecting pipeline 5114. The buoyancy chambers 5111 may be connected to the buoyancy chamber pump 5112 via the connecting pipeline 5114, and the buoyancy chamber pump 5112 may be connected to the air inlet 5113 via the connecting pipeline 5114. When the buoyancy chamber pump 5112 is in a non-working state, it acts like the one-way valve, and can prevent external liquid and/or liquid from entering the buoyancy chambers 5111 through the air inlet 5113. In some other embodiments, when the buoyancy adjustment member is a structure such as a centrifugal pump, a one-way valve is provided at the connecting pipeline 5114 to prevent external

Claim No.	Claim Language	Relevant Disclosure of Wang	Relevant Disclosure of Wang'040 supporting Wang
		buoyancy cavity 5111 through the air inlet 5113.”	liquid and/or liquid from entering the buoyancy chamber 5111 through the air inlet 5113.”
9b	and wherein the sinking and floating control unit further comprises an air inlet and outlet subunit, wherein the switch subunit is connected to the outside atmosphere through the air inlet and outlet subunit.	Wang at [0111]: “As shown in FIG. 6, the buoyancy adjustment part 511 may include two buoyancy cavities 5111, the buoyancy cavity pump 5112, the air inlet 5113, and the connection duct 5114. The buoyancy cavities 5111 may be connected to the buoyancy cavity pump 5112 through the connection duct 5114. The buoyancy cavity pump 5112 may be connected to the air inlet 5113 through the connection duct 5114. In the non-operating state, the buoyancy cavity pump 5112 has the same function as the one-way valve and can prevent the external liquid and/or gas from entering the buoyancy cavity 5111 through the air inlet 5113. In some other embodiments, when the buoyancy adjustment part is a centrifugal pump or the like, the one-way valve is disposed at the connection duct 5114 to prevent the external liquid and/or gas from entering the buoyancy cavity 5111 through the air inlet 5113. ”	Wang '040 at p.12:19-26: “As shown in FIG. 6, the buoyancy adjustment assembly 511 may include two buoyancy chambers 5111, a buoyancy chamber pump 5112, an air inlet 5113, and a connecting pipeline 5114. The buoyancy chambers 5111 may be connected to the buoyancy chamber pump 5112 via the connecting pipeline 5114, and the buoyancy chamber pump 5112 may be connected to the air inlet 5113 via the connecting pipeline 5114. When the buoyancy chamber pump 5112 is in a non-working state, it acts like the one-way valve, and can prevent external liquid and/or liquid from entering the buoyancy chambers 5111 through the air inlet 5113. In some other embodiments, when the buoyancy adjustment member is a structure such as a centrifugal pump, a one-way valve is provided at the connecting pipeline 5114 to prevent external liquid and/or liquid from entering the buoyancy chamber 5111 through the air inlet 5113. ”
10	The controllable sinking and floating swimming pool robot according to claim 1, wherein the main	Wang at [0118]: “When the cleaning device 10 needs to be switched from the position on the liquid surface 30 to the position under the liquid surface 30, the processor 52 may control the buoyancy adjustment part to reduce the volume of the gas in the buoyancy cavity 5111. ”	Wang '040 at p.13:10-11: “When the cleaning apparatus 10 needs to switch from above the liquid level 30 to below the liquid level 30, the processor 52 can control the buoyancy adjustment member to reduce the volume of the gas in the buoyancy chamber 5111. ”

Claim No.	Claim Language	Relevant Disclosure of Wang	Relevant Disclosure of Wang'040 supporting Wang
	control unit is further capable of controlling the sinking and floating control unit to enter a sinking working state based on the operational requirement information of the swimming pool robot to realize a sinking of the swimming pool robot.	Wang at [0119]: “In some embodiments, switching of the cleaning device 10 between the position on the liquid surface 30 and the position under the liquid surface 30 includes operating from the first motion state to the third motion state and operating from the third motion state to the first motion state . It may be understood that switching of the cleaning device 10 between the first motion state and the third motion state may be implemented by using the mode switching member 510, the first sensor, and the second sensor that are disposed in the cleaning device 10.”	Wang '040 at p.13:21-24: “In some embodiments, the switching of the cleaning apparatus 10 above and below the liquid level includes running from the first movement state to the third movement state and running from the third movement state to the first movement state . It can be understood that during the switching between the first movement state and the third movement state, the cleaning apparatus 10 may rely on the mode switching component 510, the first sensor, the second sensor, etc. provided therein.”
		Wang at [0120]: “After the cleaning device 10 completes water surface cleaning, the filtering box 711 is cleaned at the water surface, or the cleaning device 10 is charged at the water surface, the cleaning device 10 needs to be switched from the third motion state to the first motion state to continue cleaning the bottom of the pool. In this case, the buoyancy cavity pump 5112 may be started or the volume of the gas in the buoyancy cavity 5111 may be adjusted when the cleaning device 10 is in the third motion state, to reduce the buoyancy force. The cleaning device 10 is switched from the third motion state to the first motion state under the action of gravity thereof. In addition, an attitude sensor disposed on the cleaning device 10 may cooperate with a controller to control the attitude of the cleaning device 10 to be stable during state switching.”	Wang '040 at p.13:30-36: “After the cleaning apparatus 10 completes cleaning the water surface or cleaning the debris bin 711 on the water surface or charging on the water surface, it needs to switch from the third movement state to the first movement state to continue cleaning the pool bottom. At this time, the buoyancy chamber pump 5112 can be started in the third movement state or the amount of gas in the buoyancy chamber 5111 can be adjusted to reduce its buoyancy. The cleaning apparatus 10 switches from the third movement state to the first movement state under the action of gravity. At the same time, the posture sensor provided on the cleaning apparatus 10 can be combined with the controller to control the posture stability of the cleaning apparatus 10 during the state switching process.”

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		Wang at [0182]: “Step 1010: Obtain a target task of cleaning a target swimming pool.”	Wang '040 at p.19:21: “Step 1010: Obtain a target task for cleaning a target swimming pool.”
		Wang at [0183]: “The target swimming pool may be a to-be-cleaned swimming pool. The target task may be a task of cleaning the target swimming pool. The target task may include water surface cleaning and/or underwater cleaning. The water surface cleaning may mean cleaning a water surface of the target swimming pool. The underwater cleaning may mean cleaning an underwater part of the target swimming pool (such as water in the swimming pool and a wall of the swimming pool). In some embodiments, the target task may further include a specific to-be-cleaned part. For example, the underwater cleaning may further include, but is not limited to, cleaning the water, cleaning the bottom of the pool, cleaning each wall of the pool, and the like.”	Wang '040 at p.19:22-27: “The target swimming pool refers to the pool requiring cleaning. The target task refers to the cleaning task to be performed on the target swimming pool. The target task may include surface cleaning and/or underwater cleaning, where surface cleaning refers to cleaning the water surface of the target pool, and underwater cleaning refers to cleaning underwater areas (e.g., water body, pool wall, etc.) of the target pool. In some embodiments, the target task may further specify particular cleaning locations 4311. For example, underwater cleaning may include, but is not limited to, cleaning the water body, pool bottom, and various pool walls.”
		Wang at [0184]: “The control member may obtain the target task in various manners. For example, the control member may obtain the target task input by a user. For another example, the control member may be configured to perform the target task periodically, such as perform water surface cleaning once every three days and perform underwater cleaning once every two days. For another example, the cleaning device 10 may further include a detection member. The detection member may detect water quality of the target swimming	Wang '040 at p.19:28-32: “The control component may acquire the target task in various ways. For example, the control component may receive user input specifying the target task. Alternatively, the control component may be configured to execute the target task periodically, such as performing surface cleaning every three days and underwater cleaning every two days. Furthermore, the cleaning apparatus 10 may include a detection component for water quality detection of the target pool, obtaining water quality data. The control component may acquire

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		pool to obtain water quality data of the target swimming pool. The control member may obtain the water quality data and determine the target task based on the water quality data. The water quality data may be data reflecting a water quality condition of the target swimming pool.”	this water quality data and determine the target task based on it.”
11	The controllable sinking and floating swimming pool robot according to claim 10, wherein the sinking and floating control unit comprises an inflation and deflation subunit, a switch subunit and an airbag subunit connected to the inflation and deflation subunit, controlling the sinking and floating control unit to enter the sinking working state comprises controlling the	Wang at [0182]-[0184]. Wang at [0182]: “Step 1010: Obtain a target task of cleaning a target swimming pool.” Wang at [0183]: “The target swimming pool may be a to-be-cleaned swimming pool. The target task may be a task of cleaning the target swimming pool. The target task may include water surface cleaning and/or underwater cleaning. The water surface cleaning may mean cleaning a water surface of the target swimming pool. The underwater cleaning may mean cleaning an underwater part of the target swimming pool (such as water in the swimming pool and a wall of the swimming pool). In some embodiments, the target task may further include a specific to-be-cleaned part. For example, the underwater cleaning may further include, but is not limited to, cleaning the water, cleaning the bottom of the pool, cleaning each wall of the pool, and the like.” Wang at [0184]: “The control member may obtain the target task in various manners. For example, the control member may obtain the target task input by a	Wang '040 at p.19:21-32. Wang '040 at p.19:21: “Step 1010: Obtain a target task for cleaning a target swimming pool.” Wang '040 at p.19:22-27: “The target swimming pool refers to the pool requiring cleaning. The target task refers to the cleaning task to be performed on the target swimming pool. The target task may include surface cleaning and/or underwater cleaning, where surface cleaning refers to cleaning the water surface of the target pool, and underwater cleaning refers to cleaning underwater areas (e.g., water body, pool wall, etc.) of the target pool. In some embodiments, the target task may further specify particular cleaning locations 4311. For example, underwater cleaning may include, but is not limited to, cleaning the water body, pool bottom, and various pool walls.” Wang '040 at p.19:28-32: “The control component may acquire the target task in various ways. For example, the control component may receive user input specifying the target task. Alternatively, the control component may be configured to execute the

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	switch subunit to open and controlling the inflation and deflation subunit to discharge air in the airbag subunit.	user. For another example, the control member may be configured to perform the target task periodically, such as perform water surface cleaning once every three days and perform underwater cleaning once every two days.”	target task periodically, such as performing surface cleaning every three days and underwater cleaning every two days. Furthermore, the cleaning apparatus 10 may include a detection component for water quality detection of the target pool, obtaining water quality data. The control component may acquire this water quality data and determine the target task based on it.”
		Wang at [0118]: “When the cleaning device 10 needs to be switched from the position on the liquid surface 30 to the position under the liquid surface 30, the processor 52 may control the buoyancy adjustment part to reduce the volume of the gas in the buoyancy cavity 5111. ”	Wang '040 at p.13:10-11: “When the cleaning apparatus 10 needs to switch from above the liquid level 30 to below the liquid level 30, the processor 52 can control the buoyancy adjustment member to reduce the volume of the gas in the buoyancy chamber 5111. ”
		Wang at [0120]: “After the cleaning device 10 completes water surface cleaning, the filtering box 711 is cleaned at the water surface, or the cleaning device 10 is charged at the water surface, the cleaning device 10 needs to be switched from the third motion state to the first motion state to continue cleaning the bottom of the pool. In this case, the buoyancy cavity pump 5112 may be started or the volume of the gas in the buoyancy cavity 5111 may be adjusted when the cleaning device 10 is in the third motion state, to reduce the buoyancy force. The cleaning device 10 is switched from the third motion state to the first motion state under the action of gravity thereof. In	Wang '040 at p.13:30-36: “After the cleaning apparatus 10 completes cleaning the water surface or cleaning the debris bin 711 on the water surface or charging on the water surface, it needs to switch from the third movement state to the first movement state to continue cleaning the pool bottom. At this time, the buoyancy chamber pump 5112 can be started in the third movement state or the amount of gas in the buoyancy chamber 5111 can be adjusted to reduce its buoyancy. The cleaning apparatus 10 switches from the third movement state to the first movement state under the action of gravity. At the same time, the posture sensor provided on the cleaning apparatus 10 can be

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		addition, an attitude sensor disposed on the cleaning device 10 may cooperate with a controller to control the attitude of the cleaning device 10 to be stable during state switching.”	combined with the controller to control the posture stability of the cleaning apparatus 10 during the state switching process.”
12a	The controllable sinking and floating swimming pool robot according to claim 7, wherein the inflation and deflation subunit comprises an air pump assembly,	Wang at [0109]: “The buoyancy adjustment part may be any structure that can adjust the gas and/or the liquid in the buoyancy cavity 5111. As shown in FIG. 6, the buoyancy adjustment part may include a buoyancy cavity pump 5112. The buoyancy cavity pump 5112 can drive the buoyancy cavity 5111 to drain the liquid therefrom. The buoyancy cavity pump 5112 may be , but is not limited to, a pneumatic pump , a hydraulic pump, or an electric pump. In an operating state, the buoyancy cavity pump 5112 can adjust the liquid and/or the gas in the buoyancy cavity 5111. In a non-operating state, the buoyancy cavity pump 5112 can prevent any external liquid and/or gas of the cleaning device 10 from entering the buoyancy cavity 5111, so that the buoyancy cavity 5111 is not affected by the external liquid and/or gas.”	Wang '040 at p.11:74-p.12:5: “The buoyancy adjustment member may be any structure capable of adjusting the volume of gas and/or liquid within the buoyancy chamber 5111. As shown in FIG. 6, the buoyancy adjustment member may include a buoyancy chamber pump 5112, which can drive the discharge of liquid from the buoyancy chamber 5111. The buoyancy chamber pump 5112 may include , but is not limited to, pneumatic pumps , hydraulic pumps, or electric pumps, among others. When the buoyancy chamber pump 5112 is in the operating state, it is able to adjust the liquid and/or gas within the buoyancy chamber 5111. When the buoyancy chamber pump 5112 is in the non-working state, liquid and/or liquid outside the cleaning apparatus 10 can be prevented from entering the buoyancy chamber 5111 so that the buoyancy chamber 5111 is not affected by external liquid and/or gas.”
12b	and the switch subunit comprises an electromagnetic valve assembly or a two-position three-	Wang at [0109]: “When the air inlet 5113 does not communicate with the gas, a one-way valve may be disposed at the air inlet 5113. The one-way valve can prevent external water of the cleaning device body 101 from entering the buoyancy cavity 5111 through the air inlet 5113.”	Wang '040 at p.11:68-70: “When the air inlet 5113 is not connected to the gas, a one-way valve may be provided at the air inlet 5113. The one-way valve can prevent external water from the cleaning apparatus main body 101 from entering the buoyancy chamber 5111 through the air inlet 5113.”

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	way valve assembly.		
13	The controllable sinking and floating swimming pool robot according to claim 7, wherein in response to the outlet water detection subunit detecting that at least a part of the swimming pool robot enters underwater again and/or the posture detection unit detecting that the posture of the swimming pool robot meets a second predetermined condition, the inflation and deflation subunit and the switch subunit are	Wang at [0068]-[0070]. [0068] With reference to FIG. 7, FIG. 8, FIG. 10, FIG. 11, and FIG. 12, a first motion state is defined as a state in which the cleaning device 10 moves on the bottom wall 401, or an angle between the bottom wall 401 and an overall direction of the cleaning device 10 is less than 90° and the cleaning device 10 is away from the liquid surface 30. As shown in FIG. 10, that the cleaning device 10 is away from the liquid surface 30 may be understood as that the cleaning device 10 cleans the bottom of the pool or performs an action under- water. A second motion state is defined as a state in which the cleaning device 10 moves on the side wall 402, or the overall direction of the cleaning device 10 is substantially parallel to the side wall 402, as shown in FIG. 7 and FIG. 12. A third motion state is defined as a state in which the cleaning device 10 moves on the liquid surface 30, or the cleaning device 10 is at least partially exposed at the liquid surface 30, or the cleaning device 10 is entirely located under the liquid surface 30 and close to the liquid surface 30. That the cleaning device 10 is close to the liquid surface 30 may be understood as that a distance between the cleaning device 10 and the liquid surface 30 is less than a threshold and the cleaning device 10 can perform water surface cleaning. The overall direction of the cleaning device	Wang' 040 at p.7:29-51. In conjunction with FIG. 7, FIG. 8, FIG. 10, FIG. 11, and FIG. 12, when the cleaning apparatus 10 moves on the target bottom wall 401 or the overall direction of the cleaning apparatus 10 is at an angle less than 90° to the target bottom wall 401 and is away from the liquid level 30, this is defined as the first movement state. As shown in FIG. 10, away from the liquid level 30 can be understood as the cleaning apparatus 10 cleaning the pool bottom, performing actions in the water, etc. When the cleaning apparatus 10 moves on the target side wall 402 or the overall direction of the cleaning apparatus 10 is substantially parallel to the target side wall 402, this is defined as the second movement state, as shown in FIG. 7 and FIG. 12. When the cleaning apparatus 10 is moving on the liquid level 30, or the cleaning apparatus 10 is at least partially exposed from the liquid level 30, or the cleaning apparatus 10 is located as a whole below the liquid level 30 and close to the liquid level 30, this is defined as the third movement state, where being close to the liquid level 30 can be understood as the distance between the cleaning apparatus 10 and the liquid level 30 being less than a threshold value, and it can perform water surface cleaning work etc. In the above description, the plane where the propulsion mechanism 100 of the cleaning apparatus

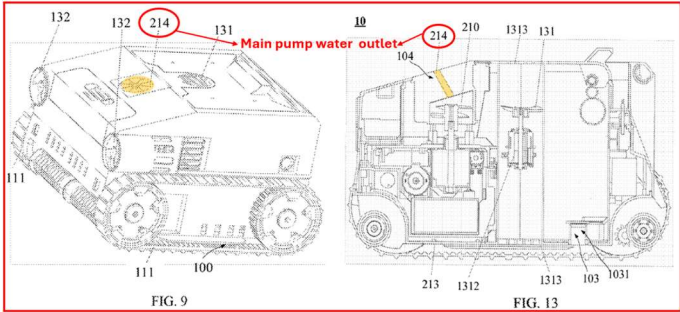
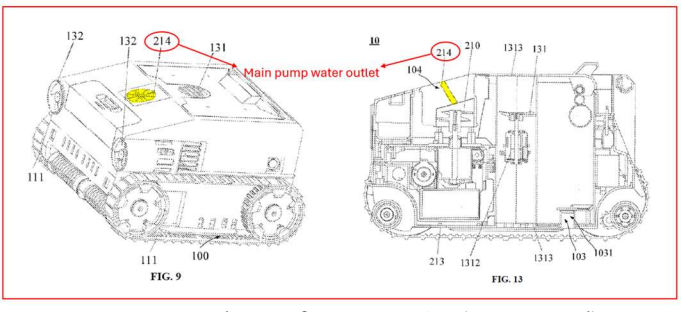
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	controlled to be closed.	10 is defined as a direction of a plane in which a movement propulsion mechanism 100 of the cleaning device 10, for example, a track 111 or a wheel 112, is in contact with a to-be-cleaned surface. [0069] Therefore, under the action of the mode switching member 510, the cleaning device 10 can be switched between the position on the liquid surface 30 and the position under the liquid surface 30, so that the cleaning device 10 is switched between the first motion state and the third motion state. The cleaning device can perform under- water cleaning in the first motion state. The cleaning device can perform water surface cleaning in the third motion state. Therefore, the cleaning device 10 can be adjusted to perform at least two operating conditions: underwater cleaning and water surface cleaning, thereby meeting various use requirements. [0070] In some embodiments, the cleaning device 10 further has the second motion state. The cleaning device can clean a pool wall or a waterline in the second motion state. Switching of the cleaning device 10 between the first motion state and the third motion state may include or exclude switching of the second motion state. In other words, the cleaning device may have the first motion state and the third motion state, or the cleaning device may have the first motion state, the second motion state, and the third motion state. The second motion state	10, such as the track 111 or the wheel 112, contacts the surface to be cleaned can be defined as the overall direction of the cleaning apparatus 10. As such, under the action of the mode switching component 510, the cleaning apparatus 10 can be switched between positions above and below the liquid level 30, enabling the switching of the cleaning apparatus 10 between the first movement state and the third movement state. The cleaning apparatus may perform underwater cleaning tasks in the first movement state. The cleaning apparatus can perform water surface cleaning tasks in the third movement state, and the cleaning apparatus 10 can be adjusted to perform at least two working conditions: underwater cleaning and water surface cleaning, thereby meeting different usage needs. In some embodiments, the cleaning apparatus 10 further comprises a second movement state. The cleaning apparatus may perform wall or waterline cleaning tasks in the second movement state. The switching of the cleaning apparatus 10 between the first and third movement states includes or does not include a second movement state. That is, the cleaning apparatus may comprise a first movement state and a third movement state. Alternatively, the cleaning apparatus may comprise a first movement state, a second movement state, and a third movement state. Wherein, the second movement state

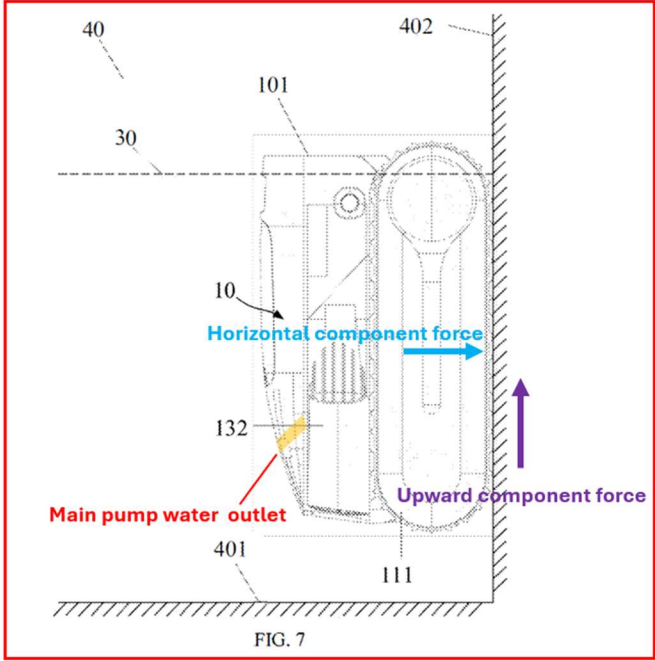
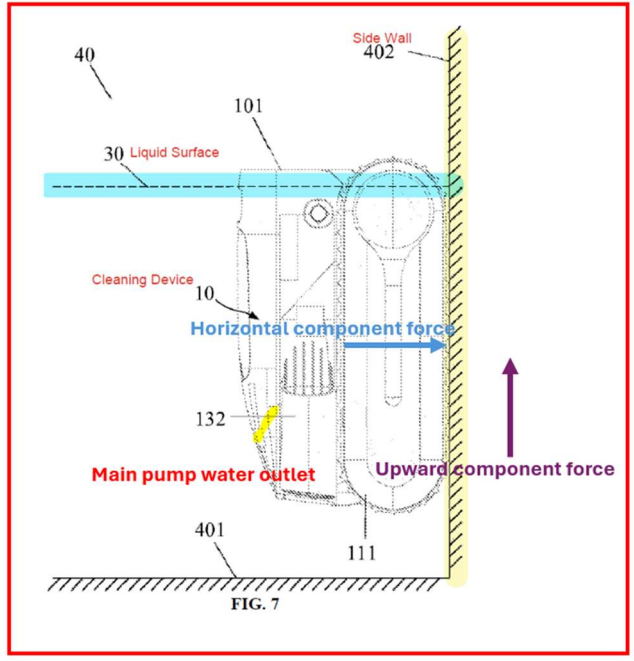
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		may be selected based on an actual requirement. This is not limited herein.	may be selected according to actual needs and is not limited here.
		Wang at [0138]-[0139]. [0138] In some embodiments, the two first wheels 1121 are disposed at the front end of the bottom of the cleaning device body 101. The two second wheels 1122 are disposed at the rear end of the bottom of the cleaning device body 101. The first wheels 1121 and the second wheels 1122 can drive the cleaning device 10 to move in the horizontal direction. When the cleaning device 10 is located on the target bottom wall 401 of the target region 40, the first wheels 1121 and the second wheels 1122 can operate to drive the cleaning device 10 to move on the target bottom wall 401 and the target side wall 402 and move from the target bottom wall 401 to the target side wall 402. In some embodiments, the movement propulsion mechanism 100 includes a track 111. The first wheel 1121 and the second wheel 1122 are connected to each other through the track 111. In other words, the first wheel 1121 and the second wheel 1122 rotate as the track 111 rotates. The track 111 can operate to drive the cleaning device 10 to move. The track 111 can drive the cleaning device 10 to move in the horizontal direction. As shown in FIG. 10, when the cleaning device 10 is located on the target bottom wall 401 of the target region 40, the track 111 can operate to drive the cleaning device 10 to move on the target bottom wall 401. The track 111 can further	Wang' 040 at p.15:25-62. In some embodiments, the two first wheels 1121 are disposed at the front end of the bottom of the cleaning apparatus main body 101, and the two second wheels 1122 are arranged at the rear end of the bottom of the cleaning apparatus main body 101. The first and second wheels 1121 and 1122 may drive the cleaning apparatus 10 to move in a horizontal direction. When the cleaning apparatus 10 is located on the target bottom wall 401 of the target area 40, the operation of the first and second wheels 1121 and 1122 may drive the cleaning apparatus 10 to move on the target bottom wall 401 and on the target side wall 402 and to transition from the target bottom wall 401 to the target side wall 402. In some embodiments, the traveling propulsion mechanism 100 includes a track 111. The first wheels 1121 and second wheels 1122 are connected by the track 111. That is, the first wheels 1121 and the second wheels 1122 rotate with the rotation of the track 111. The operation of the track 111 may drive the cleaning apparatus 10 to move. The track 111 may drive the cleaning apparatus 10 to move in a horizontal direction. As shown in FIG. 10, when the cleaning apparatus 10 is located on the target bottom wall 401 of the target area 40, the operation of the track 111 may drive the cleaning apparatus 10 to move on the

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		drive the cleaning device 10 to move in the vertical direction. As shown in FIG. 7 and FIG. 12, when the cleaning device 10 is tightly attached to the target side wall 402 of the target region 40, the track 111 can operate to drive the cleaning device 10 to move on the target side wall 402. For details about how the cleaning device 10 is tightly attached to and moves on the target side wall 402 of the target region 40, refer to the following description. [0139] In some embodiments, the track 111 enables the cleaning device 10 to move from the target bottom wall 401 to the target side wall 402. As shown in FIG. 11, when the track 111 moves to an intersection between the target bottom wall 401 and the target side wall 402, a part of the track 111 moves on the target side wall 402, and the other part of the track 111 moves on the target bottom wall 401. The part of the track 111 on the target side wall 402 can drive the cleaning device 10 to move upward until the cleaning device moves from the target bottom wall 401 to the target side wall 402. After the cleaning device 10 moves from the target bottom wall 401 to the target side wall 402, the cleaning device 10 may be driven by the track 111 to move on the target side wall 402. The cleaning device 10 can move on the target side wall 402 under the action of the second driving force provided by the second propeller 132 after the second propeller 132 performs steering. The cleaning device 10 can move on the target side wall 402 under the action of a third driving force provided by the main	target bottom wall 401. The track 111 can also drive the cleaning apparatus 10 to move in the vertical direction. As shown in FIG. 7 and FIG. 13, when the cleaning apparatus 10 is in close contact with the target side wall 402 of the target area 40, the operation of the track 111 may further drive the cleaning apparatus 10 to move on the target side wall 402. Wherein, more details on how the cleaning apparatus 10 is brought into close contact with the target side wall 402 of the target area 40 are described below. In some embodiments, the track 111 may also enable transition of the travel area of the cleaning apparatus 10 from the target bottom wall 401 to the target side wall 402. As shown in FIG. 11, when the track 111 moves to the junction between the target bottom wall 401 and the target side wall 402, a portion of the track 111 moves on the target side wall 402, while another portion moves on the target bottom wall 401. The portion of the track 111 at the target side wall 402 may drive the cleaning apparatus 10 upward until the travel area of the cleaning apparatus 10 switches from the target bottom wall 401 to the target side wall 402. When the travel area of the cleaning apparatus 10 is switched from the target bottom wall 401 to the target side wall 402, the cleaning apparatus 10 can move on the target side wall 402 driven by the track 111. The cleaning apparatus 10 can further move on the target side wall 402 under the action of the second driving force provided by the second

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		water pump 210. For details about the main water pump 210 and the third driving force provided by the main water pump 210, refer to the following description. The track 111 is disposed, so that the cleaning device 10 can move at various positions in the liquid, and the cleaning device 10 can move from the target bottom wall 401 to the target side wall 402. In some embodiments, the cleaning device 10 may further include the main water pump 210. The main water pump 210 may be configured to drive the cleaning device 10 to suck the liquid from the liquid inlet portion 103 and drain the liquid from the liquid outlet portion 104. The liquid inlet portion 103 may include one or more inlets for liquid to enter the cleaning device 10, such as the first water inlet 1031 and the second water inlet 1032. The liquid inlet portion 103 includes a main pump water inlet 213. As shown in FIG. 9, FIG. 13, FIG. 14, and FIG. 15, the main pump water inlet 213 of the cleaning device 10 may serve as an inlet for liquid to enter the cleaning device 10. The main pump water inlet 213 may be the first water inlet 1031 or the second water inlet 1032. The liquid outlet portion 104 includes one or more outlets for liquid to be drained from the cleaning device 10 into the target region 40. The liquid outlet portion 104 includes a main pump water outlet 214. The main pump water outlet 214 may be the first water outlet. As shown in FIG. 9, FIG. 13, FIG. 14, and FIG. 15, the main pump water outlet 214 of the cleaning device 10 may serve as an outlet for the	thruster 132 after turning, and the cleaning apparatus 10 can further move on the target side wall 402 based on the action of the third driving force provided by the main water pump 210. For more details regarding the main water pump 210 and the third driving force it provides, please refer to the subsequent sections. By providing the tracker 111, the cleaning apparatus 10 can be easily moved to various positions in the liquid, and the travel area of the cleaning apparatus 10 can be switched from the target bottom wall 401 to the target side wall 402. In some embodiments, the cleaning apparatus 10 may further include a main water pump 210. The main water pump 210 may be used to drive the cleaning apparatus 10 to draw liquid from the liquid inlet section 103 and discharge it from the liquid outlet section 104. The liquid inlet section 103 may include one or more entries into which liquid enters the cleaning apparatus 10, such as a first water inlet 1031, a second water inlet 1032, etc. The liquid inlet section 103 includes a main water pump inlet 213. As shown in FIG. 9, FIG. 13, FIG. 14, and FIG. 15, the main water pump inlet 213 in the cleaning apparatus 10 may serve as an inlet for liquid into the cleaning apparatus 10, wherein the main water pump inlet 213 may be the first water inlet 1031 or the second water inlet 1032. The liquid outlet section 104 may include one or more outlets where liquid within the cleaning apparatus 10 exits the cleaning apparatus 10 into the target area 40. The liquid outlet section 104 includes a main water pump outlet 214. The main water pump outlet 214 may be a

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		liquid in the cleaning device 10 to be drained from the cleaning device 10 into the target region 40.	first water outlet. As shown in FIG. 9, FIG. 13, FIG. 14, and FIG. 15, the main water pump outlet 214 in the cleaning apparatus 10 may serve as an outlet for the liquid in the cleaning apparatus 10 to leave the cleaning apparatus 10 and enter the target area 40.
		Wang at [0120]: “When the buoyancy cavity 5111 adjusts the buoyancy force by using gas, and the air inlet 5113 or an air outlet of the buoyancy cavity 5111 is located above the liquid surface, the buoyancy cavity pump 5112 is started to adjust the volume of the gas in the buoyancy cavity 5111. In this case, the cleaning device 10 may be from the first motion state to the second motion state until the air inlet 5113 is exposed at the water surface. Then, the attitude of the cleaning device 10 is adjusted to be in the third motion state. In this way, the cleaning device 10 is switched from the position under the liquid surface to the position on the liquid surface ... In addition, an attitude sensor disposed on the cleaning device 10 may cooperate with a controller to control the attitude of the cleaning device 10 to be stable during state switching.”	Wang '040 at p.13:25-36: “In the case where the buoyancy chamber 5111 uses gas to adjust the buoyancy, when the air inlet 5113 or the air outlet of the buoyancy chamber 5111 is located above the liquid level, the buoyancy chamber pump 5112 is started to adjust the amount of gas in the buoyancy chamber 5111. In this case, the mode switching of the cleaning apparatus 10 may be switching from the first movement state to the third movement state until the air inlet 5113 is exposed from the water surface, and then the posture of the cleaning apparatus 10 is adjusted to the third movement state, thereby completing the switching from below the liquid level to above the liquid level ... At the same time, the posture sensor provided on the cleaning apparatus 10 can be combined with the controller to control the posture stability of the cleaning apparatus 10 during the state switching process. ”
14a	The controllable sinking and floating swimming pool robot according to claim	Wang at [0139]: “In some embodiments, the cleaning device 10 may further include the main water pump 210. The main water pump 210 may be configured to drive the cleaning device 10 to suck the liquid from the liquid inlet portion 103	Wang '040 at p.15:51-55: “In some embodiments, the cleaning apparatus 10 may further include a main water pump 210. The main water pump 210 may be used to drive the cleaning apparatus 10 to draw liquid from the liquid inlet section 103 and

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	7, further comprising a water pump unit configured to pump liquid in the swimming pool where the swimming pool robot is located and discharge the liquid to drive the swimming pool robot,	and drain the liquid from the liquid outlet portion 104. The liquid inlet portion 103 may include one or more inlets for liquid to enter the cleaning device 10, such as the first water inlet 1031 and the second water inlet 1032.”	discharge it from the liquid outlet section 104. The liquid inlet section 103 may include one or more entries into which liquid enters the cleaning apparatus 10, such as a first water inlet 1031, a second water inlet 1032, etc.”
		Wang at [0139]: “As shown in FIG. 9, FIG. 13, FIG. 14, and FIG. 15, the main pump water outlet 214 of the cleaning device 10 may serve as an outlet for the liquid in the cleaning device 10 to be drained from the cleaning device 10 into the target region 40.”	Wang '040 at p.15:60-62: “As shown in FIG. 9, FIG. 13, FIG. 14, and FIG. 15, the main water pump outlet 214 in the cleaning apparatus 10 may serve as an outlet for the liquid in the cleaning apparatus 10 to leave the cleaning apparatus 10 and enter the target area 40.”
		 FIGS. 9 and 13 of Wang (annotated)	 FIGS. 9 and 13 of Wang'040 (annotated)
		Wang at [0143]: “In some embodiments, when the cleaning device 10 needs to move on the target side wall 402, the main pump water outlet 214 may face towards the target region 40. When the main pump water outlet 214 tilts downward along the vertical direction, the third driving force applied to the cleaning device 10 has a horizontal component force facing towards the target side wall 402, so that	Wang '040 at p.16:4-8: “In some embodiments, when the cleaning apparatus 10 needs to move along the target side wall 402, if the main water pump outlet 214 faces the interior of the target area 40 and is inclined downward in the vertical direction, the third driving force obtained by the cleaning apparatus 10 will have a horizontal component directed toward the target side wall 402, allowing the

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		the cleaning device 10 can be tightly attached to the target side wall 402. In addition, the third driving force further has an upward component force in the vertical direction, so that the cleaning device 10 can move upward along the target side wall 402."  Fig. 7 of Wang (annotated)	cleaning apparatus 10 to remain closely attached to the target side wall 402. In addition, the third driving force may also have an upward vertical component, thereby enabling the cleaning apparatus 10 to move upward along the target side wall 402."  Fig. 7 of Wang'040 (Annotated)

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14b	wherein a power of the water pump unit is changed after the sinking and floating control unit enters the floating working state or after the swimming pool robot climbs the side wall or the slope.	Wang at [0144]: “In some embodiments, the main pump water inlet 213 may be provided at the bottom of the cleaning device 10. When the cleaning device 10 needs to move on the target side wall 402, the main water pump 210 may suck the liquid through the main pump water inlet 213 to obtain a fourth driving force to drive the cleaning device 10 to be tightly attached to the target side wall 402. The fourth driving force may be a suction force generated by the main water pump 210 sucking the liquid through the main pump water inlet 213. The suction force may drive the cleaning device 10 to be tightly attached to the target side wall 402.”	Wang '040 at p.16:12-16: “In some embodiments, the main water pump inlet 213 may be provided at the bottom of the cleaning apparatus 10. When the cleaning apparatus 10 needs to move on the target side wall 402, the main water pump 210 can suck liquid from the main water pump inlet 213, thereby obtaining a fourth driving force to drive the cleaning apparatus 10 to closely adhere to the target side wall 402. The fourth driving force may be the suction force generated by the main water pump 210 drawing water through the main water pump inlet 213, which can keep the cleaning apparatus 10 closely attached to the target side wall 402.”
		Wang at [0145]: “In some embodiments, when the cleaning device 10 needs to move on the target side wall 402, the main water pump 210 of the cleaning device 10 may drive the cleaning device 10 to be tightly attached to the target side wall 402. ”	Wang '040 at p.16:17-18: “In some embodiments, when the cleaning apparatus 10 needs to move on the target side wall 402, the main water pump 210 in the cleaning apparatus 10 can drive the cleaning apparatus 10 to closely adhere to the target side wall 402. ”
15pre	A sinking and floating control method for a swimming pool robot, comprising:	<i>See, e.g.,</i> relevant disclosures for limitation [1pre] above.	<i>See, e.g.,</i> relevant disclosures for limitation [1pre] above.
15a	controlling a swimming pool robot to find a side wall or a slope	<i>See, e.g.,</i> relevant disclosures for limitation [1d] above.	<i>See, e.g.,</i> relevant disclosures for limitation [1d] above.

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	based on operational requirement information of the swimming pool robot, and enabling the swimming pool robot to crawl along the side wall or the slope;		
15b	detecting a positional relationship between the swimming pool robot and a waterline of a liquid surface of a swimming pool where the swimming pool robot is located;	<i>See, e.g.</i> , relevant disclosures for limitation [1e] above.	<i>See, e.g.</i> , relevant disclosures for limitation [1e] above.
15c	controlling a sinking and floating control unit to enter a floating working state based on detection results to	<i>See, e.g.</i> , relevant disclosures for limitation [1f] above.	<i>See, e.g.</i> , relevant disclosures for limitation [1f] above.

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	realize a floating of the swimming pool robot; and		
15d	controlling the sinking and floating control unit to stop working after the sinking and floating control unit enters the floating working state for a predetermined time.	<i>See, e.g.</i> , relevant disclosures for limitation [1g] above.	<i>See, e.g.</i> , relevant disclosures for limitation [1g] above.
16	The sinking and floating control method for the swimming pool robot according to claim 15, wherein detecting the positional relationship between the swimming pool robot and the waterline of the	<i>See, e.g.</i> , relevant disclosures for claims 2 and 15 above.	<i>See, e.g.</i> , relevant disclosures for claims 2 and 15 above.

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	liquid surface of the swimming pool where the swimming pool robot is located comprises: starting detecting the positional relationship in response to a posture of the swimming pool robot meeting a first predetermined condition.		
17	The sinking and floating control method for the swimming pool robot according to claim 16, wherein the operational requirement information comprises remote control command information sent by a user, clock information, operational task	<i>See, e.g.</i> , relevant disclosures for claims 3 and 16 above.	<i>See, e.g.</i> , relevant disclosures for claims 3 and 16 above.

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	progress information, fault information, power information or swimming pool bottom environment information.		
18	The sinking and floating control method for the swimming pool robot according to claim 17, wherein controlling the sinking and floating control unit to enter the floating working state based on detection results to realize the floating of the swimming pool robot comprises: controlling the sinking and floating control unit to enter the floating working	<i>See, e.g.</i> , relevant disclosures for claims 7 and 17 above.	<i>See, e.g.</i> , relevant disclosures for claims 7 and 17 above.

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	state in response to detecting that at least a part of the swimming pool robot has come out of water.		
19	The sinking and floating control method for the swimming pool robot according to claim 17, further comprising: controlling the sinking and floating control unit to stop working in response to detecting that at least a part of the swimming pool robot enters underwater again and/or detecting that the posture of the swimming pool robot meets a second	<i>See, e.g.</i> , relevant disclosures for claims 13 and 17 above.	<i>See, e.g.</i> , relevant disclosures for claims 13 and 17 above.

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	predetermined condition.		