

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

**XINGMAI INNOVATION TECHNOLOGY (SUZHOU) CO., LTD.
D/B/A BEATBOT,
Petitioner,**

v.

**AIPER GLOBAL PTE. LTD.,
Patent Owner.**

PGR2026-00012

U.S. Patent No. 12,221,196 B1

**PATENT OWNER'S CONTINGENT MOTION TO AMEND UNDER 37
C.F.R. § 42.221**

TABLE OF CONTENTS

I. INTRODUCTION AND PRECISE RELIEF REQUESTED	1
II. THE PROPOSED SUBSTITUTE CLAIMS.....	2
III. COMPLIANCE WITH STATUTORY AND REGULATORY REQUIREMENTS.....	3
A. Reasonable Number of Substitute Claims — 37 C.F.R. § 42.221(a)(3)	3
B. The Amendments Respond to Grounds of Unpatentability Involved in the Trial — 37 C.F.R. § 42.221(a)(2)(i)	5
C. The Amendments Do Not Enlarge Claim Scope — 37 C.F.R. § 42.221(a)(2)(ii)	6
D. No New Matter; Written Description Support — 37 C.F.R. §§ 42.221(b)(1), 42.221(f)	8
IV. THE SUBSTITUTE CLAIMS ARE PATENTABLE OVER THE ART OF RECORD AND ALL KNOWN PRIOR ART	12
A. No Asserted Reference Discloses or Suggests Initiating Waterline Detection in Response to a Detected Posture Condition	12
B. The Substitute Dependent Claims Are Separately Patentable	15
C. The Substitute Claims Are Definite and Enabled — § 112(a), (b)	17
V. CONCLUSION.....	18

I. INTRODUCTION AND PRECISE RELIEF REQUESTED

Pursuant to 35 U.S.C. § 326(d) and 37 C.F.R. § 42.221, and having conferred with the Board on August 4, 2026, Patent Owner Aiper Global Pte. Ltd. moves contingently to amend U.S. Patent No. 12,221,196 B1 (the “’196 patent”). Patent Owner proposes substitute claims 20–39 for original claims 1–19, to be considered only in the event, and only to the extent, that the Board determines a corresponding original claim to be unpatentable in its final written decision. This motion is fully contingent: Patent Owner does not concede the unpatentability of any original claim and maintains every argument presented in its Patent Owner Response. *Lectrosonics, Inc. v. Zaxcom, Inc.*, IPR2018-01129, Paper 15, at 4 (PTAB Feb. 25, 2019) (precedential).

Patent Owner respectfully requests that the Board issue preliminary guidance on this motion pursuant to 37 C.F.R. § 42.221(a)(1)(ii) and the Scheduling Order, and that, for each original claim found unpatentable, the corresponding substitute claim be entered.

The correspondence between original and substitute claims is as follows: original claims 1–6 and 8–14 correspond to substitute claims 20–25 and 28–34, respectively; original claim 7 corresponds to substitute claims 26 and 27; and original claims 15–19 corresponds to substitute claims 35–39, respectively. The

complete claim listing, with additions underlined and deletions in double brackets or strike-through, appears in Appendix A.

II. THE PROPOSED SUBSTITUTE CLAIMS

The substantive amendment is confined to the two independent claims and is narrowing. Independent substitute claim 20 (for original claim 1) adds two limitations, both taken verbatim from the language of originally filed dependent claim 2: (i) the robot further comprises “a posture detection unit configured to detect a posture of the swimming pool robot”; and (ii) “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.” Independent substitute claim 35 (for original claim 15) adds the corresponding method limitation taken from original claim 16: the recited detecting “comprises starting detecting the positional relationship in response to a posture of the swimming pool robot meeting a first predetermined condition.”

These additions claim a specific control architecture disclosed in the specification: waterline detection is not performed continuously, but is affirmatively initiated by the main control unit when the posture detection unit reports that the robot has assumed the posture associated with wall or slope climbing. EX1001, 9:31-38. The robot thus proceeds through an ordered sequence — posture change detected,

waterline detection commenced, floating working state entered, and the sinking and floating control unit stopped after the predetermined time — in which each stage is triggered by a defined machine-sensed event. Substitute claims 25 and 28 (for original claims 6 and 8) additionally conform the recited distance language, changing “distance from the waterline” to “distance below the waterline.” EX2003, ¶¶169-170.

Substitute dependent claims 21 and 36 (for original claims 2 and 16) recite the implementation of that architecture: the posture detection unit is “configured by an inertial sensor,” and the first predetermined condition comprises “the posture of the swimming pool robot changing from a state parallel to a bottom surface of the swimming pool to a state parallel to the side wall of the swimming pool.” Both limitations are expressly disclosed. EX1001, 9:31-38.

Substitute claims 27 and 33 recite the closing of the inflation and deflation subunit and the switch subunit under the closing conditions independently disclosed at EX1001, 9:5-8, 9:11-18, and 9:41-47.

III. COMPLIANCE WITH STATUTORY AND REGULATORY REQUIREMENTS

A. Reasonable Number of Substitute Claims — 37 C.F.R. § 42.221(a)(3)

Patent Owner proposes twenty substitute claims for nineteen original claims. Eighteen original claims receive a single substitute each, within the presumption that one substitute claim per challenged claim is reasonable. 37 C.F.R. § 42.221(a)(3); *Lectrosonics*, Paper 15, at 4-5. Only original claim 7 receives two substitutes (claims 26 and 27), and Patent Owner demonstrates the need for that one additional claim as follows.

The specification discloses three distinct events, each of which independently causes the inflation and deflation subunit and the switch subunit to be closed: (i) the outlet water detection subunit detecting that at least a part of the robot enters underwater again, EX1001, 9:5-8; (ii) the outlet water detection subunit not detecting such re-entry after the sinking and floating control unit has been in the floating working state for the predetermined time, EX1001, 9:11-18; and (iii) the posture detection unit detecting that the posture meets a second predetermined condition, EX1001, 9:41-47. Substitute claim 33 preserves the subject matter of original claim 13 as issued — closing upon event (i) and/or event (iii) — while substitute claim 27 — designated as a second substitute for original claim 7 — adds to the subject matter of substitute claim 26 the closing upon event (ii).

The one additional claim is needed because the two re-entry-related closing conditions — the affirmative detection of re-entry (event (i)) and the time-conditioned absence of that detection (event (ii)) — are alternatives, not species of

a single recited condition: a device may implement either without implementing the other, and Petitioner's asserted references address them differently. Confining Patent Owner to a single substitute per original claim would require it to forfeit one of two separately disclosed embodiments in a single, indivisible election. The additional claim adds no new issue of patentability beyond those already presented, requires no additional prior-art analysis beyond that set out in Section IV, and does not enlarge the scope of the original claims.

B. The Amendments Respond to Grounds of Unpatentability Involved in the Trial

— 37 C.F.R. § 42.221(a)(2)(i)

The amendments respond to each category of instituted ground. As to Grounds 1–4 (§ 103), the added limitations require that waterline detection be affirmatively initiated by the main control unit in response to a machine-detected posture condition — a control relationship absent from the asserted references, which either operate their sensors continuously or say nothing about when sensing begins. *See* Section IV.A. As to Grounds 5 and 6 (§ 112(b)), the added limitations recite in the claim itself the input (posture detection results), the condition (the first predetermined condition), the actor (the main control unit), and the resulting operation (starting the waterline detection) — further reciting the operational

relationship among the claimed units and confirming that they denote structure performing defined functions. *See* Section IV.C.

An amendment does not need to respond to every ground; it suffices that it responds to a ground involved in the trial. *Lectrosonics*, Paper 15, at 5-6. These amendments respond to all six.

C. The Amendments Do Not Enlarge Claim Scope — 37 C.F.R. § 42.221(a)(2)(ii)

1. The independent claims. Substitute claims 20 and 35 retain every limitation of original claims 1 and 15 without alteration and add limitations. A device or method meeting substitute claim 20 or 35 necessarily meets original claim 1 or 15; the converse is not true, because a robot whose waterline detection runs continuously, or is initiated by any event other than the posture meeting the first predetermined condition, falls outside the substitute claims. The amendment is therefore narrowing in scope.

2. Substitute claims 21 and 36. These substitutes delete the limitations of original claims 2 and 16 and add new limitations. The deletion does not enlarge scope, because the deleted subject matter now appears in independent substitute claims 20 and 35, from which claims 21 and 36 respectively depend, and a dependent claim incorporates by law every limitation of the claim from which it depends. 35 U.S.C. § 112(d). Substitute claim 21 therefore covers a robot having all limitations

of original claim 2 (via claim 20) and, in addition, an inertial-sensor implementation and the specific first predetermined condition; substitute claim 36 is narrower than original claim 16 for the same reason. Each substitute is narrower than the claim it replaces.

3. The remaining substitute dependent claims. Substitute claim 24 adds sensor hardware to original claim 5. Substitute claims 25 and 28 replace “from the waterline” with “below the waterline,” resolving the direction of the recited distance to the vertical approach depicted in Figure 8B, so that every device meeting the clarified limitation necessarily met the original. The re-hanging of substitute claims 25, 26, 27, 28, 29, 31, 32, 33, and 34 onto substitute claims within the amended set narrows each of them, because each substitute parent is itself narrower than the original claim it replaces. Substitute claims 22, 23, 30, 37, 38, and 39 conform dependencies only.

4. Substitute claim 27. Claim 27 is designated as a second substitute corresponding to original claim 7. It contains every limitation of substitute claim 26 — which itself retains every limitation of original claim 7 with conformed dependencies — and adds the requirement that the inflation and deflation subunit and the switch subunit be closed when the outlet water detection subunit does not detect re-entry after the predetermined time. A device meeting claim 27 necessarily meets original claim 7; the converse is not true. Claim 27 is therefore narrower than

the claim to which it corresponds, and it does not enlarge the scope of any claim of the patent.

D. No New Matter; Written Description Support — 37 C.F.R. §§ 42.221(b)(1), 42.221(f)

Patent Owner hereby demonstrates support for the entirety of each substitute claim by the original disclosure of the Application No. 18/822,334 as filed (EX1002), whose specification and figures are substantially the same as those of the '196 patent (EX1001), to which pinpoint citations are provided for the parties' convenience. In addition, the claims of the application as originally filed are themselves part of the original disclosure and constitute their own written description. *In re Gardner*, 480 F.2d 879, 879 (CCPA 1973); MPEP § 2163(I). The limitations added by amendment are taken verbatim from original dependent claims 2 and 16, which were part of the application as originally filed.

During prosecution, originally filed claim 14 was cancelled and its subject matter was incorporated into the independent claims; and originally filed claim 11 was amended to incorporate features supported by originally filed claims 7-9 and the original specification; and the remaining claims were issued substantially as filed. EX1002, pp. 128-135. Each substitute claim is accordingly supported twice over: its retained subject matter appears in the claims of the application as filed, and every

limitation — retained or added — is independently supported by the express specification passages cited below, which do not depend on any claim's prosecution history. The posture-activation limitations added to substitute claims 20 and 35 are taken verbatim from the dependent claims of the application as filed and are expressly disclosed at EX1001, 9:31-38.

Independent substitute claims 20 and 35

Every element of substitute claim 20, and every step of substitute method claim 35, appears in originally filed claims 1, 2, and 14 and in the written description: the sinking and floating control unit and its airbag, pump, and valve implementation (originally filed claim 1; EX1001, 6:31-40, 8:48-9:4, Figs. 2B, 3); the waterline detection unit and its outlet-water and proximity subunits (originally filed claims 1, 5, 6; EX1001, 8:29-47, Figs. 8A-8B); the posture detection unit (originally filed claim 2; EX1001, 9:31-33); the main control unit and each recited operation — wall-finding and crawling based on operational requirement information, detection of the positional relationship, entry into the floating working state based on detection results, and the predetermined-time stop (originally filed claims 1, 14; EX1001, 6:41-59, 7:29-8:12, 9:5-30, Figs. 3, 7); and the posture-conditioned initiation of waterline detection (originally filed claim 2; EX1001, 9:31-38).

Dependent substitute claims

Each dependent substitute claim consists of (a) the subject matter of the originally filed claim to which it corresponds — which, as originally filed claim language, is itself part of the original disclosure, *In re Gardner*, 480 F.2d at 879 — (b) conformed dependencies within the substitute set, and, for the claims identified below, (c) an added or clarified limitation supported by the express disclosure cited. The support for each addition is as follows.

Substitute claims 21 and 36 (for originally filed claims 2 and 16): the retained subject matter is that of originally filed claims 2 and 16 (now carried in independent claims 20 and 35); the added inertial-sensor implementation and the first-predetermined-condition example are supported at EX1001, 9:31-38 (“the posture detection unit 40 is configured by, for example, an inertial sensor (IMU)”; “for example, changing from a state parallel to the bottom surface of the swimming pool to a state parallel to the side wall of the swimming pool”).

Substitute claim 24 (for originally filed claim 5): the retained subject matter — the outlet water detection subunit and its function — is that of originally filed claim 5, part of the original disclosure, and is further described at EX1001, 8:29-40; the added sensor hardware is supported at EX1001, 8:33-40 (capacitive sensor; ultrasonic ranging device).

Substitute claims 25 and 28 (for originally filed claims 6 and 8): the retained subject matter is that of originally filed claims 6 and 8; the clarified “below the

waterline” geometry is supported at EX1001, 8:41-47 (predetermined distance, for example 10 cm to 20 cm, as the robot crawls upward toward the waterline) and Fig. 8B (distance H depicted vertically below waterline Wt).

Substitute claim 27 (second substitute for originally filed claim 7): the retained subject matter is that of originally filed claim 7 (carried through substitute claim 26); the added time-conditioned closing is supported at EX1001, 9:11-18 (“in response to ... the outlet water detection subunit 301 ... not detect[ing] that at least a part of the swimming pool robot 1 enters underwater again after the sinking and floating control unit 20 enters the floating working state for a predetermined time (for example, 40 seconds), the inflation and deflation subunit 202 and the switch subunit 203 are controlled to be closed”). All remaining substitute claims (22, 23, 26, 29–34, 37–39) recite the subject matter of originally filed claims 3, 4, 7, 9–14, and 17–19, respectively, with conformed dependencies and no added limitation; each is supported by its originally filed counterpart and the parent-claim disclosures cited above.

All remaining substitute claims recite the subject matter of the corresponding original claims with conformed dependencies and introduce no new limitation, where the original claims were part of the application as originally filed. Dr. Cheng has independently verified the correspondence between each added limitation and the cited disclosure. EX2003, ¶171.

IV. THE SUBSTITUTE CLAIMS ARE PATENTABLE OVER THE ART OF RECORD AND ALL KNOWN PRIOR ART

Petitioner bears the burden of proving that the proposed substitute claims are unpatentable. 35 U.S.C. § 326(e); *Lectrosonics*, Paper 15, at 3-4. Although the burden of persuasion does not rest with Patent Owner, Patent Owner nonetheless demonstrates the patentability of the substitute claims below with respect to the prior art of record, the prior art known to Patent Owner, and the grounds on which trial was instituted. The same is true of the prior art the Examiner considered during prosecution—including Korenfeld and Tryber—which does not disclose or suggest the allowed combination or the limitations the substitute claims add. EX2003, ¶¶172-174. This motion is self-contained and does not incorporate argument by reference. 37 C.F.R. § 42.6(a)(3). The patentability showing below is accordingly made in full within this motion.

A. No Asserted Reference Discloses or Suggests Initiating Waterline Detection in Response to a Detected Posture Condition

The limitation added to substitute claims 20 and 35 requires more than the presence of a posture sensor and a waterline sensor in the same machine. It requires a control relationship between them: the waterline detection unit must be caused to start detecting because the posture detection results meet the first predetermined

condition. A robot whose waterline sensing operates continuously, or begins at power-on, or begins upon a timer or a user command, does not meet the limitation regardless of what sensors it carries.

Wang (EX1005) does not disclose this relationship. Wang's sensing arrangement operates as an ongoing input to its buoyancy and motion-state logic; Wang nowhere describes a dormant detection function that is activated in response to a detected posture condition. EX1005, ¶¶0113-0114, 0120, 0256; EX2003, ¶¶172-173. Petitioner's treatment of original claim 2 confirms the gap: the Petition asserts that Wang's device "begins detecting" upon the posture change without identifying any disclosure in Wang that a detection operation is **initiated** at that time, and its supporting testimony is offered without citation to underlying facts or data. Pet., 39-41; EX1003, ¶¶303-322. Such testimony is entitled to little or no weight. 37 C.F.R. § 42.65(a).

Zhao (EX1012) does not supply the missing relationship. Zhao's gyroscope and ultrasonic sensors operate together during its docking routine, and Zhao describes monitoring distance and posture during the approach and climb; Zhao does not describe holding waterline detection in abeyance and commencing it upon a posture criterion. EX1012, 4:6-17, 5:3-14, 8:24-42; EX2003, ¶174. A general statement that a docking operation "necessarily includes" detecting is not a disclosure of the claimed initiation step. EX1003, ¶¶316-317.

Zhang (EX1009) and Guo (EX1010) are even less relevant. Zhang's control is keyed to whether the air inlet is detected to be exposed to air, an affirmative sensor state rather than a posture-triggered activation of a different sensor. EX1009, 7:34-44, 8:13-36; EX2003, ¶173. Guo describes a floating and diving assembly with a sealed internal gas circulation and does not describe posture-conditioned initiation of waterline detection at all. EX1010, ¶¶19, 34-39, 48-56; EX2003, ¶173. And Owen (EX1013), a household inflation pump with an automatic shutoff timer, has no posture sensor, no waterline sensor, and no robotic state machine into which such a relationship could be introduced. EX1013, 1:11-32, 2:1-2, 4:11-31.

Nor would a POSITA have been led to the claimed initiation without hindsight. Each asserted reference is content to let its sensors run; none identifies a problem solved by deferring the start of waterline detection, and Petitioner has never articulated a reason to modify any reference to do so — unsurprisingly, because Petitioner's position is that the feature is already present. Where the asserted motivation is absent from the references and supplied only by the claims themselves, obviousness has not been shown. *In re NTP, Inc.*, 654 F.3d 1279, 1299 (Fed. Cir. 2011). EX2003, ¶¶172-174. Nor could conclusory testimony fill that gap: combination opinions that do not explain how the references would actually be integrated are entitled to no weight. *ActiveVideo Networks, Inc. v. Verizon*

Commc'ns, Inc., 694 F.3d 1312, 1327 (Fed. Cir. 2012); *Pers. Web Techs., LLC v. Apple, Inc.*, 848 F.3d 987, 994 (Fed. Cir. 2017).

B. The Substitute Dependent Claims Are Separately Patentable

Substitute claims 21 and 36 are patentable for the reasons given above and further because no asserted reference discloses the recited first predetermined condition — a transition from a state parallel to the bottom surface to a state parallel to the side wall — as the trigger for initiating waterline detection.

Substitute claim 27 recites closing the inflation and deflation subunit and the switch subunit when the outlet water detection subunit does not detect re-entry after the sinking and floating control unit has been in the floating working state for the predetermined time. This is a sensor-supervised condition evaluated at the expiry of a time interval, and it is not disclosed by any asserted reference. Owen's timer terminates a user-initiated inflation of a household air mattress and consults no sensor at all. EX1013, 2:1-2, 4:11-31. Zhao's timer governs how long the robot waits at the waterline for user retrieval before returning underwater; it does not close a buoyancy control unit and is not conditioned on the absence of a re-submersion detection. EX1012, 8:24-42. The Examiner allowed the original claims over the closest art precisely because of the time-conditioned stopping of the sinking and floating control unit. EX1002, 157.

Substitute claim 28 (for original claim 8) recites a two-stage entry into the floating working state: the inflation and deflation subunit starts working in response to the proximity waterline detection subunit detecting that the robot has crawled to within the predetermined distance below the waterline, and the switch subunit is controlled to open in response to the outlet water detection subunit detecting emergence. EX1001, 8:56-9:4. Operating the inflation subunit while the switch subunit remains closed and the robot is submerged develops a pressure differential across the switch subunit and prepares the gas path so that air is admitted rapidly upon emergence, directly serving the '196 patent's fast-transition objective. EX1001, 1:27-34; EX2003, ¶¶23, 31. No asserted reference discloses beginning inflation upon proximity detection before emergence: Zhang inflates only when the air inlet is detected to be exposed to air, EX1009, 7:34-44; Wang's inflation is governed by its buoyancy-state logic and discloses no proximity-triggered pre-inflation, EX1005, ¶¶0113-0120; Guo discloses no waterline-proximity sensing at all; and Owen has no sensors.

Substitute claim 29 (for original claim 9) requires the switch subunit to be connected to the outside atmosphere through the air inlet and outlet subunit. Guo's sealed cabin-sourced circulation has no outside-atmosphere path. EX1010, ¶¶19, 56. Wang's only disclosed valve is the one-way valve of its liquid-adjustment

embodiment, EX1005, ¶¶0109-0111, and Wang does not disclose admitting outside-atmosphere air through a controlled switch subunit. EX2003, ¶¶169-170, 172.

Substitute claim 32 (for original claim 12) recites concrete controlled-valve hardware — an electromagnetic valve or a two-position three-way valve — as the switch subunit. A passive one-way valve is neither, and no asserted reference discloses either recited valve as the switch controlling an outside-air path in a submersible robot. EX2003, ¶¶169-170, 172.

Substitute claim 24 (capacitive or ultrasonic outlet-water sensing) and substitute claims 25 and 28 (proximity detection below the waterline) are further patentable for the reasons stated in the Patent Owner Response as to the corresponding original claims, which apply with equal force to the narrower substitutes. EX2003, ¶¶169-170, 172.

C. The Substitute Claims Are Definite and Enabled — § 112(a), (b)

The substitute claims satisfy § 112(b). “Main control unit,” “posture detection unit,” and “distance measurement unit” each connote structure to a person of ordinary skill: a control unit denotes a processor, microcontroller, or equivalent control circuitry; a posture detection unit denotes an inertial sensor, as substitute claim 21 expressly recites; and a distance measurement unit denotes a ranging sensor of the class used throughout the disclosure. EX1001, 8:38-47, 9:31-33, Fig. 7;

EX2003, ¶¶0154-0156, 0165. The amendments reinforce definiteness by reciting in the claim the input, condition, actor, and resulting operation of the initiation step, and the specification discloses the corresponding operational logic in prose. EX1001, 9:31-38; *Typhoon Touch Techs., Inc. v. Dell, Inc.*, 659 F.3d 1376, 1385-86 (Fed. Cir. 2011); *Finisar Corp. v. DirecTV Grp., Inc.*, 523 F.3d 1323, 1340 (Fed. Cir. 2008). Each added limitation is supported by the original disclosure as shown in Section III.D, satisfying § 112(a). A POSITA would understand the scope of each substitute claim with reasonable certainty. *Nautilus, Inc. v. Biosig Instruments, Inc.*, 572 U.S. 898, 910 (2014).

V. CONCLUSION

If and only if the Board finds an original claim unpatentable, Patent Owner respectfully requests entry of the corresponding substitute claim or claims.

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Respectfully submitted,

/Tairan Wang/

Tairan Wang

Reg. No. 67,961

PV IP PC

6701 Democracy Blvd, Suite 300,

Bethesda, MD 20817

Tel: (612) 501-9589

twang@pvipus.com

Patent Owner Response
PGR2026-00012

Ude Lu
Reg. No. 68,711
PV IP PC
6701 Democracy Blvd, Suite 300,
Bethesda, MD 20817
Tel: (301) 571-9300
ulu@pvipus.com

Donald R. McPhail
Reg. No. 35,811
Vanguard Crest P.C.
1500 K Street NW, Suite 228,
Washington, DC 20006
Main: (771) 777-8280
Direct: (771) 777-8283
dmcphail@vcip.us

Counsel for Patent Owner

APPENDIX A — CLAIM LISTING

Proposed substitute claims 20–39 (contingent).

20. (Substitute for claim 1) A controllable sinking and floating swimming pool robot, comprising:

a sinking and floating control unit configured to control a swimming pool robot to float and sink;

a waterline detection unit configured to detect 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;

a posture detection unit configured to detect a posture of the swimming pool robot; and

a main control unit configured to control a working state of the sinking and floating control unit,

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;

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 swimming pool robot is located; and

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,

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 predetermined time, and

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.

21. (Substitute for claim 2) The controllable sinking and floating swimming pool robot according to claim [[1]]20,

wherein the posture detection unit is configured by an inertial sensor, and

wherein the first predetermined condition comprises the posture of the swimming pool robot changing from a state parallel to a bottom surface of the swimming pool to a state parallel to the side wall of the swimming pool.

~~further comprising a posture detection unit configured to detect a posture of the swimming pool robot,~~

~~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.~~

22. (Substitute for claim 3) The controllable sinking and floating swimming pool robot according to claim [[1]]20,

wherein the operational requirement information comprises remote control command information sent by a user, clock information, operational task progress information, fault information, power information or swimming pool bottom environment information.

23. (Substitute for claim 4) The controllable sinking and floating swimming pool robot according to claim [[1]]20, 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 measurement unit or map data in the map storage unit.

24. (Substitute for claim 5) The controllable sinking and floating swimming pool robot according to claim [[1]]20,

wherein the waterline detection unit comprises an outlet water detection subunit configured to detect whether at least a part of the swimming pool robot has come out of the water,

wherein the outlet water detection subunit is configured by a capacitive sensor or an ultrasonic ranging device.

25. (Substitute for claim 6) The controllable sinking and floating swimming pool robot according to claim ~~[[1]]~~24,

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 distance ~~[[from]]~~below the waterline.

26. (Substitute for claim 7) The controllable sinking and floating swimming pool robot according to claim ~~[[5]]~~24,

wherein the sinking and floating control unit comprises an inflation and deflation subunit and a switch subunit,

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 and floating control unit enters the floating working state.

27. (Second substitute for claim 7) The controllable sinking and floating swimming pool robot according to claim [[5]]24,

wherein the sinking and floating control unit comprises an inflation and deflation subunit and a switch subunit,

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 and floating control unit enters the floating working state, and

wherein in response to the outlet water detection subunit not detecting that at least a part of the swimming pool robot enters underwater again after the sinking and floating control unit enters the floating working state for the predetermined time, the inflation and deflation subunit and the switch subunit are controlled to be closed.

28. (Substitute for claim 8) The controllable sinking and floating swimming pool robot according to claim [[5]]25,

wherein the sinking and floating control unit comprises an inflation and deflation subunit and a switch subunit,

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]]~~below the waterline, the inflation and deflation subunit is controlled to start sucking air, 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 floating working state.

29. (Substitute for claim 9) The controllable sinking and floating swimming pool robot according to claim ~~[[7]]~~26, 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, 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.

30. (Substitute for claim 10) The controllable sinking and floating swimming pool robot according to claim [[1]]20,

wherein the main 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.

31. (Substitute for claim 11) The controllable sinking and floating swimming pool robot according to claim [[10]]30,

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 switch subunit to open and controlling the inflation and deflation subunit to discharge air in the airbag subunit.

32. (Substitute for claim 12) The controllable sinking and floating swimming pool robot according to claim [[7]]26,

wherein the inflation and deflation subunit comprises an air pump assembly, and the switch subunit comprises an electromagnetic valve assembly or a two-position three-way valve assembly.

33. (Substitute for claim 13) The controllable sinking and floating swimming pool robot according to claim [[7]]26,

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 controlled to be closed.

34. (Substitute for claim 14) The controllable sinking and floating swimming pool robot according to claim [[7]]26, 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,

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.

35. (Substitute for claim 15) A sinking and floating control method for a swimming pool robot, comprising:

controlling a 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;

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, wherein the detecting comprises starting detecting the positional relationship in response to a posture of the swimming pool robot meeting a first predetermined condition;

controlling a sinking and floating control unit to enter a floating working state based on detection results to realize a floating of the swimming pool robot; and

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.

36. (Substitute for claim 16) The sinking and floating control method for the swimming pool robot according to claim [[15]]35,

wherein the posture of the swimming pool robot is detected by an inertial sensor, and

wherein the first predetermined condition comprises the posture of the swimming pool robot changing from a state parallel to a bottom surface of the swimming pool to a state parallel to the side wall of the swimming pool.

~~wherein detecting the positional relationship between the swimming pool robot and the waterline of the 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.~~

37. (Substitute for claim 17) The sinking and floating control method for the swimming pool robot according to claim [[16]]36,

wherein the operational requirement information comprises remote control command information sent by a user, clock information, operational task progress information, fault information, power information or swimming pool bottom environment information.

38. (Substitute for claim 18) The sinking and floating control method for the swimming pool robot according to claim [[17]]37, 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 state in response to detecting that at least a part of the swimming pool robot has come out of the water.

39. (Substitute for claim 19) The sinking and floating control method for the swimming pool robot according to claim ~~[[17]]~~37, 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 predetermined condition.

CERTIFICATE OF COMPLIANCE

Pursuant to 37 C.F.R. § 42.24(d), this Motion complies with the 25-page limit of 37 C.F.R. § 42.24(a)(1)(vi), excluding the claim listing appendix and the parts exempted by § 42.24(a).

Date: August 11, 2026

Respectfully submitted,

/Tairan Wang/

Tairan Wang

Reg. No. 67,961

Counsel for Patent Owner

CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. §§ 42.6(e) and 42.205, the undersigned certifies that on August 11, 2026 a complete copy of the foregoing Contingent Motion to Amend was served electronically on the following Petitioner's counsel of record:

Robert C.F. Perez
PILLSBURY WINTHROP SHAW PITTMAN LLP
7900 Tysons One Place, Suite 500,
Tysons, VA 22102
robert.perez@pillsburylaw.com

Cheng (Jack) Ko
PILLSBURY WINTHROP SHAW PITTMAN LLP
11682 El Camino Real, Suite 200,
San Diego, CA 92130
jack.ko@pillsburylaw.com

Christopher Kao
PILLSBURY WINTHROP SHAW PITTMAN LLP
Four Embarcadero Center, 22nd Floor,
San Francisco, CA 94111
christopher.kao@pillsburylaw.com

Date: August 11, 2026

Respectfully submitted,

/Tairan Wang/

Tairan Wang

Reg. No. 67,961

Counsel for Patent Owner