

United States Courts Opinion: United States District Court District of Delaware: 21-091 - MHL Custom, Inc. v. Waydoo USA, Inc. et al

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Body

Washington: United States District Court District of Delaware has issued the following opinion:

IN THE UNITED STATES DISTRICT COURT FOR THE DISTRICT OF DELAWARE
MHL CUSTOM, INC., Plaintiff, v. WAYDOO USA, INC. and SHENZHEN WAYDOO INTELLIGENCE TECHNOLOGY CO., LTD., Defendants.
Civil Action No. 21-0091-RG
MEMORANDUM OPINION
Blake A. Bennett, COOCH AND TAYLOR, P.A., Wilmington, DE; Dennis D. Murrell, Robert J. Theuerkauf (argued), Brian P. McGraw (argued), Megan E. Gibson, MIDDLETON REUTLINGER, Louisville, KY. Attorneys for Plaintiff. Kelly E. Farnan, Dorronda R. Bordley, RICHARDS, LAYTON & FINGER, P.A., Wilmington, DE; Edgar H. Haug, Robert E. Colletti (argued), Mark Basanta, Roman Khasidov, HAUG PARTNERS LLP, New York, NY. Attorneys for Defendants.
February 2, 2023
Case 1:21-cv-00091-RGA-MPT Document 153 Filed 02/03/23 Page 1 of 26 PageID #: <pageID>AN
Before me are Plaintiff MHL Custom's ('MHL') and Defendants Waydoo USA's and Shenzhen Waydoo Intelligence Technology's (collectively, 'Waydoo') motions for partial summary judgment. The parties have fully briefed the motions. (D.I 80, 83, 91, 93, 101, 106). I heard oral argument on January 4, 2023.
I. BACKGROUND
Plaintiff alleges that Defendants infringe two of Plaintiff's patents. Those patents are U.S. Patent Nos. 9,359,044 (the, "044 Patent") and 9,586,659 (the, "659 Patent") (collectively, the "Asserted Patents"). The Asserted Patents relate to a personal hydrofoil watercraft. The Asserted Patents share a common specification. Plaintiff asserts that Defendants' products infringe all claims of the '044 Patent' (claims 1-22) and '659 Patent' (claims 1-20). Defendants counterclaimed. (D.I 13). The parties agree claim 1 of the '044 Patent' and claims 1 and 16 of the '659 Patent' are representative of the other claims for purposes of the pending motions. 1 Plaintiff has moved for summary judgment of (1) direct infringement of claim 1 of the '044 Patent', (2) the '044 Patent' and '659 Patent' are not anticipated, and (3) Plaintiff has standing. (D.I 77, 78, 79). Defendants have moved for summary judgment of (1) claims 16-20 of the '659 Patent' are invalid for lack of written description, (2) non-infringement of the '044 Patent', and (3) noninfringement of claims 1-15 of the '659 Patent'. (D.I 81). 1 These three claims are the independent claims in the two patents. For purposes of the pending motions, Parties agree that the other elements of the dependent claims are met and only dispute as to whether all the claim elements as listed in the three independent claims are infringed by Defendants' products. 2
Case 1:21-cv-00091-RGA-MPT Document 153 Filed 02/03/23 Page 2 of 26 PageID #: <pageID>II. LEGAL STANDARD
The court shall grant summary judgment if the movant shows that there is no genuine dispute as to any material fact and the movant is entitled to judgment as a matter of law.' FED. R. CIV. P. 56(a). Material facts are those 'that could affect the outcome' of the proceeding. *Lamont v. New Jersey*, 637 F.3d 177, 181 (3d Cir. 2011) (quoting *Anderson v. Liberty Lobby, Inc.*, 477 U.S. 242, 248 (1986)). '[A] dispute about a

material fact is 'genuine' if the evidence is sufficient to permit a reasonable jury to return a verdict for the nonmoving party.' *Id.* The burden on the moving party may be discharged by pointing out to the district court that there is an absence of evidence supporting the non-moving party's case. *Celotex Corp. v. Catrett*, 477 U.S. 317, 323 (1986). The burden then shifts to the non-movant to demonstrate the existence of a genuine issue for trial. *Matsushita Elec. Indus. Co. v. Zenith Radio Corp.*, 475 U.S. 574, 586-87 (1986); *Williams v. Borough of West Chester*, 891 F.2d 458, 460-61 (3d Cir. 1989). A non-moving party asserting that a fact is genuinely disputed must support such an assertion by: '(A) citing to particular parts of materials in the record, including depositions, documents, electronically stored information, affidavits or declarations, stipulations ... , admissions, interrogatory answers, or other materials; or (B) showing that the materials cited [by the opposing party] do not establish the absence ... of a genuine dispute ... ' FED. R. CIV. P. 56(c)(1). The non-moving party's evidence 'must amount to more than a scintilla, but may amount to less (in the evaluation of the court) than a preponderance.' *Williams*, 891 F.2d at 460-61. When determining whether a genuine issue of material fact exists, the court must view the evidence in the light most favorable to the non-moving party and draw all reasonable inferences in that party's favor. *Scott v. Harris*, 550 U.S. 372, 378 (2007); *Wishkin v. Potter*, 476 F.3d 180, 3 Case 1:21-cv-00091-RGA-MPT Document 153 Filed 02/03/23 Page 3 of 26 PageID #: <pageID>184 (3d Cir. 2007). If the non-moving party fails to make a sufficient showing on an essential element of its case with respect to which it has the burden of proof, the moving party is entitled to judgment as a matter of law. See *Celotex*, 477 U.S. at 322.

III. DISCUSSION A. INFRINGEMENT OF CLAIMS 1-15 OF THE '659 PATENT Defendants have moved for summary judgment on non-infringement of claims 1-15 of the '659 Patent (D.I. 80 at 20-26; D.I. 83 at 29-32). The dispute focuses on whether Defendants infringe claim 1 of the '659 Patent. Claims 2-15 depend on claim 1. The claim reads as follows: 1. A passively stable, weight-shift controlled personal hydrofoil watercraft, comprising: a flotation device that has a fore-aft length greater than a lateral width, the flotation device having a top surface and a bottom surface, wherein a user can be disposed on the top surface of the flotation device in a prone, kneeling, or standing position, the flotation device having a forward section, a middle section, and a rear section; a strut having an upper end and a lower end, the upper end fixedly interconnected with the flotation device between the middle section and the rear section of the flotation device; a hydrofoil fixedly interconnected with the lower end of the strut, the hydrofoil having no movable surface; a propulsion system for propelling the watercraft in a body of water, wherein the propulsion system is connected to the hydrofoil; and the watercraft having no movable steering system. ('659 Patent, cl. 1). The parties agree that the preamble of the '659 Patent—A passively stable, weight-shift controlled personal hydrofoil watercraft—is limiting. (D.I. 83 at 30; D.I. 91 at 41). The parties dispute whether the 'stable' aspect of the limitation is met. (D.I. 83 at 29-32; D.I. 91 at 43-45). There are two issues to this dispute.

4 Case 1:21-cv-00091-RGA-MPT Document 153 Filed 02/03/23 Page 4 of 26 PageID #: <pageID> The first issue is whether 'stable' includes both static stability—having an initial tendency to return to an original condition when disturbed—and dynamic stability—eventually returning to an original condition when disturbed. (D.I. 60-2, Ex. B at 602). Defendants argue both are included; Plaintiff, only static stability. I previously construed this term to have its plain and ordinary meaning but permitted the parties to readdress the issue at this stage of the case. (D.I. 66 at 9). Because there is a dispute over the scope of the claim term, I must construe the term before addressing the question of infringement. 02 Micro Int'l Ltd. v. Beyond Innovation Tech. Co., 521 F.3d 1351, 1361 (Fed. Cir. 2008) ('A determination that a claim term 'needs no construction' or has the 'plain and ordinary meaning' may be inadequate ... when reliance on a term's 'ordinary' meaning does not resolve the parties' dispute.'). The second issue is whether Defendants infringe the stability limitation as construed.

1. Claim Construction 'It is a bedrock principle of patent law that the claims of a patent define the invention to which the patentee is entitled the right to exclude.' *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005) (en banc) (internal quotation marks omitted). "[T]here is no magic formula or catechism for conducting claim construction." Instead, the court is free to attach the appropriate weight to appropriate sources 'in light of the statutes and policies that inform patent law.' *SoftView LLC v. Apple Inc.*, 2013 WL 4758195, at *1 (D. Del. Sept. 4, 2013) (quoting *Phillips*, 415 F.3d at 1324) (alteration in original). When construing patent claims, a court considers the literal language of the claim, the patent specification, and the prosecution history. *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 977-80 (Fed. Cir. 1995) (en banc), *aff'd*, 517 U.S. 370 (1996). Of these sources, 'the specification is always highly relevant to the claim construction' 5 Case 1:21-cv-00091-RGA-MPT Document 153 Filed 02/03/23 Page 5 of 26 PageID #: <pageID> analysis. Usually, it is dispositive; it is the single best guide to the meaning of a disputed term.' *Phillips*, 415 F.3d at 1315 (internal quotation marks omitted). '[T]he words of a claim are generally given their ordinary and customary meaning ... [Which is] the meaning that the term would have to a person of

ordinary skill in the art in question at the time of the invention, i.e., as of the effective filing date of the patent application.' Id. at 1312- 13 (citations and internal quotation marks omitted). '[T]he ordinary meaning of a claim term is its meaning to [an] ordinary artisan after reading the entire patent.' Id. at 13 21 (internal quotation marks omitted). 'In some cases, the ordinary meaning of claim language as understood by a person of skill in the art may be readily apparent even to lay judges, and claim construction in such cases involves little more than the application of the widely accepted meaning of commonly understood words.' Id. at 1314. When a court relies solely upon the intrinsic evidence- the patent claims, the specification, and the prosecution history- the court's construction is a determination of law. See *Teva Pharm. USA, Inc. v. Sandoz, Inc.*, 574 U.S. 318, 331 (2015). The court may also make factual findings based upon consideration of extrinsic evidence, which 'consists of all evidence external to the patent and prosecution history, including expert and inventor testimony, dictionaries, and learned treatises.' Phillips, 415 F.3d at 1317- 19 (internal quotation marks omitted). Extrinsic evidence may assist the court in understanding the underlying technology, the meaning of terms to one skilled in the art, and how the invention works. Id. Extrinsic evidence, however, is less reliable and less useful in claim construction than the patent and its prosecution history. Id. Defendants argue that 'stable' should mean being statically stable and dynamically stable. Defendants cite to the patent specification and textbooks for support that a person of ordinary skill in the art ('POSA') would read 'stable' to require static and dynamic stability. (D.I 83 at 4-7). 6 Case 1:21-cv-00091-RGA-MPT Document 153 Filed 02/03/23 Page 6 of 26 PageID #: <pageID> Plaintiff argues that 'stable' should be interchangeable with statically stable or having static stability, and therefore, does not require that the watercraft have dynamic stability. (D.I 91 at 22). Plaintiff cites to their expert, Mr. Barry, for support that " 'stable' and 'static stability' are commonly used interchangeably with respect to aircraft and hydrofoil stability." (D.I 91 at 18 (citing D.I 80-31 , , r 12)). Mr. Barry also expressed an opinion that the patent uses the terms interchangeably. (Id. at 19). I agree with Defendants that 'stable' should mean having both static stability and dynamic stability. I previously rejected Plaintiff's argument that 'stable' and 'static stability' could be used interchangeably. (D.I 66 at 9). Plaintiff has not provided compelling intrinsic or extrinsic evidence to convince me to deviate from my initial view. Furthermore, the patent specification recites, 'This trim condition is stable if a disturbance results in a restoring moment that returns the hydrofoil to its original condition.' (' 659 Patent, col. 6: 14-16). The hydrofoil returning to its original condition is a description of dynamic stability, not static stability. Therefore, the patent specification indicates that stable and statically stable (or static stability) are not interchangeable. Therefore, I will construe 'A passively stable, weight-shift controlled personal hydrofoil watercraft' to mean 'a weight-shift controlled personal watercraft having a hydrofoil that does not have any moveable components and which, when disturbed, (1) has an initial tendency to return to its original condition and (2) eventually returns to its original condition.' 22. Non-Infringement by the Accused Products The remaining issue is whether the accused products have static stability and dynamic stability. Defendants argue that their products are dynamically unstable (or lack dynamic stability) and Plaintiff has provided no evidence to show the accused products are dynamically stable. Thus, 2 I proposed this construction prior to oral argument. (D.I 142). 7 Case 1:21-cv-00091-RGA-MPT Document 153 Filed 02/03/23 Page 7 of 26 PageID #: <pageID> Defendants argue there is no genuine issue of material fact that precludes summary judgment that the accused products do not infringe claims 1-15 of the '659 Patent. Defendants contend that the only evidence Plaintiff has that shows Defendants' products are dynamically stable are 'eigenvalue' analyses of some of the accused products. (D.I 83 at 31). The parties agree that this type of analysis can be used to assess whether a watercraft is dynamically stable. (D.I 83 at 31 ; D.I 91 at 43). 'If an eigenvalue analysis reports a positive sigma value,' it indicates that [a watercraft] is unstable.' (D.I. 83 at 3). Defendants assert, because ' [a]ll of Mr. Barry's eigenvalue analyses for [Defendants'] products report positive sigma values,' Plaintiff's own expert shows conclusively that Defendants' products do not have dynamic stability. (D.I 83 at 32). Plaintiff argues that Defendants are not entitled to summary judgment because there still exists a genuine issue of material fact as to whether Defendants' products are dynamically stable. Plaintiff cites to Mr. Barry's deposition where he testified that he did not believe his analysis showed the products were dynamically unstable. (D.I 91 at 44). Plaintiff contends that: (1) while Mr. Barry's eigenvalue analysis showed the watercrafts to be dynamically unstable, the results were 'close' to showing dynamic stability, and (2) when Mr. Barry viewed the accused products operating in the real world, he concluded that they were dynamically stable, notwithstanding the eigenvalue analysis. (Id; see D.I 85-1 , Ex. 6, 402:8-403 :23 (stating positive eigenvalues did not indicate dynamic instability in part because the software was 'an approximation' and did not account for all effects)). Plaintiff, therefore, argues that the eigenvalue analysis is not conclusive when considering Mr. Barry's testimony and other analyses. Plaintiff also relies on Mr. Barry's statements that the Athena

Vortex Lattice (A VL) software he used to analyze the stability of the watercrafts understated the stability of the accused products. 3 Mr. Barry stated that the A VL software does not account for additional stabilizing factors that 'exist once the effect of the water in which the hydrofoil is operating in is considered,' such as 'damping, free surface, added mass, and viscosity'. (D.I 91 at 44; see, e.g., D.I 80-33, Ex. 31, r.r 23 (free surface), 55 (damping, added mass and viscosity effects)). Therefore, Plaintiff contends that Mr. Barry's testimony about his different analyses and his conclusions raises a genuine dispute as to whether the accused products are dynamically stable. I agree with Plaintiff that there is a genuine dispute whether the accused products are dynamically stable. Defendants are correct that the eigenvalue analyses of the watercrafts show at least one positive sigma value for each product analyzed, which Plaintiff does not dispute, indicating dynamic instability. Those analyses, however, are not the only evidence in the record. The record also includes testimony by Mr. Barry, in which he concludes that the watercraft are dynamically stable based on analyzing the stability derivatives using the A VL software and observation of the watercraft in the real world. (D.I 91 at 44; see, e.g., D.I 80-33, r.r 26-28, 53-55). Taking the evidence in the light most favorable to Plaintiff, as I am required to do, I determine that a reasonable jury could conclude that the accused products have dynamic stability and therefore do not infringe. Therefore, I will deny summary judgment of infringement of claims 1-15 of the '659 Patent. 3 Mr. Barry used the A VL software to analyze the pitch stability derivative, directional stability derivative, and roll stability derivative to assess watercraft stability. Mr. Barry also used the AVL software to analyze the eigenvalues for his eigenvalue analysis. (See, e.g., D.I 85-1, Ex. 3, r.r 95-96, 155-156) 9 Case 1:21-cv-00091-RGA-MPT Document 153 Filed 02/03/23 Page 9 of 26 PageID #: <pageID> B. INFRINGEMENT OF THE '044 PA TENT The parties have cross-moved for summary judgment on infringement of claims 1-22 of the '044 Patent (D.I 80 at 20-26; D.I 83 at 29-32). The parties agree that whether either side is entitled to summary judgment comes down to whether there is a genuine issue of material fact that Defendants infringe claim 1 of the '044 Patent. The claim reads as follows: 1. A passively stable, weight-shift controlled personal hydrofoil watercraft, comprising: a flotation device that has a fore-aft length greater than a lateral width, the flotation device having a top surface and a bottom surface, wherein a user can be disposed on the top surface of the flotation device in a prone, kneeling, or standing position, the flotation device having a forward section, a middle section, and a rear section, and the flotation device being controlled via weight shift of the user; a strut having an upper end and a lower end, the upper end fixedly interconnected with the flotation device between the middle section and the rear section of the flotation device; a hydrofoil fixedly interconnected with the lower end of the strut, the hydrofoil having no movable surface and designed to provide passive static stability controlled solely by weight shift of the user; a propulsion system for propelling the watercraft in a body of water, wherein the propulsion system is connected to the hydrofoil; and the watercraft having no movable steering system. ('044 Patent, cl. 1). There are two disputes at issue here. First, the parties dispute whether the preamble of claim 1 is limiting. Plaintiff argues it is not; Defendants, that it is. Second, the parties dispute whether Defendants' products satisfy the stability limitations of claim 1. Resolving this second issue necessarily depends on the outcome of the first issue. 1. Whether the Preamble of Claim 1 is Limiting As an initial matter, it is proper for me to determine whether the preamble of claim 1 is limiting or not. Plaintiff argues that this is a determination to be left for the jury. (D.I 91 at 41). Case 1:21-cv-00091-RGA-MPT Document 153 Filed 02/03/23 Page 10 of 26 PageID #: <pageID> Plaintiff is mistaken. Determining the effect of preamble language is a claim-construction issue. See *Cochlear Bone Anchored Solutions AB v. Oticon Medical AB*, 958 F.3d 1348, 1354 (Fed. Cir. 2020). Claim construction and resolving the scope of asserted claims are questions of law left to the court. See *Every Penny Counts, Inc. v. American Express Co.*, 563 F.3d 1378, 1383 (citing *2Micro Int'l Ltd. v. Beyond Innovation Tech. Co.*, 521 F.3d 1351, 1361-62 (Fed. Cir. 2008)). Therefore, I find it is necessary for me to make this determination now. 4 '[A]s a general rule preamble language is not treated as limiting.' *Aspex Eyewear, Inc. v. Marchan Eyewear, Inc.*, 672 F.3d 1335, 1347 (Fed. Cir. 2012). 'Whether to treat a preamble as a limitation is determined on the facts of each case in light of the overall form of the claim, and the invention as described in the specification and illuminated in the prosecution history.' *Deere & Co. v. Bush Hog, LLC*, 703 F.3d 1349, 1357 (Fed. Cir. 2012) (quoting *Applied Materials, Inc. v. Advanced Semiconductor Materials Am., Inc.*, 98 F.3d 1563, 1572-73 (Fed. Cir. 1996)). 'In general, a preamble limits the invention if it recites essential structure or steps, or if it is necessary to give life, meaning, and vitality to the claim.' *Catalina Mktg. Int'l, Inc. v. Coo/savings.com, Inc.*, 289 F.3d 801, 808 (Fed. Cir. 2002) (citation and quotation marks omitted). 'The preamble may be limiting to the extent it is necessary to provide antecedent basis for the body of the claim.' *Cochlear Bone*, 958 F.3d at 1355 (quoting *Symantec Corp. v. Computer Assoc. Int'l, Inc.*, 522 F.3d 1279, 1288 (Fed. Cir. 2008)). In

addition, the preamble may be limiting when the preamble 'is essential to understand limitations or terms in the claim body,' recites 'additional structure or steps underscored as important by the specification,' or there was 'clear reliance on the preamble during prosecution.' While I have construed identical preamble language in the context of claim 1 of the '659 Patent as limiting, both parties agreed the preamble was limiting in that patent.¹¹ Case 1:21-cv-00091-RGA-MPT Document 153 Filed 02/03/23 Page 11 of 26 PageID #: <pageID> prosecution to distinguish the claimed invention from the prior art.' Catalina, 289 F.3d at 808. In other words, there are numerous exceptions to the default rule that a preamble is not limiting. Plaintiff contends that the preamble is not limiting because there is a presumption against reading a preamble as limiting and this case does not present one of the recognized exceptions to that presumption. Specifically, Plaintiff argues that the 'preamble does not: (1) recite essential structure; (2) provide antecedent basis to the claim term at issue; and (3) is not essential to understand limitations or terms in the claim body.' (D.I. 91 at 42). Plaintiff further argues that there was no reliance on the preamble during prosecution. (Id. at 43). Plaintiff cites to the fact the preamble was present in the original claim as filed, and the static stability limitation was added to overcome prior art. (D.I. 146 at 2). Plaintiff contends that this shows that neither the inventor nor Examiner relied on the preamble during prosecution because the addition of the static stability limitation would be unnecessary if the preamble were limiting. (Id. at 2). Defendants argue the preamble should be limiting because claim 1 of the '659 Patent, which is part of the same patent family and has an identical specification, recites identical language and both parties agree the preamble is limiting in that context. Defendants contend that there is 'no technical or legal justification for why identical preambles should be treated differently.' (D.I. 83 at 30). Defendants further argue that the preamble 'is limiting because it recites an 'essential' element not found in the body of the claim (i.e., dynamic stability).' (D.I. 106 at 15). To put it another way, Defendants argue that the patent specification 'repeatedly defines the invention as an overall stable watercraft,' and therefore the preamble should be limiting because only the preamble specifies that the invention is dynamically stable. (D.I. 145 at 3).¹² Case 1:21-cv-00091-RGA-MPT Document 153 Filed 02/03/23 Page 12 of 26 PageID #: <pageID> I agree with Plaintiff that the preamble is not limiting. As an initial matter, I am not aware of any case law that states a preamble must be limiting in one patent because the identically worded preamble is limiting in another patent belonging to the same patent family. Defendants have also not supplied any such case law, despite being given additional time to do so. (D.I. 145 at 1). The proposed identically-worded-preamble rule is inconsistent with the case law.⁵ The Federal Circuit has stated '[w]hether to treat a preamble as a limitation is determined on the facts of each case in light of the overall form of the claim[] and the invention as described in the specification and illuminated in the prosecution history.' Cochlear Bone, 958 F.3d at 1354 (quoting Deere & Co., 703 F.3d at 1357). I am thus required to analyze the form of claim 1 of the '044 Patent, which has significant differences from the form of claim 1 of the '659 Patent, when determining whether the preamble is limiting. Therefore, I do not believe that the presumption against reading a preamble as non-limiting is overcome just because the same preamble is limiting in claim 1 of the '659 Patent. I do not find that dynamic stability is an 'essential' element that requires the preamble to be limiting. Nor do I think dynamic stability is 'underscored as important by the specification.' Catalina, 289 F.3d at 808. Nowhere in the '044 Patent is the term 'dynamic stability' or 'dynamically stable' used. The '044 Patent specification does repeatedly describe the invention as being 'stable' or having 'passive stability,' and dynamic stability is a component of those terms. See Section III.A.15 Furthermore, I have not applied such a rule even when the claims sharing the identical preamble are part of the same patent. See Takeda Pharma. Co. v. Actavis Lab 'ys FL, Inc., 2016 WL 3193188, at *6 n.6, *7 n.7, *7-8 (D. Del. June 6, 2016) (independently analyzing whether identical preamble language is limiting in two separate claims of the same patent), aff'd in part, rev'd in part sub nom. Nalpropion Pharms., Inc. v. Actavis Lab 'ys FL, Inc., 934 F.3d 1344 (Fed. Cir. 2019).¹³ Case 1:21-cv-00091-RGA-MPT Document 153 Filed 02/03/23 Page 13 of 26 PageID #: <pageID> supra. 'But not every preamble reference to additional structure is limiting, even when the structure is noted in the specification—even, indeed, when the structure is 'underscored as important by the specification.' Arctic Cat Inc. v. GEP Power Products, Inc., 919 F.3d 1320, 1329 (Fed. Cir. 2019) (quoting Catalina, 289 F.3d at 808 ('[W]hen reciting additional structure or steps underscored as important by the specification, the preamble may operate as a claim limitation.')). Furthermore, even though the specification references the importance of stability, it similarly does so with respect to static stability. See '044 Patent 2: 17-20 ('The prior art in powered hydrofoil surfboards have all relied on moveable surfaces for control, and have ignored the possibility of designing the hydrofoil for passive static stability.'): 5:50-54 ('Note that other versions of the hydrofoil are possible: the key is designing the hydrofoil for passive static stability via planform design, airfoil design, and span-wise twist distribution.'). Therefore, I read the specification as underscoring the

importance that the watercraft have static stability. The body of claim 1 of the '044 Patent addresses this essential, static stability element of the invention by reciting 'a hydrofoil ... designed to provide passive static stability.' ('044 Patent, cl. 1). Because having static stability is already an explicit limitation in the body of the claim, I do not read the preamble as supplying an essential element for claim 1 of the '044 Patent.⁶ Accordingly, I conclude that the preamble of claim 1 of the '044 Patent is not limiting.⁶ It is this explicit recitation of static stability in the body of the claim 1 of the '044 Patent that differentiates the effect of the preamble in claim 1 of the '044 Patent from the effect of the preamble in claim 1 of the '659 Patent. The body of claim 1 of the '659 Patent does not contain any limitations pertaining to stability. As already discussed, the shared patent specification underscores the importance of the watercraft having static stability. Therefore, the preamble is providing an essential element in claim 1 of the '659 Patent by stating that the watercraft needs to be 'stable.' Since the preamble is limiting, the full scope of 'stable' becomes a limitation.¹⁴ Case 1:21-cv-00091-RGA-MPT Document 153 Filed 02/03/23 Page 14 of 26 PageID #: <pageID>2. Non-Infringement of the '044 Patent Defendants' motion for summary judgment of non-infringement of the '044 Patent is premised on the preamble of claim 1 of the '044 Patent being limiting and requiring the additional limitation of dynamic stability. (D.I. 83 at 29-31). Because I have determined that the preamble to claim 1 is not limiting, there is no dynamic stability limitation in the claims of the '044 Patent. Therefore, Defendants' motion for summary judgment of non-infringement of the '044 Patent is denied.³ Infringement of the '044 Patent Plaintiff moves for summary judgment that Defendants infringe claim 1 of the '044 Patent, and, by extension, all other claims of the '044 Patent, on the ground that there is no genuine issue of fact that Defendants' accused products are statically stable.⁷ Plaintiff argues that the testimony of its expert witness, Mr. Barry, and the analysis he conducted of the accused products, demonstrates that the accused products are passively statically stable. (D.I. 80 at 24-26). Plaintiff contends that because Defendants have not produced any affirmative evidence to dispute that the accused products are passively statically stable, there is no disputed fact in the record that prevents finding that the accused products infringe the '044 Patent. (Id. at 25-26). Defendants argue, 'There is a genuine dispute as to whether [Plaintiff] has evidence sufficient to meet its burden for showing even static stability.' (D.I. 93 at 25). Defendants contend that their expert witness, Dr. Triantafyllou, has 'explained that in trying to show static stability of the Accused Products, Mr. Barry concocted his own stability standard rather than assess them according to the standard set out in the Asserted Patents.' (Id. at 26). Defendants further argue,⁷ The parties agree that the only claim limitation in question is whether Defendants' products meet the stability limitation of claim 1. As discussed above, claim 1 of the '044 Patent only requires static stability because the preamble is not limiting.¹⁵ Case 1:21-cv-00091-RGA-MPT Document 153 Filed 02/03/23 Page 15 of 26 PageID #: <pageID> Without undisputed evidence that the Accused Products meet the standard set out in the Asserted Patents—which [Plaintiff] does not have because Mr. Barry did not so opine—summary judgment of infringement is improper.' (Id.). Defendants also argue that summary judgment is improper because Mr. Barry did not examine all of the accused products for infringement. (Id.). I agree with Defendants that there exists a genuine issue of material fact. Plaintiff has provided evidence through Mr. Barry's testimony and analysis to show that Defendants' accused products are statically stable. Defendants' expert responded by noting that Mr. Barry's analysis deviates from that included in the asserted patents, and the reason for doing so goes unexplained. (D.I. 85-1, Ex. 8, 1 17). A reasonable juror could weigh the testimony by the parties' experts and reach the conclusion that Plaintiff has not carried its burden to show that Defendants' products are statically stable. Therefore, I will deny summary judgment as to infringement of the '044 Patent. C. WRITTEN DESCRIPTION OF CLAIMS 16-20 OF THE '659 PATENT Defendants move for summary judgment of invalidity for lack of written description for claims 16-20 of the '659 Patent. Claim 16, which is representative of the other claims,⁸ reads as follows:¹⁶ A personal hydrofoil watercraft, comprising: a surfboard-shaped flotation device that has a fore-aft length greater than a lateral width, the flotation device having a top surface and a bottom surface, wherein the top surface has a substantially horizontal supporting surface configured to support a user in a prone, kneeling, or standing position, the flotation device having a forward section, a middle section, and a rear section; a hydrofoil interconnected with the surfboard-shaped flotation device, the hydrofoil having a strut and a first hydrofoil wing, an upper end of the strut being fixedly interconnected with the surfboard-shaped flotation device;⁸ Claims 17-20 are dependent claims that depend on claim 16.¹⁶ Case 1:21-cv-00091-RGA-MPT Document 153 Filed 02/03/23 Page 16 of 26 PageID #: <pageID> a propulsion system attached to the surfboard-shaped flotation device for propelling the watercraft in a body of water, the propulsion system comprising a battery, an electric motor, a motor speed controller, and a propulsor, wherein the propulsor is selected from a propeller, a ducted propeller, or a pump-jet, and the battery and motor speed controller are contained in a watertight compartment integrated into the flotation

device; the watercraft having no movable steering system; a handheld controller having a throttle; and a throttle interface, wherein the throttle is adapted to send electronic signals to the throttle interface that cause an output of the propulsion system to change. ('659 Patent, cl. 16). Defendants assert the claims are invalid for lack of written description because they do not contain a stability limitation (i.e., do not require the watercraft to be statically stable, dynamically stable, or both), but the specification of the Asserted Patents 'clearly discloses the alleged invention as being a stable hydrofoil watercraft, and never suggests that the alleged invention can be anything other than stable.' (D.I. 83 at 26). Defendants further contend that the file history of the '044 Patent shows the patent examiner 'explicitly relied on the hydrofoil providing static stability in allowing the '044 [P]atent.' (Id.). Defendants analogize the present case to *ICU Medical, Inc. v. Alaris Medical Sys., Inc.*, 558 F.3d 1368, 1377-79 (Fed. Cir. 2009). Plaintiff does not dispute that neither static stability nor dynamic stability (or both together) are limitations of the claims 16-20 of the '659 Patent. Plaintiff asserts the written description requirement is met because the patent specification does not limit the invention to a 'stable' watercraft. Plaintiff analogizes the present case to *ScriptPro LLC v. Innovation Assoc., Inc.*, 833 F.3d 1336, 1340-42 (Fed. Cir. 2016). Plaintiff argues that a stable watercraft is just one purpose of the invention and claims 16-20 of the '659 Patent are written to address other purposes of the invention, such as not having a movable steering system, providing a 'surfing feel,' and being easy to transport and maintain. (D.I. 91 at 39).

Case 1:21-cv-00091-RGA-MPT Document 153 Filed 02/03/23 Page 17 of 26 PageID #: <pageID> The written description requirement contained in 35 U.S.C. § 112 requires that the specification 'clearly allow persons of ordinary skill in the art to recognize that [the inventor] invented what is claimed.' *Ariad Pharms., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (en banc) (alteration in original). 'In other words, the test for sufficiency is whether the disclosure of the application relied upon reasonably conveys to those skilled in the art that the inventor had possession of the claimed subject matter as of the filing date.' Id. 'When determining whether a specification contains adequate written description, one must make an 'objective inquiry into the four corners of the specification from the perspective of a person of ordinary skill in the art.' *Bos. Sci. Corp. v. Johnson & Johnson*, 647 F.3d 1353, 1366 (Fed. Cir. 2011) (quoting *Ariad*, 598 F.3d at 1351). The written description inquiry is a question of fact. *Ariad*, 598 F.3d at 1351. Although it is a question of fact, '[c]ompliance with the written description requirement ... is amenable to summary judgment in cases where no reasonable fact finder could return a verdict for the nonmoving party.' *PowerOasis, Inc. v. T-Mobile USA, Inc.*, 522 F.3d 1299, 1307 (Fed. Cir. 2008). 'A party must prove invalidity for lack of written description by clear and convincing evidence.' *Vasudevan Software, Inc. v. MicroStrategy, Inc.*, 782 F.3d 671, 682 (Fed. Cir. 2015). I find that Defendants are entitled to summary judgment that claims 16-20 of the '659 Patent are invalid for lack of written description. The patent specification does not disclose that the patentee possessed a personal hydrofoil watercraft that lacks both static and dynamic stability. There is no genuine disputed fact about this. The specification of the '659 Patent only, and repeatedly, describes the invention as being a watercraft that is either stable or at least has static stability. For example, the abstract of the patent recites, 'A passively stable personal hydrofoil watercraft . . . ' ('659 Patent at Abstract). The

Case 1:21-cv-00091-RGA-MPT Document 153 Filed 02/03/23 Page 18 of 26 PageID #: <pageID> patent specification further recites, 'The hydrofoil of the present invention has been designed to provide passive stability in the longitudinal direction, making traditional altitude control systems based on moveable surfaces unnecessary.' (Id. at col. 2: 8-12). Static stability distinguishes the invention from the prior art. The specification recites, 'The prior art in powered hydrofoil surfboards have all relied on moveable surfaces for control, and have ignored the possibility of designing the hydrofoil for passive static stability . . . [T]he present invention is specifically designed to achieve desired levels of stability and controllability without the need for moveable surfaces.' (Id. at col. 2:20-26). The patent specification further emphasizes that the hydrofoil should be designed to provide static stability to the watercraft, even for undisclosed embodiments. (Id. at col. 5:62-65 ('Note that other versions of the hydrofoil are possible: the key is designing the hydrofoil for passive static stability via planform design, airfoil design, and span-wise twist distribution.')). The patent specification attributes the ability to be controlled by weight shift to the stability of the watercraft. The specification states, 'This invention exploits passive stability to obviate the necessity for mechanisms or active control systems to provide stability. This passive stability allows the watercraft to be controlled by weight shift rather than by mechanical systems.' (Id. at col. 6:7-11). There is nothing in the patent specification to suggest that a watercraft that is both statically and dynamically unstable is part of the disclosure. See *LizardTech, Inc. v. Earth Resource Mapping, Inc.*, 424 F.3d 1336, 1346 (Fed. Cir. 2005). I agree with Defendants that the present case is similar to *ICU Medical*. In *ICU Medical*, the patent at issue claimed medical valves with spikes and without spikes (i.e., valves without the spike limitation). The specification of the patent, however, only described 'medical valves

withspikes.' Id. at 1378. The Federal Circuit upheld the district court's grant of summary judgment19Case 1:21-cv-00091-RGA-MPT Document 153 Filed 02/03/23 Page 19 of 26 PageID #:<pageID>that the 'spikeless' claims were invalid for lack of written description because a POSA would nothave understood the patentee to have invented a 'spikeless' medical valve. Id. at 13 78-79. Similarly, in the present case, the '659 Patent only discusses a watercraft that is at leaststatically stable. There is nothing in the specification that would signal to a POSA that the patenteeinvented a watercraft that is statically unstable. Furthermore, at oral argument, Plaintiff failed to point to any disclosure in the patent specification of a description or embodiment of a watercraftthat was not at least statically stable. (D.I 147 at 73:9-23). See ICU Medical, 558 F.3d at 1379. While Plaintiff argues that this case is more analogous to ScriptPro LLC v. InnovationAssoc., Inc. , 833 F.3d 1336 (Fed. Cir. 2016), I disagree. In ScriptPro, the Federal Circuit reversedthe district court's ruling that claims without a limitation of employing a 'sorting and storage scheme based on patient-identifying information' were invalid for lack of written description. Id. at 1341. The Federal Circuit noted that while the patent specification 'focuses on embodimentsemploying a sorting and storage scheme based on patient-identifying information,' it is not a limitation of the invention because the invention is used to solve many problems, not all of whichinvolve using a scheme based on patient-identifying information. Id. Specifically, the Federal Circuit cautioned that 'a specification's focus on one particular embodiment or purpose cannotlimit the described invention where the specification expressly contemplates other embodimentisor purposes.' Id. at 1341. Plaintiffs arguments that watercraft stability is just one solution the invention addresses, like the scheme in ScriptPro, misses the mark. First, in ScriptPro, the Federal Circuit stated thatthe 'patent's express disclosure that sorting and storing can be done in a number of waysdistinguishes this case from ... ICU Medical.' Id. Specifically, the Federal Circuit found that theinvention was not limited to using a patient-identifying information sorting scheme because the20Case 1:21-cv-00091-RGA-MPT Document 153 Filed 02/03/23 Page 20 of 26 PageID #:<pageID>patent specification disclosed that 'any predetermined storage scheme will do.' Id. Unlike inScriptPro, there is no such express disclosure in the '659 Patent specification that the watercraftcan be statically and dynamically unstable. Nor is there anything that could reasonably be interpreted as an implied disclosure. Second, the Federal Circuit noted that the patent in ScriptPro was aimed at addressingmultiple problems and that the different claims were directed at 'covering these different aspectsof the invention.' Id. at 1342. In this case, however, the patent specification clearly describes staticstability as a limitation of the invention as a whole, not an aspect of some embodiments or onepurpose. See p.19 supra. The patent specification is not just describing some embodiments asstable or having static stability. (See, e.g. , '659 Patent, col. 2:9-12; 2:23-25, 5:62-65). Nor is thespecification describing stability as just one purpose of the invention. The patent specification, instead, is emphasizing that it is the stability of the watercraft - or at the least static stabilityprovided by the hydrofoil - that permits the invention to achieve the full scope of its purposes suchas not having a moveable steering system. (See id. at col. 6:7-11). Therefore, I find that Defendants are entitled to summary judgment that claims 16-20 ofthe '659 Patent are invalid for lack of written description.D. ANTICIPATION OF THE '044 PATENT AND '659 PATENTPlaintiff moves for summary judgment on Defendants' counterclaims that the AssertedPatents are invalid as anticipated by Plaintiff's products. (D.I 80 at 26-37; see also D.I 13 at 13-14). Defendants concede that they are not arguing that Plaintiff's own products invalidate theAsserted Patents. (D.I 93 at 27 ('Waydoo is not asserting that the Asserted Patents are invalidover MHL's own products.')). Therefore, this issue is moot and Plaintiff's motion is dismissed.21Case 1:21-cv-00091-RGA-MPT Document 153 Filed 02/03/23 Page 21 of 26 PageID #:<pageID>Plaintiff also moves for summary judgment on Defendants' counterclaims that the AssertedPatents are invalid as anticipated by the Evolo Report. The Evolo Report is a 554 page report from'a graduate-level student project that was completed in 2009 by naval architecture students at theRoyal Institute of Technology in Stockholm, Sweden.' (D.I 80 at 26-37). 9There are two issues to this dispute. The first issue is whether the Evolo Report discloses the static stability limitation of theclaims 1-22 of the '044 Patent and claims 1-15 of the '659 Patent. 10 Plaintiff argues it does not; Defendants argue it does. The second issue is whether the Evolo Report is a printed publication. Plaintiff argues theEvolo Report is not because it was not publicly accessible before the priority date of the AssertedPatents. Defendants argue there is a genuine issue of material fact as to whether the Evolo Reportwas publicly accessible.I address each issue in turn. 1. Does the Evolo Report Disclose the Static Stability Limitation?'To show that a patent claim is invalid as anticipated, the accused infringer must show byclear and convincing evidence that a single prior art reference discloses each and every element of a claimed invention.' Silicon Graphics, Inc. v. AT! Tech., Inc. , 607 F.3d 784, 796 (Fed. Cir. 2010). '[E]very element of the claimed invention [must be described], either expressly or inherently, such9 Plaintiff argue that Defendants improperly combine multiple Evolo-related

references into one anticipation analysis. Defendants argue in their briefing that the Evolo Report itself is the single prior art reference that anticipates the Asserted Patents. (D.I 93 at 30). Therefore, for purposes of this motion, I focus only on the Evolo Report. Plaintiff also argues that claims 16-20 of the '659 Patent are not invalidated by anticipation because the Evolo Report does not disclose a motor speed controller, but this issue is moot as I have found claims 16-20 of the '659 Patent to be invalid for lack of written description. See Section III.C supra. 22 Case 1:21-cv-00091-RGA-MPT Document 153 Filed 02/03/23 Page 22 of 26 PageID #: <pageID> that a person of ordinary skill in the art could practice the invention without undue experimentation.' Callaway Golf Co. v. Acushnet Co., 576 F.3d 1331, 1346 (Fed. Cir. 2009). As with infringement, the court construes the claims and compares them against the prior art. See Enzo Biochem, Inc. v. Applera Corp., 599 F.3d 1325, 1332 (Fed. Cir. 2010). 'While anticipation is a question of fact, it may be decided on summary judgment if the record reveals no genuine dispute of material fact.' Encyclopaedia Britannica, Inc. v. Alpine Elecs. of Am., Inc., 609 F.3d 1345, 1349 (Fed. Cir. 2010). Plaintiff argues that the Evolo Report does not disclose a statically stable watercraft. Specifically, Plaintiff argues that Defendants cannot meet their burden because Dr. Triantafyllou did not mathematically assess the stability of the watercraft disclosed in the Evolo Report. (D.I 80 at 34-35). Plaintiff also cites to Mr. Barry's expert report to show that the Evolo Report discloses a statically unstable watercraft (Id. at 35-36). Defendants argue that there is a material issue of fact as to whether the Evolo Report discloses a statically stable watercraft because Dr. Triantafyllou concluded that the Evolo Report discloses a statically stable watercraft. (D.I 93 at 32 (citing D.I 85-1, Ex. 7, r.r 220-241)). Defendants contend that Dr. Triantafyllou responded to the arguments raised by Plaintiff's expert, Mr. Barry. (D.I 93 at 32 (citing D.I 85-1, Ex. 9, r.r 71-77)). I find there are genuine issues of material fact as to whether the Evolo Report discloses a statically stable watercraft. Both parties rely on the testimony of their expert witnesses to establish their positions. A reasonable juror could weigh the testimony by the parties' experts and reach the conclusion that Defendants have shown that the Evolo Report discloses a statically stable watercraft. 23 Case 1:21-cv-00091-RGA-MPT Document 153 Filed 02/03/23 Page 23 of 26 PageID #: <pageID> 2. Is the Evolo Report a Printed Publication? 'Whether a reference qualifies as a 'printed publication' under § 102(b) is a legal conclusion based on underlying factual findings.' Jazz Pharm., Inc. v. Amneal Pharm., LLC, 895 F.3d 1347, 1356 (Fed. Cir. 2018). 'A reference is considered publicly accessible if it was disseminated or otherwise made available to the extent that persons interested and ordinarily skilled in the subject matter or art, exercising reasonable diligence, can locate it.' Acceleration Bay, LLC v. Activision Blizzard Inc., 908 F.3d 765, 772 (Fed. Cir. 2018) (citation and internal quotation marks omitted). 'The test for public accessibility is not 'has the reference been indexed?'" Id. at 774. Instead, 'the ultimate question is whether the reference was 'available to the extent that persons interested and ordinarily skilled in the subject matter or art[,] exercising reasonable diligence, can locate it.'" Voter Verified, Inc. v. Premier Election Sols., Inc., 698 F.3d 1374, 1380 (Fed. Cir. 2012) (quoting SRI Int'l, Inc. v. Internet Sec. Sys., Inc., 511 F.3d 1186, 1194 (Fed. Cir. 2008)). Plaintiff argues the Evolo Report was not publicly accessible before the priority date of the Asserted Patents. (D.I 80 at 30-32). Plaintiff specifically contends that there is no evidence that the Evolo website, which contained a link to the Evolo Report, was indexed by Google, would turn up on a Google search in 2013, or was otherwise accessible to a POSA before the Asserted Patents' priority date. (D.I 32). Defendants argue that Plaintiff is not entitled to summary judgment because there is evidence that the Evolo Report was publicly accessible before the Asserted Patents' priority date. Therefore, there is a disputed material of fact, making summary judgment inappropriate. Defendants argue that the record contains evidence that the Evolo Report was downloaded in the United States before the priority date of the Asserted Patents; that their expert Mr. Lanterman 24 Case 1:21-cv-00091-RGA-MPT Document 153 Filed 02/03/23 Page 24 of 26 PageID #: <pageID> concluded that the Evolo website was likely indexed by Google and had regular activity, and that an article published in the Swedish magazine Batnytt ('Boat News') in August 2009 detailed the Evolo project and contained a link to the Evolo website. (D.I 93 at 28-30). I find there is a genuine issue of material fact as to whether the Evolo Report was publicly accessible to a POSA prior to October 2013. Plaintiff concedes that there was at least one user in the United States (or at least outside of Sweden and Switzerland) who downloaded the Evolo Report. (D.I 80 at 16, n.7). Further, the article in Batnytt may also have served as a publicly accessible 'research aid' that would have led a POSA to the Evolo website, which contained the Evolo Report. See, e.g., Blue Calypso, LLC v. Groupon, Inc., 815 F.3d 1331, 1350 (Fed. Cir. 2016); Bruckelmyer v. Ground Heaters, Inc., 445 F.3d 1374, 1379 (Fed. Cir. 2006). For these reasons, I find a reasonable jury could determine that the Evolo Report was publicly accessible before the Asserted Patents' priority date. Therefore, I find Plaintiff is not entitled to summary judgment on Defendants' counterclaims that the Asserted Patents are anticipated by the Evolo Report. E.

United States Courts Opinion: United States District Court District of Delaware: 21-091 - MHL Custom, Inc. v.
Waydoo USA, Inc. et al

PLAINTIFF'S STANDING Plaintiff moved for summary judgment on Defendants' affirmative defense that Plaintiff lacks standing. (D.I 79). After oral argument, Defendants stated they are not challenging standing. (D.J. 145). Therefore, I will dismiss Plaintiff's motion for summary judgment on standing as moot. IV. CONCLUSION For the reasons stated above, I deny Plaintiff's motion for summary judgment for infringement of the '044 Patent, deny Plaintiff's motion for summary judgment for the Asserted Patents not being invalid as anticipated by the Evolo Report, and dismiss Plaintiff's motion for summary judgment on Defendants' lack of standing argument. I deny Defendants' motion for summary judgment for non-infringement of the '044 Patent and '659 Patent and grant Defendants' motion for summary judgment of invalidity for lack of written description for claims 16-20 of the '659 Patent. An appropriate order will issue. Case 1:21-cv-00091-RGA-MPT Document 153 Filed 02/03/23 Page 25 of 26 PageID #: <pageID>

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
90/015,269	08/09/2023	9586659	GBWHCC001-EPR	5917
530	7590	08/21/2023		
Lerner David LLP 20 COMMERCE DRIVE CRANFORD, NJ 07016			EXAMINER ENGLE, PATRICIA LYNN	
			ART UNIT	PAPER NUMBER
			3993	
			MAIL DATE	DELIVERY MODE
			08/21/2023	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.



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(THIRD PARTY REQUESTER'S CORRESPONDENCE ADDRESS)

Bayramoglu Law Offices LLC
1540 West Warm Springs Road
Suite 100
Henderson, Nevada 89014

***EX PARTE* REEXAMINATION COMMUNICATION TRANSMITTAL FORM**

REEXAMINATION CONTROL NO. 90/015,269 .

PATENT UNDER REEXAMINATION 9586659 .

ART UNIT OCRU .

Enclosed is a copy of the latest communication from the United States Patent and Trademark Office in the above identified *ex parte* reexamination proceeding (37 CFR 1.550(f)).

Where this copy is supplied after the reply by requester, 37 CFR 1.535, or the time for filing a reply has passed, no submission on behalf of the *ex parte* reexamination requester will be acknowledged or considered (37 CFR 1.550(g)).

/PMartin, Paralegal/

<i>Ex Parte Reexamination Interview Summary – Pilot Program for Waiver of Patent Owner's Statement</i>	Control No.	Patent Under Reexamination is Requested	
	90/015,269	9586659	
	Examiner	Art Unit	AIA (FITF) Status
	Patricia Engle	3993	Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address. --

All participants (USPTO official and patent owner):

- (1) Patricia Martin (3) _____
(2) Brian Tomkins, 58550 (4) _____

Date of Telephonic Interview: 17 August 2023.

A. The USPTO official requested waiver of the patent owner's statement pursuant to the pilot program for waiver of patent owner's statement in *ex parte* reexamination proceedings.*

- ☐ The patent owner **agreed** to waive its right to file a patent owner's statement under 35 U.S.C. 304 in the event reexamination is ordered for the above-identified patent.
- ☒ The patent owner **did not agree** to waive its right to file a patent owner's statement under 35 U.S.C. 304 at this time.
- ☐ USPTO personnel were unable to reach the patent owner.**

B. The Patent Owner of record telephoned the Office and indicated they would like to participate in the pilot program for waiver of patent owner's statement in *ex parte* reexamination proceedings.*

- ☐ The Patent owner of record telephoned the Office and **agreed** to waive its right to file a patent owner's statement under 35 U.S.C. 304 in the event reexamination is ordered for the above-identified patent.

The patent owner is not required to file a written statement of this telephone communication under 37 CFR 1.560(b) or otherwise. However, any disagreement as to this interview summary must be brought to the immediate attention of the USPTO, and no later than one month from the mailing date of this interview summary. Extensions of time are governed by 37 CFR 1.550(c).

*For more information regarding this pilot program, see *Pilot Program for Waiver of Patent Owner's Statement in Ex Parte Reexamination Proceedings*, 75 Fed. Reg. 47269 (August 5, 2010), available on the USPTO Web site at <http://www.uspto.gov/patents/law/notices/2010.jsp>.

**The patent owner may contact the USPTO personnel at (571) 272-7705 or at the telephone number provided below if the patent owner decides to waive the right to file a patent owner's statement under 35 U.S.C. 304.

/Patricia Martin/

Paralegal Specialist, OCRU

(571) 272-5004

Signature and telephone number of the USPTO official, who contacted, was contacted by, or attempted to contact the patent owner.

cc: Requester (if third party requester)



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REEXAM CONTROL NUMBER	FILING OR 371 (c) DATE	PATENT NUMBER
90/015,269	08/09/2023	

Bayramoglu Law Offices LLC
Bayramoglu Law Offices LLC
1540 West Warm Springs Road
Suite 100
Henderson, NEVADA 89014

**CONFIRMATION NO. 5917
REEXAMINATION REQUEST
NOTICE**



Date: 08/09/2023

NOTICE OF STREAMLINED REEXAMINATION REQUEST FILING DATE

(Third Party Requester)

Requester is hereby notified that the filing date of the request for reexamination is 08/09/2023, the date that the filing requirements of 37 CFR § 1.510 were received.

A decision on the request for reexamination will be mailed within three months from the filing date of the request for reexamination. (See 37 CFR 1.515(a)).

A copy of the Notice is being sent to the person identified by the requester as the patent owner. Further patent owner correspondence will be the latest attorney or agent of record in the patent file. (See 37 CFR 1.33). Any paper filed should include a reference to the present request for reexamination (by Reexamination Control Number).

cc: Patent Owner
530
Lerner David LLP
20 COMMERCE DRIVE
CRANFORD, NJ 07016

/rbell/

Legal Instruments Examiner
Central Reexamination Unit 571-272-7705; FAX No. 571-273-9900



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BIB DATA SHEET

CONFIRMATION NO. 5917

SERIAL NUMBER 90/015,269	FILING or 371(c) DATE 08/09/2023 RULE	CLASS 440	GROUP ART UNIT 3993	ATTORNEY DOCKET NO. GBWHCC001-EPR	
APPLICANTS JACOB WILLEM LANGELAAN, Residence Not Provided; BAYRAMOGLU LAW OFFICES LLC, HENDERSON, NV; INVENTORS 9586659, Residence Not Provided; IP-R-Us, LLC, Residence Not Provided; ** CONTINUING DATA ***** This application is a REX of 15/064,521 03/08/2016 PAT 9586659 which is a CON of 14/509,289 10/08/2014 PAT 9359044 which claims benefit of 61/889,071 10/10/2013 ** FOREIGN APPLICATIONS ***** ** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ** ** SMALL ENTITY **					
Foreign Priority claimed ☐ Yes ☐ No 35 USC 119(a-d) conditions met ☐ Yes ☐ No Verified and Acknowledged <u>Examiner's Signature</u> Met after Allowance ☐ <u>Initials</u>		STATE OR COUNTRY	SHEETS DRAWINGS	TOTAL CLAIMS 20	INDEPENDENT CLAIMS 2
ADDRESS Lerner David LLP 20 COMMERCE DRIVE CRANFORD, NJ 07016 UNITED STATES					
TITLE POWERED HYDROFOIL BOARD					
FILING FEE RECEIVED 0.00	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:		☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other _____ ☐ Credit		



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REEXAM CONTROL NUMBER	FILING OR 371 (c) DATE	PATENT NUMBER
90/015,269	08/09/2023	

530
Lerner David LLP
20 COMMERCE DRIVE
CRANFORD, NJ 07016

CONFIRMATION NO. 5917 REEXAM ASSIGNMENT NOTICE



Date: 08/09/2023

NOTICE OF ASSIGNMENT OF REEXAMINATION REQUEST

The above-identified request for reexamination has been assigned to Art Unit 3993. All future correspondence to the proceeding should be identified by the control number listed above and directed to the assigned Art Unit.

A copy of this Notice is being sent to the latest attorney or agent of record in the patent file or to all owners of record. (See 37 CFR 1.33(c)). If the addressee is not, or does not represent, the current owner, he or she is required to forward all communications regarding this proceeding to the current owner(s). An attorney or agent receiving this communication who does not represent the current owner(s) may wish to seek to withdraw pursuant to 37 CFR 1.36 in order to avoid receiving future communications. If the address of the current owner(s) is unknown, this communication should be returned within the request to withdraw pursuant to Section 1.36.

NOTICE OF USPTO EX PARTE REEXAMINATION PATENT OWNER STATEMENT WAIVER PROGRAM

The USPTO has implemented a pilot program where, after a reexamination proceeding has been granted a filing date and before the examiner begins his or her review, the patent owner may orally waive the right to file a patent owner's statement. See *"Pilot Program for Waiver of Patent Owner's Statement in Ex Parte Reexamination Proceedings,"* 75 FR 47269 (August 5, 2010). One goal of the pilot program is to reduce the pendency of reexamination proceedings and improve the efficiency of the reexamination process.

Ordinarily when ex parte reexamination is ordered, the USPTO must wait until after the receipt of the patent owner's statement and the third party requester's reply, or after the expiration of the time period for filing the statement and reply (a period that can be as long as 5 to 6 months), before mailing a first determination of patentability. The USPTO's first determination of patentability is usually a first Office action on the merits or a Notice of Intent to Issue Reexamination Certificate (NIRC).

Under the pilot program, the patent owner's oral waiver allows the USPTO to act on the first determination of patentability immediately after determining that reexamination will be ordered, and in a suitable case issue the reexamination order and the first determination of patentability (which could be a NIRC if the claims under reexamination are confirmed) at the same time.

Benefits to the Patent Owner for participating in this pilot program include reduction in pendency.

To participate in this pilot program, Patent Owners may contact the USPTO's Central Reexamination Unit (CRU) at 571-272-7705. The USPTO will make the oral waiver of record in the reexamination file in an interview summary and a copy will be mailed to the patent owner and any third party requester.

cc: Third Party Requester(if any)
Bayramoglu Law Offices LLC
Bayramoglu Law Offices LLC
1540 West Warm Springs Road
Suite 100
Henderson, NEVADA 89014

/rbell/

Legal Instruments Examiner
Central Reexamination Unit 571-272-7705; FAX No. 571-273-9900



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Patent Assignment Abstract of Title

Total Assignments: 1

Application #: 15064521 Filing Dt: 03/08/2016 Patent #: 9586659 Issue Dt: 03/07/2017
PCT #: NONE Intl Reg #: Publication #: US20160185430 Pub Dt: 06/30/2016
Inventor: Jacob Willem Langelaan
Title: Powered Hydrofoil Board

Assignment: 1

Reel/Frame:	Received:	Recorded:	Mailed:	Pages:
<u>056687 / 0055</u>	06/25/2021	06/25/2021	06/29/2021	3

Conveyance: ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS).

Assignor: LANGELAAN, JACOB W.

Exec Dt: 07/16/2020

Assignee: MHL CUSTOM, INC.

500 BO BAJURAS
ISABELA, PUERTO RICO 00662

Correspondent: LERNER, DAVID, LITTENBERG, KRUMHOLZ & MENTLIK, LLP
20 COMMERCE DR.
CRANFORD, NJ 07016

Search Results as of: 08/09/2023 01:35 PM

If you have any comments or questions concerning the data displayed, contact PRD / Assignments at 571-272-3350. v.2.8
Web interface last modified: Jun 26, 2017 v.2.6

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(Also referred to as FORM PTO-1465)

REQUEST FOR *EX PARTE* REEXAMINATION TRANSMITTAL FORM

Address to:
Mail Stop *Ex Parte* Reexam
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Attorney Docket No.: GBWHCC001-EPR

Date: 08/07/2023

1. ☐ This is a request for *ex parte* reexamination pursuant to 37 CFR 1.510 of patent number 9,586,659 issued March 7, 2017. The request is made by:
☐ patent owner. ☒ third party requester.
2. ☐ The name and address of the person requesting reexamination is:
Bayramoglu Law Offices LLC
1540 W. Warm Springs Road Suite 100 Henderson, Nevada 89014
3. Requester ☒ asserts small entity status (37 CFR 1.27) or ☐ certifies micro entity status (37 CFR 1.29). Only a patent owner requester can certify micro entity status. Form PTO/SB/15A or B must be attached to certify micro entity status.
4. This request is accompanied by payment of the reexamination fee as set forth in:
☐ 37 CFR 1.20(c)(2), or
☒ 37 CFR 1.20(c)(1). In checking this box for payment of the fee set forth in 37 CFR 1.20(c)(1), requester asserts that this request has forty (40) or fewer pages and complies with all other requirements of 37 CFR 1.20(c)(1).
Payment of the reexamination fee is made by the method set forth below.
a. ☐ A check in the amount of \$_____ is enclosed to cover the reexamination fee.
b. ☒ The Director is hereby authorized to charge the reexamination fee to Deposit Account No. 506203.
c. ☐ Payment by credit card. Form PTO-2038 is attached; or
d. ☐ Payment made via EFS-Web.
☒ In addition, the Director is hereby authorized to charge any fee deficiencies to Deposit Account No. 506203.
5. ☒ Any refund should be made by ☐ check or ☒ credit to Deposit Account No. 506203 37 CFR 1.26(c). If payment is made by credit card, refund must be to credit card account.
6. ☒ A copy of the patent to be reexamined having a double column format on one side of a separate paper is enclosed. 37 CFR 1.510(b)(4).
7. ☐ CD-ROM or CD-R in duplicate, Computer Program (Appendix) or large table
☐ Landscape Table on CD

[Page 1 of 3]

This collection of information is required by 37 CFR 1.510. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) a request for reexamination. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 18 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Mail Stop *Ex Parte* Reexam, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

8. ☐ Nucleotide and/or Amino Acid Sequence Submission
If applicable, items a. – c. are required.
- a. ☐ Computer Readable Form (CRF)
- b. Specification Sequence Listing on:
- i. ☐ CD-ROM (2 copies) or CD-R (2 copies) or
- ii. ☐ paper
- c. ☐ Statements verifying identity of above copies.
9. ☐ A copy of any disclaimer, certificate of correction or reexamination certificate issued in the patent is included.
10. ☒ Reexamination of claim(s) Claim 1-20 of U.S. Patent 9,586,659 B2 is requested.
11. ☒ A copy of every patent or printed publication relied upon is submitted herewith including a listing thereof on Form PTO/SB/08, PTO-1449, or equivalent.
12. ☐ An English language translation of all necessary and pertinent non-English language patents and/or printed publications is attached.
13. ☒ The attached detailed request includes at least the following items:
- a. A statement identifying each substantial new question of patentability based on prior patents and printed publications. 37 CFR 1.510(b)(1).
- b. An identification of every claim for which reexamination is requested, and a detailed explanation of the pertinency and manner of applying the cited art to every claim for which reexamination is requested. 37 CFR 1.510(b)(2).
14. ☐ A proposed amendment is included (only where the patent owner is the requester). 37 CFR 1.510(e).
15. ☒ It is certified that the statutory estoppel provisions of 35 U.S.C. 315(e)(1) or 35 U.S.C. 325(e)(1) do not prohibit requester from filing this *ex parte* reexamination request. 37 CFR 1.510(b)(6).
16. Service
- a. ☒ It is certified that a copy of this request (if filed by other than the patent owner) has been served in its entirety on the patent owner as provided in 37 CFR 1.33(c).
- The name and address of the party served are:
- Lerner David LLP
- 20 COMMERCE DRIVE CRANFORD, NJ 07016 UNITED STATES
- Date of Service: 08/07/2023
- OR
- b. ☐ A duplicate copy is enclosed since service on patent owner was not possible. An explanation of the efforts made to serve patent owner is attached. See MPEP 2220.

17. Correspondence Address: Direct all communication about the reexamination to:

☒ The address associated with Customer Number: 98346

OR

☐ Firm or Individual Name Bayramoglu Law Offices LLC
(at the address identified below)

Address

1540 West Warm Springs Road, Suite 100

City

Henderson

State

Nevada

Zip

89014

Country

US

Telephone

(702) 462-5973

Email

in@bayramoglu-legal.com

18. ☐ The patent is currently the subject of the following concurrent proceeding(s):

- a. ☐ Copending reissue Application No. _____
- b. ☐ Copending reexamination Control No. _____
- c. ☐ Copending interference No. _____
- d. ☐ Copending litigation styled _____

WARNING : Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

/Gokalp Bayramoglu/

Authorized Signature

August 8, 2023

Date

Gokalp Bayramoglu

Typed/Printed Name

66305

Registration No.

☐ For Patent Owner Requester

☒ For Third Party Requester

Electronic Patent Application Fee Transmittal

Application Number:				
Filing Date:				
Title of Invention:	POWERED HYDROFOIL BOARD			
First Named Inventor/Applicant Name:	Jacob Willem LANGELAAN			
Filer:	Gokalp Bayramoglu/Selin Tutluer			
Attorney Docket Number:	GBWHCC001-EPR			
Filed as Small Entity				
Filing Fees for ex parte reexam				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Miscellaneous:				
REQUEST FOR EX PARTE REEXAM- STREAMLINED	2831	1	2520	2520
Total in USD (\$)				2520

Electronic Acknowledgement Receipt

EFS ID:	48414669
Application Number:	90015269
International Application Number:	
Confirmation Number:	5917
Title of Invention:	POWERED HYDROFOIL BOARD
First Named Inventor/Applicant Name:	Jacob Willem LANGELAAN
Customer Number:	98346
Filer:	Gokalp Bayramoglu/Selin Tutluer
Filer Authorized By:	Gokalp Bayramoglu
Attorney Docket Number:	GBWHCC001-EPR
Receipt Date:	09-AUG-2023
Filing Date:	
Time Stamp:	09:35:45
Application Type:	Reexam (Third Party)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	\$2520
RAM confirmation Number	E202389036186548
Deposit Account	
Authorized User	

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Reexam Certificate of Service	1-GBWHCC001-EPR-Certificate-of-Service-07282023.pdf	84315	no	2
			04c6f56e2e6cd39742b23b8f28c015131070357c		
Warnings:					
Information:					
2	Reexam - Affidavit/Declaration/Exhibit Filed by 3rd Party	2-GBWHCC001-EPR-cited-reference-TW201000361A.pdf	11408315	no	38
			83dbeccb16ec3db2e75c381b3bb367b8cd6fcd35		
Warnings:					
Information:					
3	Reexam - Info Disclosure Statement Filed by 3rd Party	3-GBWHCC001-EPR-IDS.pdf	1034694	no	4
			57f4c3b6ff13b0e98422ea362c2bd01ac8b23583		
Warnings:					
Information:					
4	Copy of patent for which reexamination is requested	4-GBWHCC001-EPR-patent-to-be-reexamined.pdf	13265363	no	13
			0ae2690bdb481b342ef7cfce8c1f1820e94364fa		
Warnings:					
Information:					
5	Receipt Original Ex Parte Reexamination by 3rd party fewer then 40 Pages Rule 1.20(C)(1)	5-GBWHCC001-EPR-Request-for-Ex-parte-reexamination-20230801-clean.pdf	1706232	no	39
			402bed5301dff055f28557ab589d97e187e9270		
Warnings:					
Information:					
6	Transmittal of New Application	6-GBWHCC001-EPR-Request-for-Ex-Parte-Reexamination-Transmittal-Form.pdf	167517	no	3
			4197a002b657e02be33cdfbca9b5d703db42dc39		
Warnings:					
Information:					
Page 499 of 596					

7	Fee Worksheet (SB06)	fee-info.pdf	38544	no	2
			83a7744194754455e400b4f6a59c655c9f32390		
Warnings:					
Information:					
Total Files Size (in bytes):				27704980	
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.					

CERTIFICATE OF SERVICE

I hereby certify that the following correspondence is being transmitted using the EFS Web submission system, fax to the US Patent and Trademark Office, or is being deposited first class mail to the United States Postal Service as first-class mail in an envelope addressed to the United States Patent and Trademark Office, Commissioner for Patents, PO Box 1450, Alexandria, Virginia 22313-1450: (1) REQUEST FOR REEXAMINATION OF U.S. PATENT 9,586,659 (2) Information Disclosure Statement (3) U.S. PATENT 9,586,659 (4) Rexam Ref# US Patent 5,544,607 (5) Rexam Ref# US PGPUB 2005/0255764 (6) Reexam Ref# US PGPUB 2011/0111650 (7) Taiwan PGPUB TW201000361A (8) Cover letter addressed to Lerner David LLP (9) Certificate of Service (10) Statement pursuant to 35 USC §315 or §325: Petitioner for Reexamination is not estopped or barred from bringing this petition under 35 USC §315 or §325. Further, there are no other related pending legal proceedings (i.e., civil actions or administrative proceedings) (11) Transmittal Form PTO/SB/57.

Patent & Trademark Office Record
Lerner David LLP
20 COMMERCE DRIVE
CRANFORD, NJ 07016
UNITED STATES

Dated: July 28, 2023

/Gokalp Bayramoglu/

Attorney for Petitioner/Requestor

Bayramoglu Law Offices LLC

1540 W. Warm Springs Road, Suite 100

Henderson, NV 89014

Phone: (702) 462-5973 / Email: in@bayramoglu-legal.com

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

REQUEST FOR REEXAMINATION OF U.S. PATENT 9,586,659

Application Serial No.: 15/064,521

Confirmation Number: 7155

Filing Date: 03/08/2016

Group Art Unit: 3617

First Named Inventor: Jacob Willem LANGELAAN Examiner: JOVON E HAYES

Title: POWERED HYDROFOIL BOARD

Commissioner for Patents

P.O. Box 1450

Alexandria, Virginia 22313-1450

**DOCUMENTS REGARDING REQUEST FOR REEXAMINATION OF U.S.
PATENT 9,586,659**

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	
	Filing Date	
	First Named Inventor	Jacob Willem LANGELAAN
	Art Unit	
	Examiner Name	
	Attorney Docket Number	GBWHCC001-EPR

U.S.PATENTS

Remove

Examiner Initial*	Cite No	Patent Number	Kind Code ¹	Issue Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear
	1	5544607	A	1996-08-13	RORABAUGH, DALE, et al.	

If you wish to add additional U.S. Patent citation information please click the Add button.

Add

U.S.PATENT APPLICATION PUBLICATIONS

Remove

Examiner Initial*	Cite No	Publication Number	Kind Code ¹	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear
	1	20050255764	A1	2005-11-17	WOOLLEY ROBERT C	
	2	20110111650	A1	2011-05-12	BRADEN PAUL T, et al.	

If you wish to add additional U.S. Published Application citation information please click the Add button.

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FOREIGN PATENT DOCUMENTS

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Examiner Initial*	Cite No	Foreign Document Number ³	Country Code ²ⁱ	Kind Code ⁴	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	T ⁵
	1	201000361	TW	A	2010-01-01	GRANDOT TECH INC		

If you wish to add additional Foreign Patent Document citation information please click the Add button

Add

NON-PATENT LITERATURE DOCUMENTS

Remove

**INFORMATION DISCLOSURE
STATEMENT BY APPLICANT**
(Not for submission under 37 CFR 1.99)

Application Number	
Filing Date	
First Named Inventor	Jacob Willem LANGELAAN
Art Unit	
Examiner Name	
Attorney Docket Number	GBWHCC001-EPR

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T ⁵
	1		

If you wish to add additional non-patent literature document citation information please click the Add button

EXAMINER SIGNATURE

Examiner Signature		Date Considered	
--------------------	--	-----------------	--

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. ² Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). ³ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁴ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁵ Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		
	Filing Date		
	First Named Inventor	Jacob Willem LANGELAAN	
	Art Unit		
	Examiner Name		
	Attorney Docket Number	GBWHCC001-EPR	

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Gokalp Bayramoglu/	Date (YYYY-MM-DD)	2023-08-03
Name/Print	Gokalp Bayramoglu	Registration Number	66305

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. **DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application Serial No.: 15/064,521

Confirmation Number: 7155

Filing Date: 03/08/2016

Group Art Unit: 3617

First Named Inventor: Jacob Willem LANGELAAN

Examiner: JOVON E HAYES

Attorney Docket: GBWHCC001-EPR

Title: POWERED HYDROFOIL BOARD

Commissioner for Patents

P.O. Box 1450

Alexandria, Virginia 22313-1450

REQUEST FOR REEXAMINATION OF U.S. PATENT 9,586,659

Identification of the Claims for Which Reexamination Is Requested

In accordance with 37 CFR 1.510, reexamination of claims 1-20 of U.S. Patent 9,586,659 B2 is requested, in view of the following references:

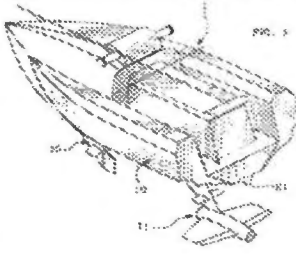
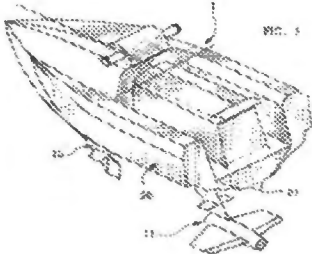
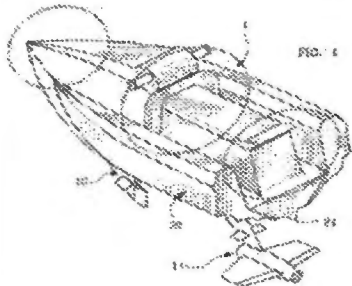
<u>Publication Number</u>	<u>Inventor</u>	<u>Published Date</u>
US Patent 5,544,607	Rorabaugh et al	Aug. 13, 1996
US PGPUB 2005/0255764	Woolley	Nov. 17, 2005
US PGPUB 2011/0111650	Braden et al.	May 12, 2011
Taiwan PGPUB TW201000361A	Wang	Jan. 1, 2010

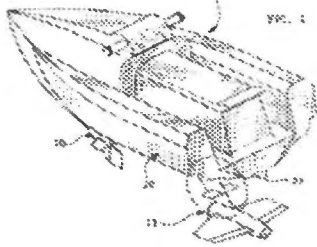
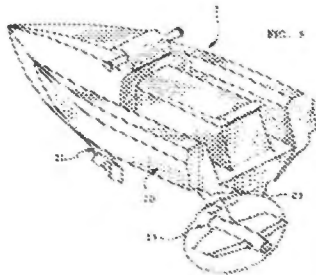
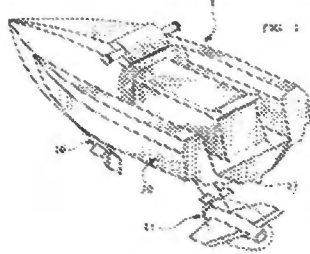
Statement Pointing Out Each Substantial New Question of Patentability

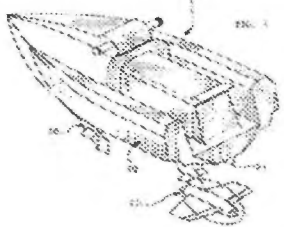
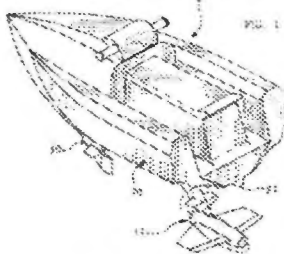
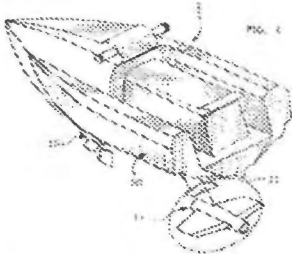
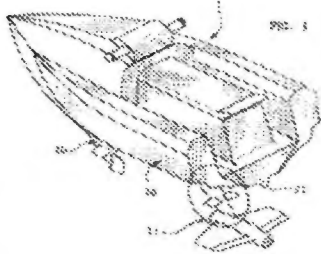
None of the above listed 4 references was recorded in the file of U.S. Patent 9,586,659 B2. These references were not used or relied upon in any rejection nor considered during the prosecution of U.S. Patent 9,586,659 B2, the teachings of these references raise a substantial new question of the patentability of U.S. Patent 9,586,659 B2.

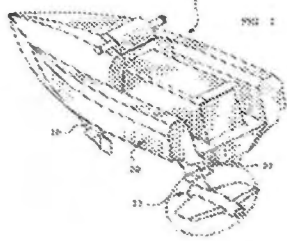
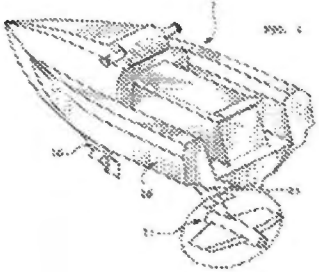
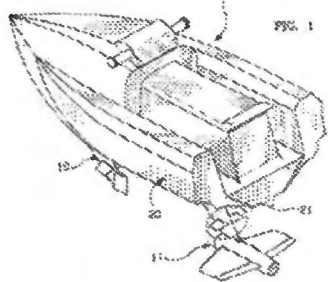
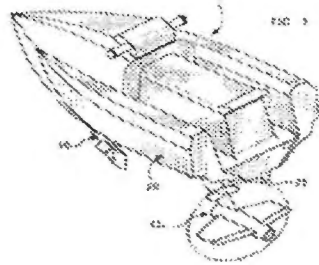
Detailed Explanation Under 37 CFR 1.510(b)

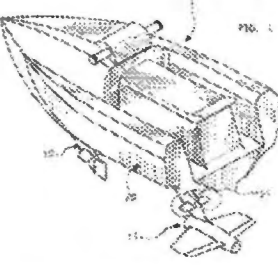
A substantial new question of the patentability of Claims 1, 3-7, 12, 15, and 17 by Rorabaugh (US 5,544,607) under 35 U.S.C. §102.

Claims of '659 Patent	Figures of Rorabaugh	Disclosure of Rorabaugh and 102 Rejections
Claim 1 A passively stable, weight-shift controlled personal hydrofoil watercraft, comprising:	 (Rorabaugh's FIG. 1)	Fig 1 of the RORABAUGH shows a motorcycle like Jet Ski. In fact, the Jet Ski is a kind of passively stable, weight-shift controlled personal hydrofoil watercraft. 10:37-44.
a flotation device that has a fore-aft length greater than a lateral width, the flotation device having a top surface and a bottom surface, wherein a user can be disposed on the top surface of the flotation device in a prone, kneeling, or standing position,	 (Rorabaugh's FIG. 1)	Fig. 1 of the RORABAUGH shown the shape of the hydrofoil watercraft is a flotation device that has a fore-aft length greater than a lateral width. In fact the Fig 1 of the RORABAUGH shows the hydrofoil watercraft as the flotation device also having a top surface and a bottom surface, wherein a user can be disposed on the top surface of the flotation device in a prone, kneeling, or standing position.
the flotation device having a forward section, a middle section, and a rear section;	 (Rorabaugh's FIG. 1)	The Fig 1 of the RORABAUGH also shows the hydrofoil watercraft as the flotation device having a forward section, a middle section, and a rear section.

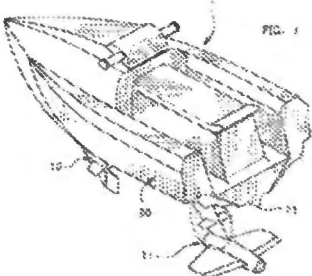
	(Rorabaugh's FIG. 1)	
a strut having an upper end and a lower end, the upper end fixedly interconnected with the flotation device between the middle section and the rear section of the flotation device;	 (Rorabaugh's FIG. 1)	According to Fig. 1 of the RORABAUGH, the stern hydrofoil assembly 11 mounts a downwards-extending from the hydrofoil watercraft like strut also having an upper end and a lower end, the upper end fixedly interconnected with the flotation device between the middle section and the rear section of the flotation device. 10:37-44. and Fig. 1.
a hydrofoil fixedly interconnected with the lower end of the strut, the hydrofoil having no movable surface;	 (Rorabaugh's FIG. 1)	According to Fig. 1 of the RORABAUGH, these hydrofoils extend into the water is the same as a hydrofoil fixedly interconnected with the lower end of the strut. According to the basic knowledge, most of the hydrofoils of the ship are fixed. In other words, the hydrofoil of the hydrofoil watercraft also having no movable surface. 10:37-44. and Fig. 1.
a propulsion system for propelling the watercraft in a body of water,	 (Rorabaugh's FIG. 1)	According to Fig. 1 of the RORABAUGH, the hydrofoil watercraft also having a propulsion system for propelling the watercraft in a body of water. 8:10-13 and Fig. 1.

wherein the propulsion system is connected to the hydrofoil; and the watercraft having no movable steering system.	 (Rorabaugh's FIG. 1)	The of the RORABAUGH shows the propulsion system of hydrofoil watercraft is connected to the hydrofoil. Note that FIG. 1 of RORABAUGH illustrates that two handles are fixed to the watercraft (i.e the watercraft having no movable steering system).
Claim 3 the propulsor is disposed below the hydrofoil.	 (Rorabaugh's FIG. 1)	According to Fig. 1 of RORABAUGH, the propulsor is disposed below the hydrofoil.
Claim 4 the hydrofoil is indirectly connected to the strut.	 (Rorabaugh's FIG. 1)	It can be seen from the figure of RORABAUGH that the hydrofoil is indirectly connected to the strut.
Claim 5 the strut is directly connected to the propulsion system.	 (Rorabaugh's FIG. 1)	It can be seen from the figure of RORABAUGH that the strut is directly connected to the propulsion system.

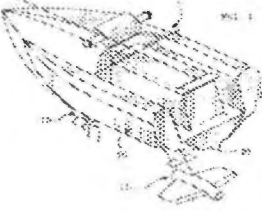
Claim 6 a first hydrofoil wing of the hydrofoil is indirectly connected to the strut through the propulsion system.	 (Rorabaugh's FIG. 1)	It can be seen from the Fig. 1 of Rorabaugh that the first hydrofoil wing of the hydrofoil is indirectly connected to the strut through the propulsion system.
Claim 7 the hydrofoil comprises a plurality of wings that are interconnected by way of a strut.	 (Rorabaugh's FIG. 1)	It can be seen from the Fig. 1 of RORABAUGH that the hydrofoil comprises a plurality of wings that are interconnected by way of a strut.
Claim 12 a first hydrofoil wing of the hydrofoil is directly connected to the strut.	 (Rorabaugh's FIG. 1)	As shown in Fig. 1 of RORABAUGH, there is hydrofoil is directly connected to the strut.
Claim 15 the propulsion system is directly or indirectly connected to the hydrofoil.	 (Rorabaugh's FIG. 1)	According to Fig. 1 of RORABAUGH, the propulsion system is directly or indirectly connected to the hydrofoil.

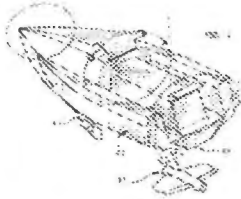
Claim 17 the hydrofoil comprises a plurality of hydrofoil wings including the first hydrofoil wing and a second hydrofoil wing, the first and second hydrofoil wings being connected by way of a strut.	 (Rorabaugh's FIG. 1)	From Fig. 1 of the RORABAUGH, two hydrofoil wings being connected by way of a strut.
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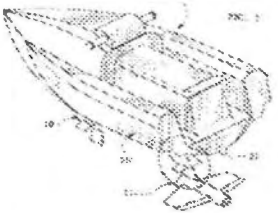
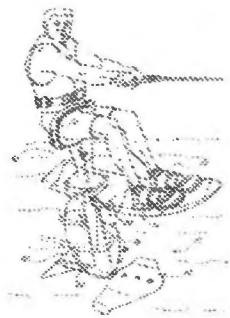
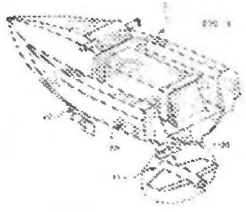
A substantial new question of the patentability of Claim 13 over Rorabaugh (US 5,544,607) under 35 U.S.C. §103.

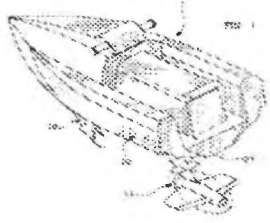
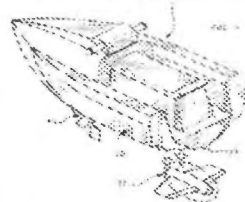
Claims of '659 Patent	Figures of the references	Disclosure of the references and 103 Rejections
Claim 13 the strut has an internal passage and electrical wires extend from the electric motor to the watertight compartment inside the strut through the internal passage for controlling the electric motor.	 (Rorabaugh's FIG. 1)	Rorabaugh et al. discloses "A straight drive line runs directly from the engine within the demi-hull to a propeller or water jet--making thereby an efficiently short mechanical drive connection." RORABAUGH, 8:10-13. One of ordinary skill in the art at the time of invention would find it obvious to incorporate an electric motor into Rorabaugh's watercraft in order to enhance the speed of the watercraft. Also, it would have been obvious to connect electrical wires from an engine to the propeller through the strut when an electric motor is used in the system, thereby allowing implementation of the watercraft.

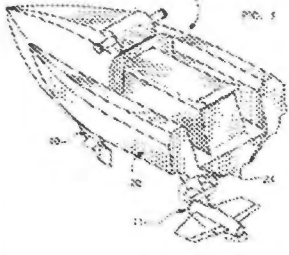
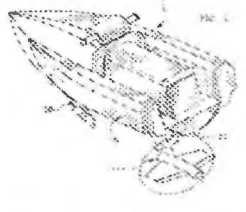
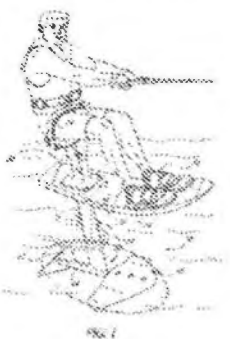
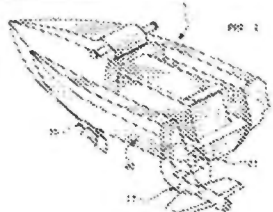
A substantial new question of the patentability of Claims 1, 3-7, 12-13, 15, and 17 over Rorabaugh in view of Woolley (US PGPUB 2005/0255764) under 35 U.S.C. §103.

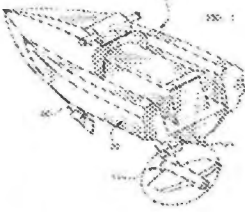
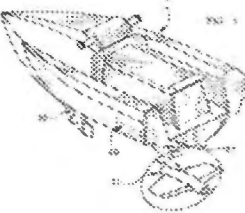
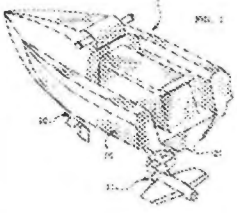
Claims of '659 Patent	Figures of the references	Disclosure of the references and 103 Rejections
Claim 1 A passively stable, weight-shift controlled personal hydrofoil watercraft, comprising:	 (Rorabaugh's FIG. 1)  (WOOLLEY's FIG. 1)	Fig. 1 of the RORABAUGH shows a motorcycle like Jet Ski. In fact, the Jet Ski is a kind of passively stable, weight-shift controlled personal hydrofoil watercraft. 10:37-44. Fig 1. of the WOOLLEY shows a flying ski being a kind of passively stable, weight-shift controlled personal hydrofoil watercraft.
a flotation device that has a fore-aft length greater than a lateral width,		Fig 1 of the RORABAUGH shown the shape of the hydrofoil watercraft is a flotation device that has a fore-aft length greater than a lateral width. Fig 1 of the WOOLLEY also shown the shape of the flying ski is a flotation device that has a fore-aft length greater than a lateral width. 【0102】 lines 2-4 and Fig. 1.

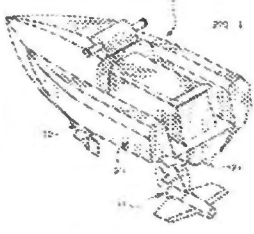
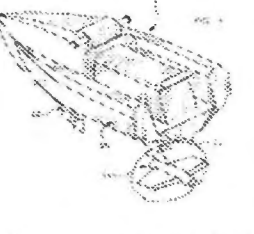
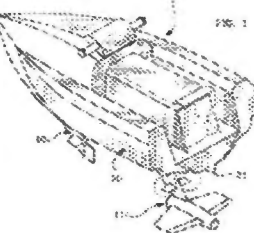
the flotation device having a top surface and a bottom surface, wherein a user can be disposed on the top surface of the flotation device in a prone, kneeling, or standing position,		In fact the Fig 1 of the RORABAUGH shows the hydrofoil watercraft as the flotation device also having a top surface and a bottom surface, wherein a user can be disposed on the top surface of the flotation device in a prone, kneeling, or standing position. The upper face 22 and a lower face 24 of the flying ski 10 according to the Fig 1 of the WOOLLEY also representing a top surface and a bottom surface, wherein a user can be disposed on the top surface of the flotation device in a prone, kneeling, or standing position. 【0102】 lines 2-4 and Fig. 1.
the flotation device having a forward section, a middle section, and a rear section;	 (Rorabaugh's FIG 1)  (WOOLLEY's FIG. 1)	The Fig 1 of the RORABAUGH also shows the hydrofoil watercraft as the flotation device having a forward section, a middle section, and a rear section. 【0102】 lines 2-4 and Fig. 1.

a strut having a upper end and a lower end, the upper end fixedly interconnected with the flotation device between the middle section and the rear section of the flotation device;	 (Rorabaugh's FIG. 1)  (WOOLLEY's FIG. 1)	According to Fig. 1 of the RORABAUGH, the stern hydrofoil assembly 11 mounts a downwards-extending from the hydrofoil watercraft like strut also having a upper end and a lower end, the upper end fixedly interconnected with the flotation device between the middle section and the rear section of the flotation device. 10:37-44, and Fig. 1. According to Fig. 1 of the WOOLLEY, the strut 36 providing a suitable distance between the board 20 and planing blade 38 means the strut also having a upper end and a lower end, the upper end fixedly interconnected with the flotation device between the middle section and the rear section of the flotation device. 【0134】 lines 1-4 and Fig. 1.
a hydrofoil fixedly interconnected with the lower end of the strut, the hydrofoil having no movable surface;	 (Rorabaugh's FIG. 1)	According to Fig. 1 of the RORABAUGH, these hydrofoils extend into the water is the same as a hydrofoil fixedly interconnected with the lower end of the strut. 10:37-44, and Fig. 1. According to Fig. 1 of the WOOLLEY, the flying ski also has a hydrofoil fixedly interconnected with the lower end of the strut. According to the basic knowledge,

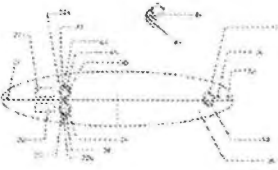
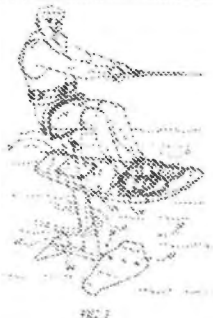
	 (WOOLLEY's FIG. 1)	most of the hydrofoils of the ship are fixed. In other words, the hydrofoil of the hydrofoil watercraft also having no movable surface. 【0143】 lines 8-14.
a propulsion system for propelling the watercraft in a body of water,	 (Rorabaugh's FIG. 1)	According to Fig. 1 of the RORABAUGH, the hydrofoil watercraft also having a propulsion system for propelling the watercraft in a body of water. 8:10-13 and Fig. 1.
wherein the propulsion system is connected to the hydrofoil; and the watercraft having no movable steering system.	 (Rorabaugh's FIG. 1)  (WOOLLEY's FIG. 1)	The of the RORABAUGH shows the propulsion system of hydrofoil watercraft is connected to the hydrofoil. Although the jet ski like Fig 1 is steered by the water flow, the user will also steer by tilting, which may cause difficulty in controlling the jet ski. The flying ski of WOOLLEY illustrates a watercraft having no movable steering system. One of ordinary skill in the art would find it obvious to incorporate the no movable steering system as disclosed by WOOLLEY into RORABAUGH

		in order to stabilize the control system, thereby enhancing stability of the jet ski.
Claim 3 the propulsor is disposed below the hydrofoil.	 (Rorabaugh's FIG. 1)	According to Fig. 1 of RORABAUGH, the propulsor is disposed below the hydrofoil.
Claim 4 the hydrofoil is indirectly connected to the strut.	 (Rorabaugh's FIG. 1)  (WOOLLEY's FIG. 1)	RORABAUGH illustrates the hydrofoil is indirectly connected to the strut. WOOLLEY also illustrates the hydrofoil is indirectly connected to the strut.
Claim 5 the strut is directly connected to the propulsion system.		It can be seen from the figure of RORABAUGH that the strut is directly connected to the propulsion system.

	(Rorabaugh's FIG. 1)	
Claim 6 a first hydrofoil wing of the hydrofoil is indirectly connected to the strut through the propulsion system.	 (Rorabaugh's FIG. 1)	It can be seen from the Fig. 1 of Rorabaugh that the first hydrofoil wing of the hydrofoil is indirectly connected to the strut through the propulsion system.
Claim 7 the hydrofoil comprises a plurality of wings that are interconnected by way of a strut.	 (Rorabaugh's FIG. 1)  (WOOLLEY's FIG. 1)	It can be seen from the Fig. 1 of RORABAUGH or the Fig. 1 of WOOLLEY that the hydrofoil comprises a plurality of wings that are interconnected by way of a strut.
Claim 12 a first hydrofoil wing of the hydrofoil is directly connected to the strut.	 (Rorabaugh's FIG. 1)	As shown in Fig. 1 of RORABAUGH, there is hydrofoil is directly connected to the strut.

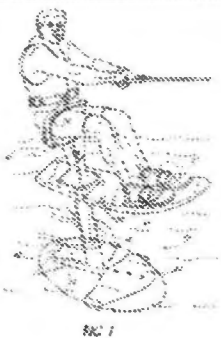
Claim 13 the strut has an internal passage and electrical wires extend from the electric motor to the watertight compartment inside the strut through the internal passage for controlling the electric motor.	 (Rorabaugh's FIG. 1)	Rorabaugh et al. discloses "A straight drive line runs directly from the engine within the demi-hull to a propeller or water jet--making thereby an efficiently short mechanical drive connection." RORABAUGH, 8:10-13. Although the straight drive line is not an electrical wire, it is possible to connect the straight drive line from the engine to the propeller through the strut. In the case of using an electric motor, it is not difficult to imagine that the same can be done for electrical wires.
Claim 15 the propulsion system is directly or indirectly connected to the hydrofoil.	 (Rorabaugh's FIG. 1)	According to Fig. 1 of RORABAUGH, the propulsion system is directly or indirectly connected to the hydrofoil.
Claim 17 the hydrofoil comprises a plurality of hydrofoil wings including the first hydrofoil wing and a second hydrofoil wing, the first and second hydrofoil wings being connected by way of a strut.	 (Rorabaugh's FIG. 1)	From Fig. 1 of the RORABAUGH, two hydrofoil wings being connected by way of a strut.

A substantial new question of the patentability of Claims 1-20 over Woolley in view of Braden (US PG PUB 2011/0111650) under 35 U.S.C. §103.

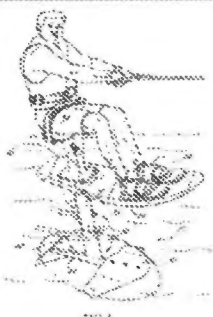
Claims of '659 Patent	Figures of the references	Disclosure of the references and 103 Rejections
Claim 1 A passively stable, weight-shift controlled personal hydrofoil watercraft, comprising:	 (WOOLLEY's FIG. 1)  (BRADEN's FIG. 2)	Fig 1 of the WOOLLEY shows a flying ski being a kind of passively stable, weight-shift controlled personal hydrofoil watercraft. Fig 1 of the BRADEN also shows a powered surfboard being a kind of passively stable, weight-shift controlled personal hydrofoil watercraft.
a flotation device that has a fore-aft length greater than a lateral width,	 (WOOLLEY's FIG. 1)	Fig. 1 of the WOOLLEY also shown the shape of the flying ski is a flotation device that has a fore-aft length greater than a lateral width. 【0102】 lines 2-4 and Fig. 1. Fig. 2 of the BRADEN also shown the shape of the powered surfboard is a flotation device that has a fore-aft length greater than a lateral width.

	 (BRADEN's FIG. 2)	
the flotation device having a top surface and a bottom surface, wherein a user can be disposed on the top surface of the flotation device in a prone, kneeling, or standing position,	 (BRADEN's FIG. 1)	The upper face 22 and a lower face 24 of the flying ski 10 according to the Fig 1 of the WOOLLEY also representing a top surface and a bottom surface, wherein a user can be disposed on the top surface of the flotation device in a prone, kneeling, or standing position 【0102】 lines 2-4 and Fig. 1. As shown as Fig. 1 of the BRADEN, the powered surfboard means a flotation device having a top surface and a bottom surface, wherein a user can be disposed on the top surface of the flotation device in a prone, kneeling, or standing position.
the flotation device having a forward section, a middle section, and a rear section;	 (WOOLLEY's FIG. 1)	The front end 26 and a rear end 28 of the flying ski 10 according to the Fig 1 of the WOOLLEY also representing the flotation device having a forward section, a middle section, and a rear section. 【0102】 lines 2-4 and Fig. 1. As shown as Fig. 1 of the BRADEN, the powered surfboard means a

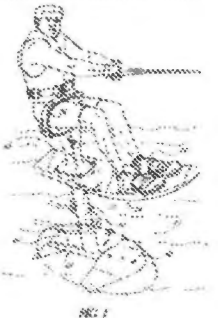
	 1) FIG. 1 (BRADEN's FIG. 1)	flotation device having a forward section, a middle section, and a rear section.
a strut having a upper end and a lower end, the upper end fixedly interconnected with the flotation device between the middle section and the rear section of the flotation device;	 FIG. 1 (WOOLLEY's FIG. 1)  1) FIG. 1 (BRADEN's FIG. 1)	According to Fig. 1 of the WOOLLEY, the strut 36 providing a suitable distance between the board 20 and planing blade 38 means the strut also having a upper end and a lower end, the upper end fixedly interconnected with the flotation device between the middle section and the rear section of the flotation device. 【0134】 lines 1-4 and Fig. 1. The electric motor 12 of the powered surfboard attaches to the bottom of the body 10 near the tail through a motor mount 13 means the strut also having a upper end and a lower end, the upper end fixedly interconnected with the flotation device between the middle section and the rear section of the flotation device. 【0024】 lines 1-3 and Fig. 1.

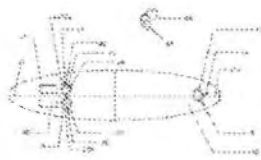
a hydrofoil fixedly interconnected with the lower end of the strut, the hydrofoil having no movable surface;	 (WOOLLEY's FIG. 1)	According to Fig. 1 of the WOOLLEY, the flying ski also has a hydrofoil fixedly interconnected with the lower end of the strut. 【0143】 lines 8-14.
a propulsion system for propelling the watercraft in a body of water,	 (BRADEN's FIG. 1)	Woolley does not expressly disclose a propulsion system for propelling the watercraft in a body of water. Fig. 1 of the BRADEN discloses a propulsion system for propelling the watercraft in a body of water. 【0024】 lines 1-3 and Fig. 1.
wherein the propulsion system is connected to the hydrofoil; and the watercraft having no movable steering system.	 (WOOLLEY's FIG. 1)	One of ordinary skill in the art would find it obvious to incorporate the propulsion system into Woolley in order to enhancing the speed of the watercraft, thereby increasing user's experience of the watercraft. FIG. 1 of WOOLLEY illustrates the watercraft having no movable steering system.
Claim 2 the propulsion system comprises a battery, an electric motor, a motor speed controller, and a propulsor, the propulsor selected from a propeller, a ducted	 (BRADEN's FIG. 1)	Braden et al. discloses "A propeller 11 powered by an electric motor 12 attaches to the bottom of the body 10 near the tail through a motor mount 13." BRADEN, 【0024】 lines 1-3. Braden et al. discloses "Batteries 21

propeller, or a pump-jet.		preferably are rated for marine use with waterproof and explosion-proof casings.” BRADEN, 【0026】 lines 4-6.
Claim 3 the propulsor is disposed below the hydrofoil.	 FIG. 1 (WOOLLEY's FIG. 1)  FIG. 1 (BRADEN's FIG. 1)	When combining Braden's propulsor into Woolley, the propulsor would be disposed below the hydrofoil of Woolley. One of ordinary skill in the art would find it obvious to incorporate the propulsor as disclosed by Braden into Woolley in order to increase the speed of the watercraft.
Claim 4 the hydrofoil is indirectly connected to the strut.	 FIG. 1 (WOOLLEY's FIG. 1)	It can be seen from the WOOLLEY's figure that the hydrofoil is indirectly connected to the strut.

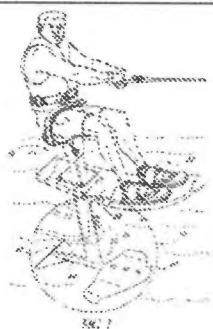
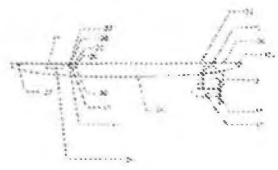
Claim 5 the strut is directly connected to the propulsion system.	 FIG. 1 (BRADEN's FIG. 1)	It can be seen the strut from BRADEN is directly connected to the propulsion system.
Claim 6 a first hydrofoil wing of the hydrofoil is indirectly connected to the strut through the propulsion system.		When combining Braden's propulsor into Woolley, a first hydrofoil wing of the hydrofoil would be indirectly connected to the strut through the propulsion system of Woolley. One of ordinary skill in the art would find it obvious to incorporate the propulsor as disclosed by Braden into Woolley in order to increase the speed of the watercraft.
Claim 7 the hydrofoil comprises a plurality of wings that are interconnected by way of a strut.	 FIG. 1 (WOOLLEY's FIG. 1)	It can be seen from Fig. 1 of WOOLLEY that the hydrofoil comprises a plurality of wings that are interconnected by way of a strut.
Claim 8 the battery and motor speed controller are contained in a watertight compartment integrated into the flotation device.		Braden et al. discloses "Batteries 21 preferably are rated for marine use with waterproof and explosion-proof casings." BRADEN, 【0026】 lines 4-6.

Claim 9 the electric motor is integrated into a waterproof, streamlined pod and the watercraft comprises a cooling system for cooling the electric motor.		Braden et al. discloses “Batteries 21 preferably are rated for marine use with waterproof and explosion-proof casings.”. BRADEN, 【0026】 lines 4-6. It is a basic common sense to protect electrical components by waterproofing. Also, it is common knowledge that motors need to be cooled.
Claim 10 the waterproof, streamlined pod is removably interconnected with the hydrofoil through a fitting.		According to the WOOLLEY description, the hydrofoils are indeed already removably interconnected with the hydrofoil through a fitting. 【0143】 lines 8-14.
Claim 11 a wireless handheld controller having a transmitter, and a throttle interface having a receiver, wherein the transmitter is adapted to send wireless signals to the receiver that cause an output of the propulsion system to change.		Braden et al. discloses “The surfboard may be provided with a wireless control for the electric motor 12”. BRADEN, 【0027】 lines 1-2.

Claim 12 a first hydrofoil wing of the hydrofoil is directly connected to the strut.	 (WOOLLEY's FIG. 1)	The hydrofoil of WOOLLEY is connected to the strut. It is also noted that from the perspective of the claimed structure, it is not enough to have a special effect directly or indirectly to cause patentability.
Claim 13 the strut has an internal passage and electrical wires extend from the electric motor to the watertight compartment inside the strut through the internal passage for controlling the electric motor.	 (BRADEN's FIG. 1)	In BRADEN, its battery is in the surfboard, and the propeller is fixed at the lower end of the strut, so the electrical wires naturally pass through the internal passage of the strut.
Claim 14 the flotation device has a detector adapted to detect a user's presence on the flotation device and cease operation of the electric motor if the detector detects that the user is not on the flotation device.	 (WOOLLEY's FIG. 1)	It is also noted that the mechanism of detecting the user's absence from the watercraft even if it is powered is a commonly known technology and function, which is not enough to be a patentable reason. One of ordinary skill in the art would find it obvious to incorporate the mechanism to detect user's absence into WOOLLEY in order to ensure safety of the device.
Claim 15 the propulsion system is directly or indirectly connected to the hydrofoil.		When combining Braden's propulsor into Woolley, the the propulsion system would be directly or indirectly connected to the hydrofoil of Woolley. One of ordinary skill in the art would

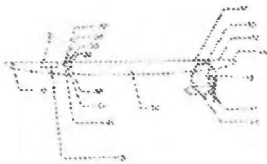
		find it obvious to incorporate the propulsor as disclosed by Braden into Woolley in order to increase the speed of the watercraft.
Claim 16 A personal hydrofoil watercraft	 (WOOLLEY's FIG. 1)  (BRADEN's FIG. 1)	Fig. 1 of the WOOLLEY shows a flying ski being a kind of a personal hydrofoil watercraft. Fig. 1 of the BRADEN shows a powered surfboard also being a kind of a personal hydrofoil watercraft.
a surfboard-shaped flotation device that has a fore-aft length greater than a lateral width,		Fig. 1 of the WOOLLEY also shown the shape of the flying ski is a surfboard-shaped flotation device that has a fore-aft length greater than a lateral width. 【0102】 lines 2-4 and Fig. 1. Fig. 2 of the BRADEN also shown the shape of the powered surfboard is a surfboard-shaped flotation device that has a fore-aft length greater than a lateral width.

the flotation device having a top surface and a bottom surface, wherein the top surface has a substantially horizontal supporting surface configured to support a user in a prone, kneeling, or standing position,	 FIG. 1 (BRADEN's FIG. 1)	The upper face 22 and a lower face 24 of the flying ski 10 according to the Fig. 1 of the WOOLLEY also representing a flotation device having a top surface and a bottom surface, wherein the top surface has a substantially horizontal supporting surface configured to support a user in a prone, kneeling, or standing position. 【0102】 lines 2-4 and Fig. 1. As shown as Fig. 1 of the BRADEN, the powered surfboard means a flotation device having a top surface and a bottom surface, wherein the top surface has a substantially horizontal supporting surface configured to support a user in a prone, kneeling, or standing position.
the flotation device having a forward section, a middle section, and a rear section;	 FIG. 1 (WOOLLEY's FIG. 1)  FIG. 1	The front end 26 and a rear end 28 of the flying ski 10 according to the Fig. 1 of the WOOLLEY also representing the flotation device having a forward section, a middle section, and a rear section. 【0102】 lines 2-4 and Fig. 1. As shown as Fig. 1 of the BRADEN, the powered surfboard means a flotation device having a forward section, a middle section, and a rear

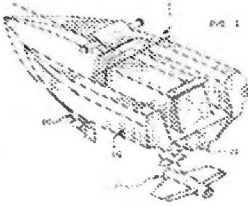
	(BRADEN's FIG. 1)	section.
a hydrofoil interconnected with the surfboard-shaped flotation device, the hydrofoil having a strut and a first hydrofoil wing, an upper end of the strut being fixedly interconnected with the surfboard-shaped flotation device;	 (WOOLLEY's FIG. 1)  (BRADEN's FIG. 1)	According to Fig. 1 of the WOOLLEY, the strut 36 providing a suitable distance between the board 20 and planing blade 38 means the strut also having an upper end and a lower end, the upper end fixedly interconnected with the flotation device between the middle section and the rear section of the flotation device. 【0134】 lines 1-4 and Fig. 1. According to Fig. 1 of the WOOLLEY, the flying ski also has a hydrofoil fixedly interconnected with the lower end of the strut. 【0143】 lines 8-14. The electric motor 12 of the powered surfboard attaches to the bottom of the body 10 near the tail through a motor mount 13 means the strut also having an upper end and a lower end, the upper end fixedly interconnected with the flotation device between the middle section and the rear section of the flotation device. 【0024】 lines 1-3 and Fig. 1.
a propulsion system attached to the surfboard-shaped flotation device for propelling the watercraft in a body of water	 (BRADEN's FIG. 1)	Woolley does not expressly disclose a propulsion system for propelling the watercraft in a body of water. Fig. 1 of the BRADEN discloses a propulsion

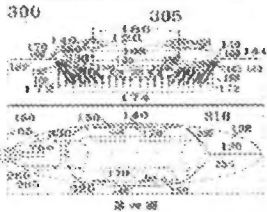
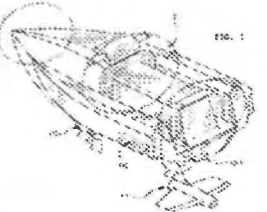
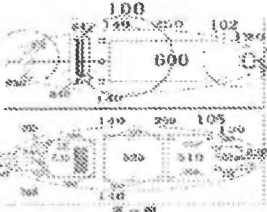
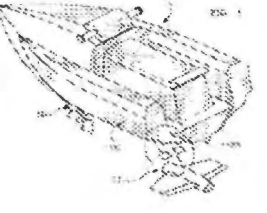
	(BRADEN's FIG. 1)	system for propelling the watercraft in a body of water. 【0024】 lines 1-3 and Fig. 1.
the propulsion system comprising a battery, an electric motor, a motor speed controller, and a propulsor,		BRADEN contains the same propulsion system, and the propulsion system also comprising a battery, an electric motor, a motor speed controller, and a propulsor. 【0026】 lines 4-6, and 【0030】 lines 2-4. One of ordinary skill in the art would find it obvious to incorporate the propulsion system into Woolley in order to enhancing the speed of the watercraft, thereby increasing user's experience of the watercraft.
wherein the propulsor is selected from a propeller, a ducted propeller, or a pump-jet, and the battery and motor speed controller are contained in a watertight compartment integrated into the flotation device;		BRADEN also considers the requirement of waterproofing, and achieves the following description: "the propulsor is selected from a propeller, a ducted propeller, or a pump-jet, and the battery and motor speed controller are contained in a watertight compartment integrated into the flotation device" 【0026】 lines 4-6.

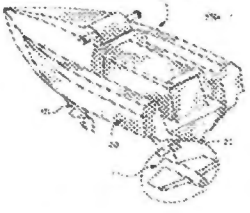
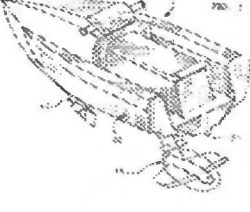
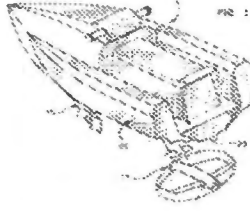
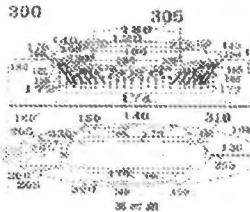
the watercraft having no movable steering system;	 (WOOLLEY's FIG. 1)	The flying ski of WOOLLEY is exactly the watercraft having no movable steering system.
a handheld controller having a throttle; and a throttle interface, wherein the throttle is adapted to send electronic signals to the throttle interface that cause an output of the propulsion system to change.		BRADEN describes about controlling for the electric motor 12, meaning have the functionality described below: "handheld controller having a throttle". 【0027】 lines 1-2.
Claim 17 the hydrofoil comprises a plurality of hydrofoil wings including the first hydrofoil wing and a second hydrofoil wing, the first and second hydrofoil wings being connected by way of a strut.	 (WOOLLEY's FIG. 1)	From Fig. 1 of the WOOLLEY, two hydrofoil wings being connected by way of a strut.
Claim 18 the watercraft comprises a cooling system for cooling the electric motor.		Braden et al. discloses "A source of electrical power provides energy for electric motor 12 to turn the propeller 11". BRADEN, 【0030】 lines 2-4. One of ordinary skill in the art would readily recognize that cooling the electric motor is a basic common

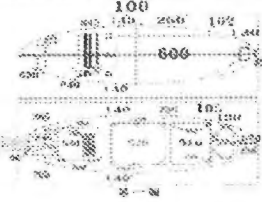
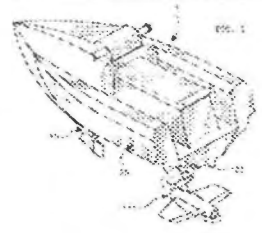
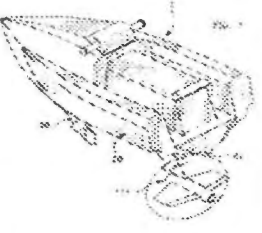
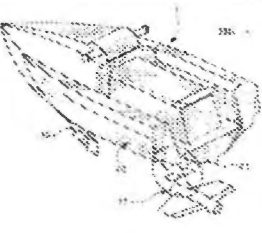
		sense and thus add a cooling device to cool the electric motor.
Claim 19 the strut has an internal passage and electrical wires extend from the electric motor to the watertight compartment inside the strut through the internal passage for controlling electric motor.	 (BRADEN's FIG. 1)	In BRADEN, its battery is in the surfboard, and the propeller is fixed at the lower end of the strut, so the electrical wires naturally pass through the internal passage of the strut.
Claim 20 the handheld controller comprises a wireless transmitter operatively coupled to the throttle and the throttle interface includes a receiver, the transmitter being adapted to send wireless signals to the receiver in response to actuation of the throttle that cause an output of the propulsion system to change.		Braden et al. discloses "The surfboard may be provided with a wireless control for the electric motor 12". BRADEN, 【0027】 lines 1-2.

A substantial new question of the patentability of Claims 1-20 over Rorabaugh in view of Wang (TW201000361A) under 35 U.S.C. §103.

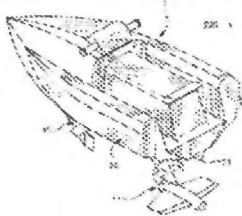
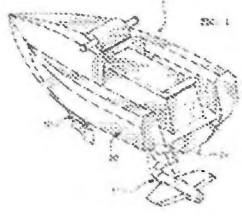
Claims of '659 Patent	Figures of the references	Disclosure of the references and 103 Rejections
Claim 1 A passively stable, weight-shift controlled personal hydrofoil watercraft, comprising:	 (Rorabaugh's FIG. 1)	Fig. 1 of the RORABAUGH shows a motorcycle like Jet Ski. In fact, the Jet Ski is a kind of passively stable, weight-shift controlled personal hydrofoil watercraft. 10:37-44. WANG discloses a power water sports

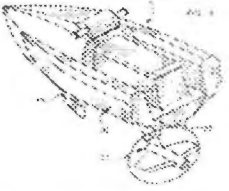
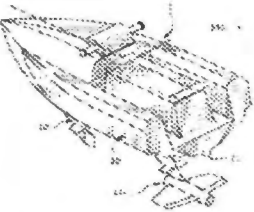
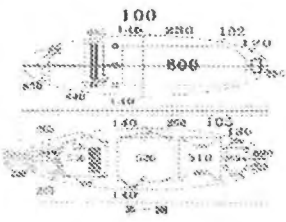
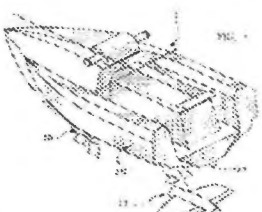
	 (Wang's FIG. 1)	
the flotation device having a forward section, a middle section, and a rear section;	 (Rorabaugh's FIG. 1)  (Wang's FIG. 1)	The Fig 1 of the RORABAUGH shows the hydrofoil watercraft as the flotation device having a forward section, a middle section, and a rear section. The Fig 1 of the WANG also shows the power water sports floating board as the flotation device having a forward section, a middle section, and a rear section.
a strut having a upper end and a lower end, the upper end fixedly interconnected with the flotation device between the middle section and the rear section of the flotation device;	 (Rorabaugh's FIG. 1)	According to Fig. 1 of the RORABAUGH, the stern hydrofoil assembly 11 mounts a downwards-extending from the hydrofoil watercraft like strut also having a upper end and a lower end, the upper end fixedly interconnected with the flotation device between the middle section and the rear section of the flotation device.

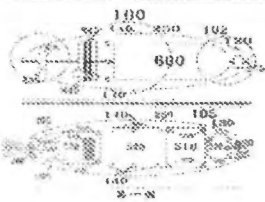
a hydrofoil fixedly interconnected with the lower end of the strut, the hydrofoil having no movable surface;	 (Rorabaugh's FIG. 1)	According to Fig. 1 of the RORABAUGH, these hydrofoils extend into the water is the same as a hydrofoil fixedly interconnected with the lower end of the strut.
a propulsion system for propelling the watercraft in a body of water,	 (Rorabaugh's FIG. 1)	According to Fig. 1 of the RORABAUGH, the hydrofoil watercraft also has a propulsion system for propelling the watercraft in a body of water. 8:10-13 According to the above mention of the WANG also has a propulsion system for propelling the watercraft in a body of water. WANG, Page 6 lines 5-8.
wherein the propulsion system is connected to the hydrofoil; and the watercraft having no movable steering system.	 (Rorabaugh's FIG. 1)  (Wang's FIG. 1)	The of the RORABAUGH shows the propulsion system of hydrofoil watercraft is connected to the hydrofoil. Although the jet ski like Fig 1 is steered by the water flow, the user will also steer by tilting, which may cause difficulty in controlling the jet ski. The flying ski of Wang illustrates a watercraft having no movable steering system. One of ordinary skill in the art would find it obvious to incorporate the no movable steering system as disclosed by Wang into Rorabaugh in order to

		stabilize the control system, thereby enhancing stability of the jet ski.
Claim 2 the propulsion system comprises a battery, an electric motor, a motor speed controller, and a propulsor, the propulsor selected from a propeller, a ducted propeller, or a pump-jet.	 (Wang's FIG. 1)	Wang discloses the propulsion system comprises a battery, an electric motor, a motor speed controller, and a propulsor, the propulsor selected from a propeller, a ducted propeller, or a pump-jet. Page 13 lines 13-16, page 16 lines 4-5, page 16 lines 14-15, and page 16 line 28.
Claim 3 the propulsor is disposed below the hydrofoil.	 (Rorabaugh's FIG. 1)	According to Fig. 1 of RORABAUGH, the propulsor is disposed below the hydrofoil.
Claim 4 the hydrofoil is indirectly connected to the strut.	 (Rorabaugh's FIG. 1)	It can be seen from the RORABAUGH's figure that the hydrofoil is indirectly connected to the strut.
Claim 5 the strut is directly connected to the propulsion system	 (Rorabaugh's FIG. 1)	It can be seen the strut from RORABAUGH is directly connected to the propulsion system.

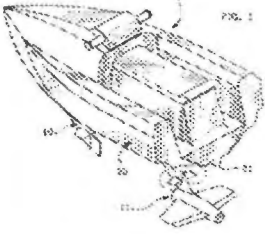
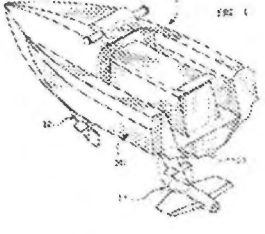
Claim 6 a first hydrofoil wing of the hydrofoil is indirectly connected to the strut through the propulsion system.	 (Rorabaugh's FIG. 1)	It can be seen from the Fig. 1 of Rorabaugh that the first hydrofoil wing of the hydrofoil is indirectly connected to the strut through the propulsion system.
Claim 7 the hydrofoil comprises a plurality of wings that are interconnected by way of a strut.	 (Rorabaugh's FIG. 1)	It can be seen from Fig. 1 of RORABAUGH that the hydrofoil comprises a plurality of wings that are interconnected by way of a strut.
Claim 8 the battery and motor speed controller are contained in a watertight compartment integrated into the flotation device.		Wang discloses "Lock each cabin and the bottom 130 of the board for water sports to prevent water leakage and protect the equipment or equipment in the cabin from damage" WANG, Page 14 lines 25-27.
Claim 9 the electric motor is integrated into a waterproof, streamlined pod and the watercraft comprises a cooling system for cooling the electric motor.		Wang discloses "Lock each cabin and the bottom 130 of the board for water sports to prevent water leakage and protect the equipment or equipment in the cabin from damage" WANG, Page 14 lines 25-27.
Claim 10 the waterproof, streamlined pod is removably interconnected with the hydrofoil through a fitting.		Although only RORABAUGH mentions hydrofoil, whether hydrofoil can be disassembled is purely an easily associative technology, which is not enough to be patentable.
Claim 11 a wireless handheld controller		Both RORABAUGH and WANG have underwater power. In fact, both

having a transmitter, and a throttle interface having a receiver, wherein the transmitter is adapted to send wireless signals to the receiver that cause an output of the propulsion system to change.		underwater power must have a throttle valve and its control method. Therefore, only describing the general relationship between the controller, throttle valve, and propeller cannot constitute Patentability. Even if the description of wireless control is added, it is only common knowledge.
Claim 12 a first hydrofoil wing of the hydrofoil is directly connected to the strut	 (Rorabaugh's FIG. 1)	As shown in Fig. 1 of RORABAUGH, there is hydrofoil is directly connected to the strut.
Claim 13 the strut has an internal passage and electrical wires extend from the electric motor to the watertight compartment inside the strut through the internal passage for controlling the electric motor.	 (Rorabaugh's FIG. 1)	Although the straight drive line of the RORABAUGH is not an electrical wire, it is possible to connect the straight drive line from the engine to the propeller through the strut. In the case of using an electric motor, it is not difficult to imagine that the same can be done for electrical wires. 8.10-13.
Claim 14 the flotation device has a detector adapted to detect a user's presence on the flotation device and cease operation of the electric motor if the detector detects that the user is not on the flotation device		The function of cease operation of the electric motor if the detector detects that the user is not on the flotation device has been specifically described in the WANG case. Page 16 line 19.

Claim 15 the propulsion system is directly or indirectly connected to the hydrofoil.	 (Rorabaugh's FIG. 1)	According to Fig. 1 of RORABAUGH, the propulsion system is directly or indirectly connected to the hydrofoil.
Claim 16 A personal hydrofoil watercraft	 (Rorabaugh's FIG. 1)  (Wang's FIG. 1)	Fig 1 of the RORABAUGH shows a motorcycle like Jet Ski. In fact, the Jet Ski is a kind of a personal hydrofoil watercraft. 10:37-44. WANG is a power water sports floating board, equivalent to a personal hydrofoil watercraft.
a surfboard-shaped flotation device that has a fore-aft length greater than a lateral width,	 (RORABAUGH's FIG. 1)	Although RORABAUGH is not surfboard-shaped, it is not difficult to associate with the teaching of WANG. It also has a fore-aft length greater than a lateral width. Fig. 1 of the Wang also shown the shape of the power water sports floating board is a surfboard-shaped flotation device that has a fore-aft length greater than a lateral width.

	 (Wang's FIG. 1)	forward section, a middle section, and a rear section.
a hydrofoil interconnected with the surfboard-shaped flotation device, the hydrofoil having a strut and a first hydrofoil wing, an upper end of the strut being fixedly interconnected with the surfboard-shaped flotation device;	 (RORABAUGH's FIG. 1)  (RORABAUGH's FIG. 1)	According to Fig. 1 of the RORABAUGH, the stern hydrofoil assembly 11 mounts a downwards-extending from the hydrofoil watercraft like strut of the flotation device 10:37-44. According to Fig. 1 of the RORABAUGH, these hydrofoils extend into the water is the same as a hydrofoil fixedly interconnected with the lower end of the strut. 10:37-44.
a propulsion system attached to the surfboard-shaped flotation device for propelling the watercraft in a body of water	 (RORABAUGH's FIG. 1)	According to Fig. 1 of the RORABAUGH, the hydrofoil watercraft also has a propulsion system for propelling the watercraft in a body of water. 8:10-13. According to the above mention of the WANG also has a propulsion system attached to the surfboard-shaped flotation device for propelling the watercraft in a body of water. Page 6 lines 5-8.

the propulsion system comprising a battery, an electric motor, a motor speed controller, and a propulsor, wherein the propulsor is selected from a propeller, a ducted propeller, or a pump-jet, and the battery and motor speed controller are contained in a watertight compartment integrated into the flotation device;		Rorabaugh does not expressly disclose these limitations. However, Wang in page 14 lines 20-21, page 14 lines 25-27, page 16 lines 4-5, page 16 lines 14-15, and page 16 line 28 disclose the limitations. One of ordinary skill in the art at the time of invention would find it obvious to incorporate an electric motor as disclosed by Wang into Rorabaugh's watercraft in order to enhance the speed of the watercraft. Also, it would have been obvious to add a battery, a motor speed controller, and a propulsor in the arrangement similarly as disclosed by Wang, thereby allowing implementation of the watercraft.
the watercraft having no movable steering system;	(Wang's FIG. 1)	The power water sports floating board of WANG is exactly the watercraft having no movable steering system.
a handheld controller having a throttle; and a throttle interface, wherein the throttle is adapted to send electronic signals to the throttle interface that cause an output of the propulsion system to change.		Wang discloses "Acceleration sensing line 845 on the board 250 for water sports, its main purpose is to do induction mode with feet and/or with a certain part of the body and/or wearing some kind of sensing device, is to control the power of the present invention. The speed of the movable

		board 250 (low speed 850, medium speed 860, high speed 870)” WANG, Page 13 lines 13-16.
Claim 17 the hydrofoil comprises a plurality of hydrofoil wings including the first hydrofoil wing and a second hydrofoil wing, the first and second hydrofoil wings being connected by way of a strut.	 (RORABAUGH's FIG. 1)	From Fig. 1 of the RORABAUGH, two hydrofoil wings being connected by way of a strut.
Claim 18 the watercraft comprises a cooling system for cooling the electric motor.		Wang discloses “Electric motor 700 commonly known as an electric engine, is the main kinetic energy for generating rotational power source” WANG, Page 16 lines 14-15. One of ordinary skill in the art would readily recognize that cooling the electric motor is a basic common sense and thus add a cooling device to cool the electric motor.
Claim 19 the strut has an internal passage and electrical wires extend from the electric motor to the watertight compartment inside the strut through the internal passage for controlling electric motor.	 (RORABAUGH's FIG. 1)	Although the straight drive line of the RORABAUGH is not an electrical wire, it is possible to connect the straight drive line from the engine to the propeller through the strut. In the case of using an electric motor, it is not difficult to imagine that the same can be done for electrical wires. 8, 10-13.

Claim 20 the handheld controller comprises a wireless transmitter operatively coupled to the throttle and the throttle interface includes a receiver, the transmitter being adapted to send wireless signals to the receiver in response to actuation of the throttle that cause an output of the propulsion system to change.		Both RORABAUGH and WANG have underwater power. In fact, both underwater power must have a throttle valve and its control method. Therefore, only describing the general relationship between the controller, throttle valve, and propeller cannot constitute Patentability.
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As a third-party requester, I certify that the statutory estoppel provisions of 35 U.S.C. 315(e)(1) or 35 U.S.C. 325(e)(1) do not prohibit me from filing this *ex parte* reexamination request.

Conclusion

For the reasons given above, reexamination of claims 1-20 of U.S. Patent 9,586,659 B2 is requested.

Respectfully submitted,
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 Bayramoglu Law Offices LLC
 Date: 08/01/2023



US009586659B2

(12) **United States Patent**
Langelaan

(10) **Patent No.:** **US 9,586,659 B2**
(45) **Date of Patent:** ***Mar. 7, 2017**

(54) **POWERED HYDROFOIL BOARD**

USPC 114/74
See application file for complete search history.

(71) Applicant: **Jacob Willem Langelaan**, State
College, PA (US)

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(72) Inventor: **Jacob Willem Langelaan**, State
College, PA (US)

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(*) Notice: Subject to any disclaimer, the term of this
patent is extended or adjusted under 35
U.S.C. 154(b) by 0 days.

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This patent is subject to a terminal dis-
claimer.

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(21) Appl. No.: **15/064,521**

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(22) Filed: **Mar. 8, 2016**

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(Continued)

(65) **Prior Publication Data**

US 2016/0185430 A1 Jun. 30, 2016

Related U.S. Application Data

(63) Continuation of application No. 14/509,289, filed on
Oct. 8, 2014, now Pat. No. 9,359,044.
(Continued)

Primary Examiner — Lars A Olson
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Woessner, P.A.

(51) **Int. Cl.**

B63B 35/79 (2006.01)
B63B 1/24 (2006.01)
B63H 11/04 (2006.01)
B63H 1/16 (2006.01)
B63H 21/17 (2006.01)

(Continued)

(57) **ABSTRACT**

A passively stable personal hydrofoil watercraft that has a flotation device, wherein a user can ride in a prone, kneeling, or standing position. The watercraft includes a strut having an upper end interconnected with the flotation device and lower end connected with a hydrofoil. The hydrofoil greatly reduces the power required to travel at higher speed. The watercraft also includes a propulsion system connected to the hydrofoil. Both longitudinal and directional control of the watercraft is via weight shift, eliminating the need of any movable surfaces. The flotation device, strut, and hydrofoil may be permanently interconnected or may be detachable.

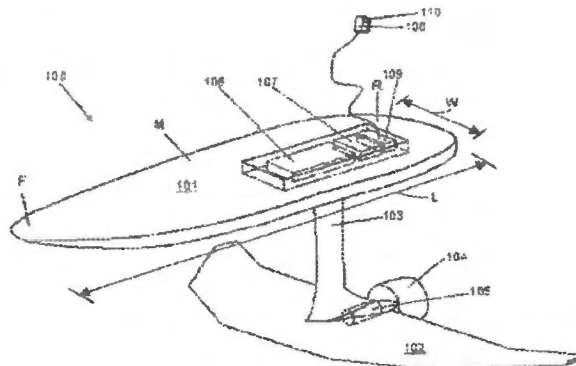
(52) **U.S. Cl.**

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(58) **Field of Classification Search**

CPC **B63B 1/248**

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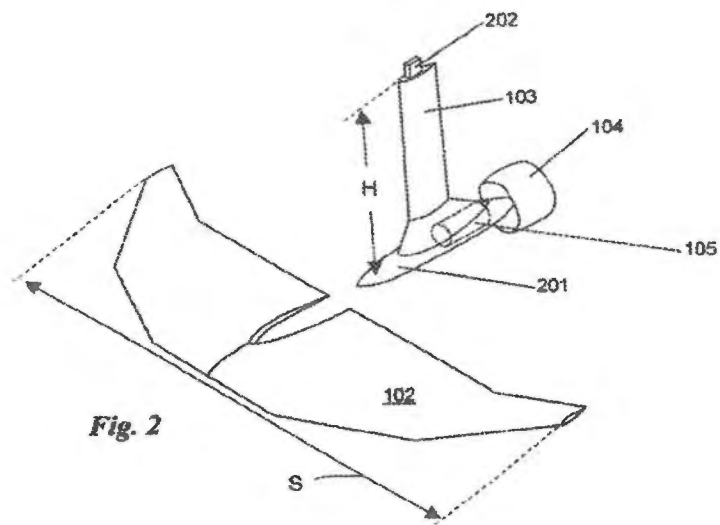
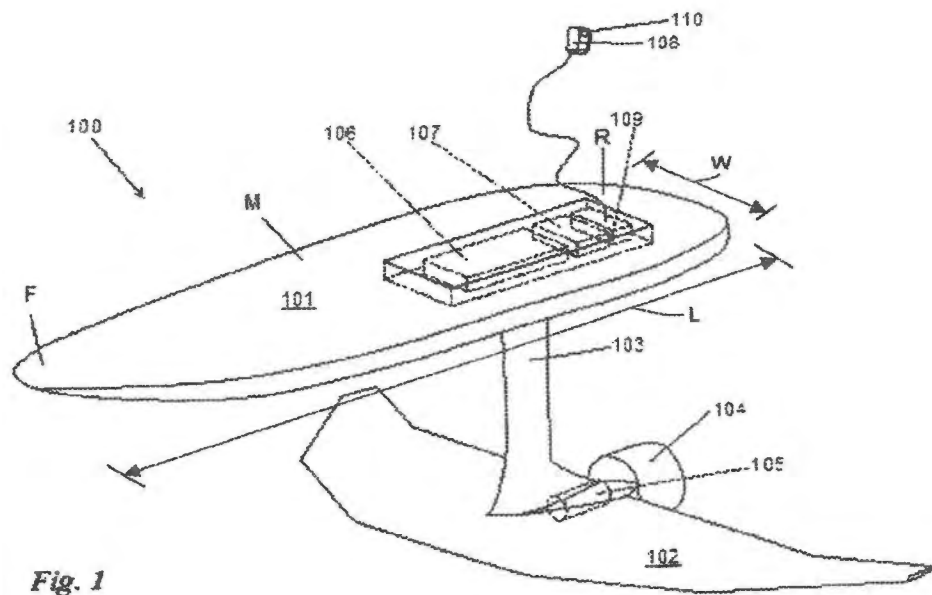
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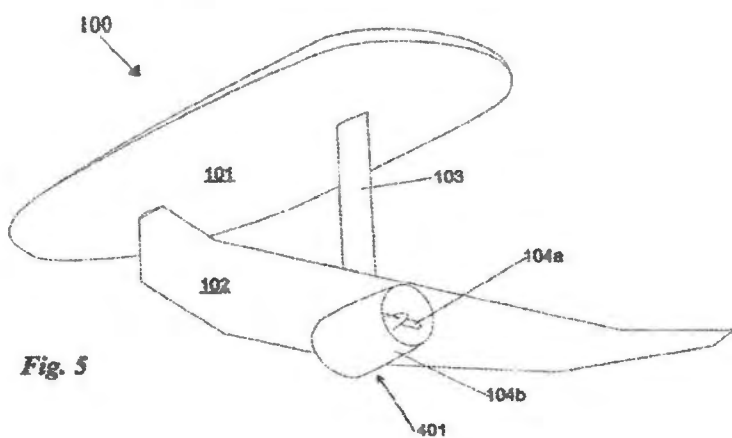
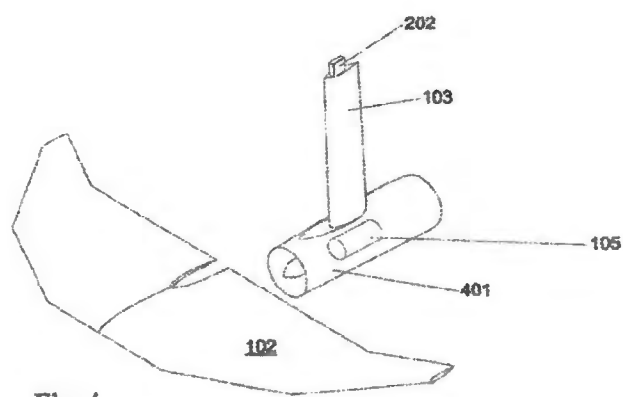
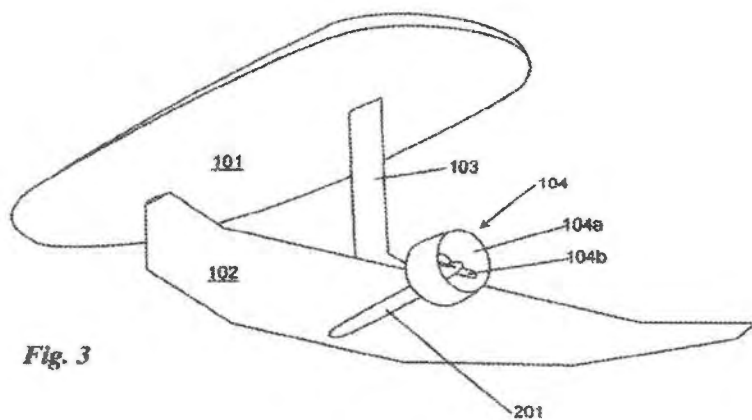
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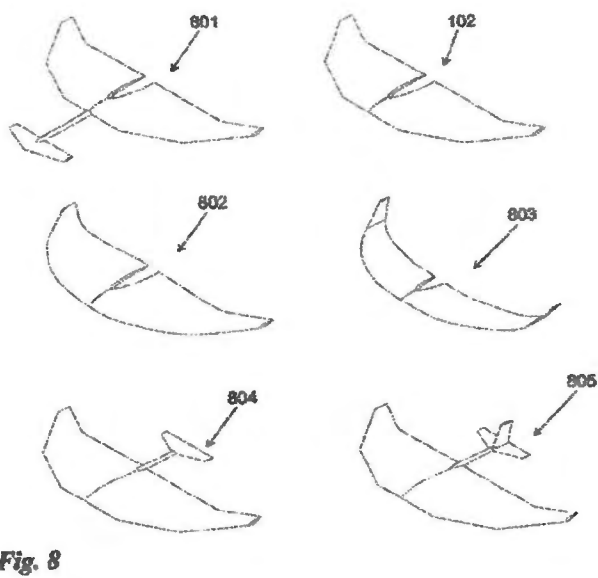
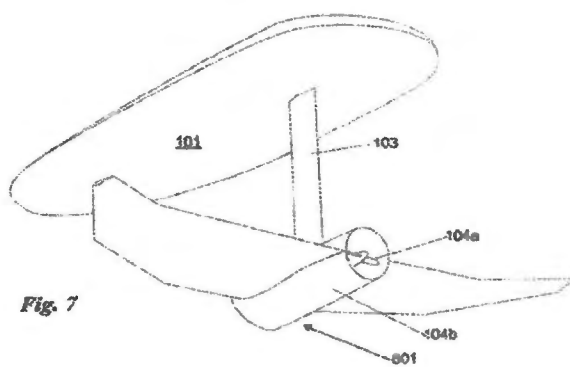
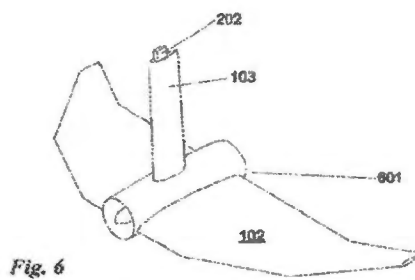
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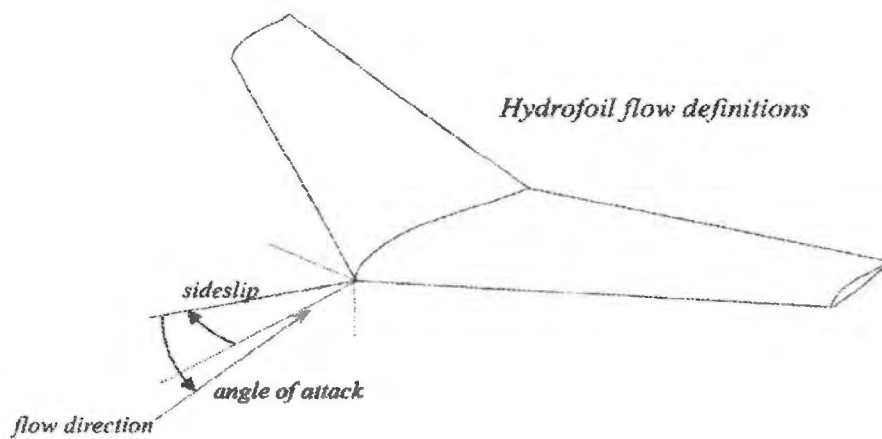
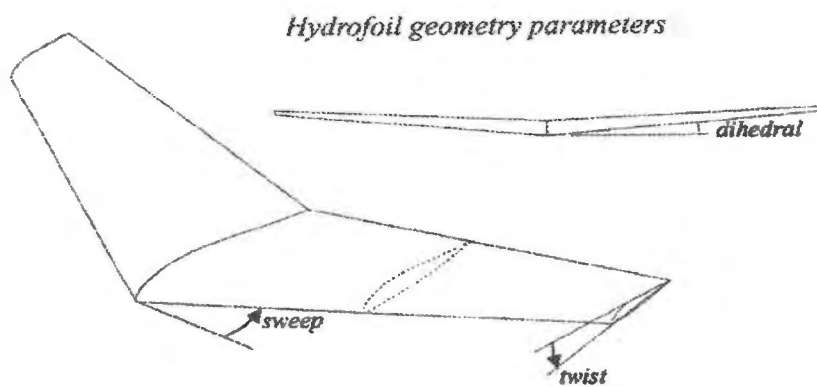
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**Fig. 9****Fig. 10**

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POWERED HYDROFOIL BOARD**CROSS-REFERENCE TO RELATED APPLICATION**

This application is a continuation of U.S. Ser. No. 14/509,289, filed Oct. 8, 2014, which claims priority to U.S. Provisional Patent Application Ser. No. 61/889,071, filed Oct. 10, 2013, the contents of which are incorporated herein in their entireties.

FIELD OF THE INVENTION

The present invention relates to personal watercraft; specifically, an electrically powered hydrofoil surfboard that is controlled by weight shift.

BACKGROUND OF THE INVENTION

Hydrofoils have been used on surfboards (U.S. Pat. No. 5,062,378 A. Bateman; U.S. Pat. No. 3,747,138, Morgan; U.S. Pat. No. 7,144,285 B1, Tareah), sailboards (U.S. Pat. No. 4,508,046 Shannon), water skis (U.S. Pat. No. 7,232,355, Woolley), and devices for swimmers (U.S. Pat. No. 2,931,332, Hebrank) as well as ships and boats (e.g. U.S. Pat. No. 3,227,123 A Voigt). The purpose of hydrofoils on surfboards is typically to enable higher speeds and to lift the surfboard above the choppy, turbulent surface of the water, thus enabling surfing on larger waves. On sailboards and kiteboards, hydrofoils enable higher speeds; and on water skis hydrofoils enable new forms of trick skiing.

Powered surfboards have been developed for reducing the effort required in paddling (U.S. Pat. No. 7,731,555 B2 Railey) and as personal watercraft (U.S. Pat. No. 6,702,634 B2 Jung, U.S. Pat. No. 3,262,413 A Bloomingdale et al., U.S. Pat. No. 6,192,817 B1 Dec, U.S. Pat. No. 4,971,586 A Walsh, U.S. Pat. No. 4,274,357 A Dawson). A particularly well-designed example of this type is the Jet-Surf (<http://www.jet-surfs.com>). However, significant power is required to achieve speeds typical of surfing (up to ten horsepower to achieve thirty miles per hour), precluding the use of battery-powered motors for operationally useful periods.

A major factor that distinguishes surfboards from other watercraft is that control (both speed and directional) is affected via weight shift rather than by moveable surfaces (such as rudders) or thrust vectoring. Indeed, other methods of transport (skateboards and snowboards) also rely heavily on weight shift, and this method of control is central to the experience of surfing, snowboarding, and skateboarding.

An electrically powered hydrofoil device is described in Chen (U.S. Pat. No. 7,047,901 B2). The watercraft in that disclosure has two main disadvantages. First, the device in Chen requires a stabilizing component that controls the depth of the hydrofoil. Second, a steering mechanism is used for directional control. Therefore it does not (and cannot) accurately mimic the experience of surfing or snowboarding.

A need therefore exists for a personal watercraft that provides improved control and performance while providing a "surfing feel." In addition, this personal watercraft should be mechanically simple, easy to transport, and easy to maintain.

SUMMARY OF THE INVENTION

Embodiments of the present invention improve upon the powered surfboard by incorporating a hydrofoil. The hydrofoil greatly reduces the power required to travel at "fun"

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speeds (ranging from twenty to thirty miles per hour, but can be higher or lower depending on the user), so that a battery-powered electric motor (rather than an internal combustion engine) can be used to power the propulsion system. This results in reduced noise and vibration as well as reduced environmental impact.

Embodiments of the present invention also improve upon the powered hydrofoil surfboard. The hydrofoil of the present invention has been designed to provide passive stability in the longitudinal direction, making traditional altitude control systems based on moveable surfaces unnecessary. Further, both longitudinal and directional control of the board is via weight shift, so that riding the board is similar in feel to surfing or snowboarding, and the lack of a mechanical steering system makes the craft lighter, reduces parts count, and reduces the likelihood of a mechanical failure. Speed control is provided through a combination of throttle and weight shift.

The prior art in powered hydrofoil surfboards have all relied on moveable surfaces for control, and have ignored the possibility of designing the hydrofoil for passive static stability. The watercraft of the present invention is specifically designed to achieve desired levels of stability and controllability without the need for moveable surfaces. This is done through a combination of airfoil design, planform design, and tailoring the span-wise twist distribution to achieve desired outcomes.

Specific hydrofoils can be designed for different purposes: a larger foil results in lower speeds, more suitable for training; smaller foils operate at higher speeds for more advanced user; and tuning of the specific profile, twist, and dihedral can also be used to tailor the board to the user. A fixed canard or horizontal tail surface can also be added to further improve passive longitudinal stability as a training aid while still requiring the use of weight shift for control. A fixed vertical tail can be added to improve lateral stability as a training aid while still requiring the use of weight shift for control.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a personal hydrofoil watercraft in accordance with the present invention;

FIG. 2 is an exploded perspective view showing one embodiment of the hydrofoil and propulsion system assembly;

FIG. 3 is a perspective view from underneath a personal hydrofoil watercraft in accordance with the present invention;

FIG. 4 is an exploded perspective view showing an alternate embodiment of the hydrofoil and propulsion system assembly;

FIG. 5 is a perspective view from underneath a personal hydrofoil watercraft with the hydrofoil and propulsion system of FIG. 4;

FIG. 6 is a perspective view of an embodiment of the hydrofoil and propulsion system as an integrated body;

FIG. 7 is a perspective view from underneath a personal hydrofoil watercraft with the hydrofoil and propulsion system of FIG. 6;

FIG. 8 shows perspective views of alternate examples of hydrofoil planform designs;

FIG. 9 is a schematic illustrating hydrofoil flow definitions; and

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FIG. 10 is a schematic showing hydrofoil geometry parameters

DETAILED DESCRIPTION OF THE INVENTION

Referring to FIG. 1, a perspective view of a hydrofoil watercraft 100 in accordance with an embodiment of the present invention is shown. Watercraft 100 may include a flotation board 101, a hydrofoil 102 spaced below the flotation board, a strut 103 connecting the hydrofoil to the board, a propulsion system 104, an electric motor 105, a battery 106, a motor speed controller 107, a throttle system 108, a throttle interface 109, and a spring-loaded trigger 110.

The flotation board 101 of FIG. 1 is similar to those used in surfing or sailboarding. In the illustrated embodiment, the flotation board has a fore-aft length L that is greater than its lateral width W. Generally, the ratio of lateral width W to length L may be between 0.2 and 0.5. The length L will generally be in the range of 5 to 8 feet and the width W will generally be in the range of 1.5 to 2 feet. The primary function of the flotation board is to provide flotation at low speeds, and it is preferentially configured with a flat upper surface to allow an adult human to lie prone, sit, kneel or stand on it and an opposed bottom surface facing the water. The lower surface may be almost flat to permit good hydroplaning.

The flotation board 101 can be made of foam, fiber-reinforced epoxy (using glass, carbon, or Kevlar fibers), or other suitable materials known to those of skill in the art. It may have a watertight compartment defined therein to contain the battery 106, motor speed controller 107 and throttle interface 109. The flotation board 101 provides an attachment structure for attaching the strut 103. The attachment structure may be a releasable mechanism to permit easy assembly and dis-assembly for transport. The flotation board 101 may be said to have a forward section F at the front end, a rear section R at the rear end and a middle section M intermediate the front and rear ends. Element M may also represent a midpoint that is halfway between the front and rear ends. As shown, the strut 103 is connected to the flotation board between the middle section M and the rear section R. The connection is behind the midpoint M and centered side to side. A throttle cable may connect the throttle module 108 to the throttle interface 109 or wireless communication may be provided between the throttle module 108 and throttle interface 109. In an alternate arrangement, the batteries 106 may be contained in the strut 103 or embedded in the hydrofoil 102. Each configuration has advantages and disadvantages ranging from ease of access for charging (in the case of a compartment in the flotation board) to reduction in the length of wires needed to connect the battery to the motor (in the case of containment in the strut or hydrofoil).

The strut 103 can be made of extruded aluminum, fiber-reinforced epoxy (using glass, carbon, or Kevlar fibers), or other suitable materials known to those of skill in the art. As shown, the strut is streamlined in cross-section to minimize drag. The strut may be constructed so as to allow passage of electrical wires from the motor speed controller 107 to the electric motor 105, such as inside or attached to the strut. The primary function of the strut is to rigidly connect the hydrofoil 102 at a fixed distance H from the board 101. The distance H will generally be in the range of 1 to 4 feet. In an alternative embodiment, more than one strut may be used or the strut may be shaped differently than shown.

The hydrofoil 102 of FIG. 1 is specifically designed to be statically stable in the longitudinal degrees of freedom via a

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combination of airfoil design, planform design and spanwise twist distribution. The hydrofoil 102 has a wingspan S (see FIG. 2). The wingspan will generally be in the range of 1 to 4 feet. It is also designed to be stable in sideslip ("weathercock stability") either via planform design or via the addition of small vertical foils (winglets or fins). In some cases it may be advantageous to add a fixed canard or horizontal tail to further enhance static longitudinal stability (for example, for training purposes). The fixed distance H (see FIG. 2) of the strut 103 may be greater than the wingspan S of the hydrofoil 102 so that the hydrofoil remains fully submerged even when the user is leaning to turn.

The propulsion system 104 (discussed in more detail below) may comprise a ducted propeller or pump-jet, or may be of another type. The propulsion system is driven by the electric motor 105.

The electric motor 105 is connected to the motor speed controller 107 using wires sized to carry the required voltage and current. The motor speed controller 107 may include other functionality such as a low-voltage alarm or other protective circuitry for the battery 106; alternately, such circuitry may be included in the throttle interface 109. The main function of the throttle interface is to connect the motor speed controller 107 to the throttle module 108.

The throttle module 108 may be a hand-held device with a spring-loaded trigger 110 (so the throttle disengages automatically when it is released). Pulling or depressing the trigger causes the motor to turn a propeller or impeller in the propulsion system 104, with motor speed being proportional to the degree the trigger is pulled or depressed. The throttle module communicates the degree of trigger pull/depression to the throttle interface 109 via a cable or wirelessly. The throttle module may take other forms, such as being operated by other body parts.

The throttle interface 109 may in addition include circuitry and connections to permit charging of the battery 106. This would include battery protection circuits. The throttle interface may also include a means to display battery information to the user (for example, via LEDs to indicate charge state). Alternately, such information may be displayed on the throttle module 108.

To operate the watercraft 100, a user initially lies prone on the flotation board 101. The throttle is engaged, causing the craft to accelerate. As the craft gains speed the user may move to a kneeling or standing position. As the craft further gains speed the hydrofoil generates sufficient lift to raise the board above the water. The user controls altitude of the board by leaning back (to go up) and forward (to go down). The user can steer left or right by leaning in the appropriate direction. Releasing the throttle causes the motor to stop, reducing speed. The watercraft 100 may have other safety devices and features which causes the electric motor 105 to stop when the rider falls off the flotation board 101. These devices may monitor the presence of a user on the flotation board 101.

FIG. 2 shows an exploded perspective view of one embodiment of the hydrofoil 102, strut 103, propulsion system 104, and electric motor 105. The electric motor 105 and propulsion system 104 are integrated into a waterproof, streamlined pod 201 that is designed to be embedded in the hydrofoil 102. The pod 201 also defines the lower end of the strut 103. The streamlined pod performs two main structural functions: it transmits propulsion forces to the strut 103 and it transmits lift forces from the hydrofoil 102 to the strut 103. It may also contain provisions for cooling the electric motor 105. The pod 201 is connected to the hydrofoil 102 either by

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a fitting (so that the hydrofoil can be easily removed) or it is integrally manufactured with the hydrofoil 102.

In its preferential form the electric motor 105 is a high efficiency brushless motor. A gearbox may be provided to ensure that the propeller or impeller of the propulsion system 104 operates over an appropriate range of speeds.

The strut 103 contains at its upper end a fitting 202 to attach the strut to the flotation board 101 of FIG. 1. This fitting fits into a complementary slot in flotation board 101 and may use one of several methods to attach the strut 103 to the flotation board 101: examples include bolts, pins, or latches. Any other attachment approach may be used, or the strut and/or foil and/or flotation board may be integrally formed or permanently interconnected.

FIG. 3 shows a perspective view of the watercraft 100 from below. In its preferred form the propulsion system 104 comprises a propeller 104a and a duct 104b. The duct has two purposes: it acts as a propeller guard and it is designed to increase propeller thrust. In an alternate form the propulsion system may comprise a pump-jet.

FIG. 4 shows an exploded perspective view of an alternative embodiment of the hydrofoil 102, strut 103, electric motor 105 and propulsion system 401. In this embodiment the propulsion system comprises a long duct and may contain a stator assembly. The duct functions both as a guard for the propeller (shown in FIG. 3) and to improve hydrodynamic efficiency. A stator (not shown) aft of the propeller can also be included to improve propulsive efficiency. In this embodiment the electric motor 105 is enclosed in a streamlined pod embedded in the propulsion system. In the embodiment of FIG. 4, the propulsion system is mounted below the hydrofoil 102. FIG. 5 shows a perspective view of the watercraft 100 from below with the propulsion system 401 mounted below the hydrofoil 102.

FIG. 6 shows a perspective view of an alternative embodiment of the hydrofoil 102, strut 103, and propulsion system 601. In this embodiment the propulsion system is integrated in the hydrofoil so that the inlet is at or near the forward (leading) edge of the hydrofoil and the outlet is at or near the rear (trailing) edge of the hydrofoil. As in the embodiments of FIG. 2, FIG. 3, FIG. 4 and FIG. 5, the propulsion system comprises a duct, a propeller, electric motor, and may include a stator.

FIG. 7 shows a perspective view of the watercraft 100 from below with the propulsion system of FIG. 6 integrated in the hydrofoil.

FIG. 8 shows perspective views of alternative embodiments of the hydrofoil planform. Hydrofoil 801 includes a fixed canard that increases stability (suitable for training). Note that this canard is fixed, not movable: control still occurs through weight shift. Hydrofoil 102 is shown in earlier drawings, and can be considered a baseline "all around" hydrofoil (suitable for a wide range of abilities). Foils 802 and 803 are progressively higher performance, permitting higher speeds and/or greater maneuverability. Foil 803 includes winglets, which increase directional stability and decrease drag. Foil 804 includes a horizontal tail, which improves longitudinal stability (similar to 801, it is suitable for training). Foil 805 includes both a horizontal tail and a vertical tail, improving longitudinal stability and directional stability (suitable for training). These tails may be considered a secondary hydrofoil. Note that other versions of the hydrofoil are possible: the key is designing the hydrofoil for passive static stability via planform design, airfoil design, and span-wise twist distribution.

Preferred embodiments of the present invention provide a hydrofoil watercraft with a fixed hydrofoil connected to a

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flotation board by one or more struts, with the fixed hydrofoil having no movable or adjustable surfaces. No movable hydrofoil is provided, but secondary hydrofoils on one or more struts (as shown in 801, 804, and 805) may be included. Additionally, no movable steering system is provided, as the watercraft is maneuvered by weight shifts.

This invention exploits passive stability to obviate the necessity for mechanisms or active control systems to provide stability. This passive stability allows the watercraft to be controlled by weight shift rather than by mechanical systems. FIG. 9 and FIG. 10 show the hydrofoil flow definitions and hydrofoil geometry parameters respectively. For the hydrofoil, longitudinally trimmed motion occurs when the total pitching moment is zero. This trim condition is stable if a disturbance results in a restoring moment that returns the hydrofoil to its original condition. The pitching moment coefficient can be written as $C_m = C_{m0} + C_{m\alpha} \alpha + C_{m\dot{\alpha}} \dot{\alpha}$ where C_{m0} is the pitching moment coefficient at zero angle of attack and zero pitch rate, $C_{m\alpha}$ is the derivative of pitching moment coefficient with respect to angle of attack (called pitch stiffness), α is the angle of attack (the angle between the flow direction and the chord of the hydrofoil), $C_{m\dot{\alpha}}$ is the derivative of pitching moment coefficient with respect to pitch rate (called pitch damping), and $\dot{\alpha}$ is the pitch rate. To ensure a trimmable, stable hydrofoil, the following conditions must be true: $C_{m0} > 0$, $C_{m\alpha} < 0$, $C_{m\dot{\alpha}} < 0$. This is achieved with a combination of airfoil selection, hydrofoil sweep and span-wise twist. The exact ratios of wing sweep and twist are dependent on the degree of stability desired and are also affected by the pitching moment characteristics of the airfoil. The derivative $C_{m\dot{\alpha}}$ determines the "quickness" of the longitudinal response. Typically it will lie between -2 and -20 , with more negative values leading to a "sluggish" feel. In the steady state (when $\dot{\alpha} = 0$) the angle of attack (and thus speed) at which trim occurs is a function of C_{m0} and $C_{m\alpha}$.

$$\alpha_{trim} = -\frac{C_{m0}}{C_{m\alpha}}$$

C_{m0} is defined entirely by hydrofoil design parameters; $C_{m\alpha}$ is defined by a combination of hydrofoil design parameters and the location of the center of gravity: this is the means by which weight shift enables longitudinal control of the hydrofoil watercraft.

Similarly for lateral motion, trim occurs when the yawing moment and rolling moment are zero. It is further desirable that this occurs at zero sideslip angle, so the hydrofoil "tracks straight" through the water. When the yaw rate is zero, rolling moment coefficient and yawing moment coefficient can be written as

$$C_l = C_{l0} + C_{l\beta} \beta + C_{l\dot{\beta}} \dot{\beta}$$

$$C_n = C_{n0} + C_{n\beta} \beta + C_{n\dot{\beta}} \dot{\beta}$$

where C_{l0} and C_{n0} are the roll rate and yaw rate at zero sideslip, respectively, $C_{l\beta}$ and $C_{n\beta}$ are the derivatives of roll rate and yaw rate with respect to sideslip angle, respectively, $C_{l\dot{\beta}}$ and $C_{n\dot{\beta}}$ are the derivatives of roll rate and yaw rate with respect to roll rate, respectively. Note that $C_{n\beta}$ is sometimes called weathercock stiffness and $C_{l\dot{\beta}}$ is sometimes called roll damping. Trimmable, stable motion at zero sideslip is achieved by ensuring that the following conditions are true:

$$C_{l0} < 0$$

$$C_{n0} < 0$$

$$C_{\dot{\theta}} < 0$$

$$C_{\dot{\psi}} > 0$$

$$C_{\dot{\phi}} < 0$$

This is achieved through a combination of sweep and dihedral and can also be influenced with the addition of winglets or a fin. The practical upper limit of $C_{\dot{\theta}}$ and practical lower limits of $C_{\dot{\phi}}$ and $C_{\dot{\psi}}$ are determined by the practicality of hydrofoil design. For example, sweep angles greater than 60 degrees are unlikely to lead to useable designs and twist of greater than 15 degrees is unlikely to lead to useable designs. Given these geometric limits and the subjective judgment of "ride quality" on the part of a user, bounds on the roll and yaw derivatives exist but are not quantifiable to a useful degree of precision.

Directional control is achieved by the weight shift and the weathercock stability stiffness. Shifting weight to one side causes the watercraft to roll to that side; this causes sideslip in the direction of the weight shift, and the $C_{\dot{\psi}}$ term causes the vehicle to turn in the direction of the lean. It should be noted that there is a trade-off between stability and maneuverability. More experienced users generally want a watercraft that is somewhat less stable to provide greater maneuverability. In contrast, less experienced users may want a watercraft that has more stability, and this may be done through appropriate design of the hydrofoil to give the desired stability and maneuverability characteristics.

As will be clear to those of skill in the art, the herein described embodiments of the present invention may be altered in various ways without departing from the scope or teaching of the present invention. It is the following claims, including all equivalents, which define the scope of the invention.

I claim:

1. A passively stable, weight-shift controlled personal hydrofoil watercraft, comprising:

a flotation device that has a fore-aft length greater than a lateral width, the flotation device having a top surface and a bottom surface, wherein a user can be disposed on the top surface of the flotation device in a prone, kneeling, or standing position, the flotation device having a forward section, a middle section, and a rear section;

a strut having an upper end and a lower end, the upper end fixedly interconnected with the flotation device between the middle section and the rear section of the flotation device;

a hydrofoil fixedly interconnected with the lower end of the strut, the hydrofoil having no movable surface;

a propulsion system for propelling the watercraft in a body of water, wherein the propulsion system is connected to the hydrofoil; and

the watercraft having no movable steering system.

2. A watercraft in accordance with claim 1, wherein the propulsion system comprises a battery, an electric motor, a motor speed controller, and a propulsor, the propulsor selected from a propeller, a ducted propeller, or a pump-jet.

3. A watercraft in accordance with claim 2, wherein the propulsor is disposed below the hydrofoil.

4. A watercraft in accordance with claim 1, wherein the hydrofoil is indirectly connected to the strut.

5. A watercraft in accordance with claim 4, wherein the strut is directly connected to the propulsion system.

6. A watercraft in accordance with claim 5, wherein a first hydrofoil wing of the hydrofoil is indirectly connected to the strut through the propulsion system.

7. A watercraft in accordance with claim 4, wherein the hydrofoil comprises a plurality of wings that are interconnected by way of a strut.

8. A watercraft in accordance with claim 2, wherein the battery and motor speed controller are contained in a watertight compartment integrated into the flotation device.

9. A watercraft in accordance with claim 2, wherein the electric motor is integrated into a waterproof, streamlined pod and the watercraft comprises a cooling system for cooling the electric motor.

10. A watercraft in accordance with claim 9, wherein the waterproof, streamlined pod is removably interconnected with the hydrofoil through a fitting.

11. A watercraft in accordance with claim 8, further comprising a wireless handheld controller having a transmitter, and a throttle interface having a receiver, wherein the transmitter is adapted to send wireless signals to the receiver that cause an output of the propulsion system to change.

12. A watercraft in accordance with claim 1, wherein a first hydrofoil wing of the hydrofoil is directly connected to the strut.

13. A watercraft in accordance with claim 8, wherein the strut has an internal passage and electrical wires extend from the electric motor to the watertight compartment inside the strut through the internal passage for controlling the electric motor.

14. A watercraft in accordance with claim 13, wherein the flotation device has a detector adapted to detect a user's presence on the flotation device and cease operation of the electric motor if the detector detects that the user is not on the flotation device.

15. A watercraft in accordance with claim 1, wherein the propulsion system is directly or indirectly connected to the hydrofoil.

16. A personal hydrofoil watercraft, comprising:

a surfboard-shaped flotation device that has a fore-aft length greater than a lateral width, the flotation device having a top surface and a bottom surface, wherein the top surface has a substantially horizontal supporting surface configured to support a user in a prone, kneeling, or standing position, the flotation device having a forward section, a middle section, and a rear section;

a hydrofoil interconnected with the surfboard-shaped flotation device, the hydrofoil having a strut and a first hydrofoil wing, an upper end of the strut being fixedly interconnected with the surfboard-shaped flotation device;

a propulsion system attached to the surfboard-shaped flotation device for propelling the watercraft in a body of water, the propulsion system comprising a battery, an electric motor, a motor speed controller, and a propulsor, wherein the propulsor is selected from a propeller, a ducted propeller, or a pump-jet, and the battery and motor speed controller are contained in a watertight compartment integrated into the flotation device;

the watercraft having no movable steering system;

a handheld controller having a throttle; and

a throttle interface, wherein the throttle is adapted to send electronic signals to the throttle interface that cause an output of the propulsion system to change.

17. A watercraft in accordance with claim 16, wherein the hydrofoil comprises a plurality of hydrofoil wings including the first hydrofoil wing and a second hydrofoil wing, the first and second hydrofoil wings being connected by way of a strut.

18. A watercraft in accordance with claim 16, wherein the watercraft comprises a cooling system for cooling the electric motor.

19. A watercraft in accordance with claim 16, wherein the strut has an internal passage and electrical wires extend from the electric motor to the watertight compartment inside the strut through the internal passage for controlling electric motor.

20. A watercraft in accordance with claim 16, wherein the handheld controller comprises a wireless transmitter operatively coupled to the throttle and the throttle interface includes a receiver, the transmitter being adapted to send wireless signals to the receiver in response to actuation of the throttle that cause an output of the propulsion system to change.

* * * * *

UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : 9,586,659 B2
APPLICATION NO. : 15/064521
DATED : March 7, 2017
INVENTOR(S) : Jacob Willem Langelaan

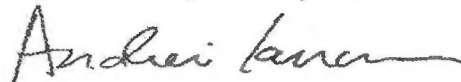
Page 1 of 1

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

In the Claims

In Column 9, Line 4, in Claim 19, after "controlling", insert --the--

Signed and Sealed this
First Day of May, 2018



Andrei Iancu
Director of the United States Patent and Trademark Office



Espacenet

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Foot operated hidden power surfboard for aquatic activity

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Applicant(s): GRANDOT TECH INC [TW] ± (GRANDOT TECH.
INCORPORATED)

Classification: - international: **B63B35/79**
- cooperative:

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Abstract of TW201000361 (A)

The invention provides a foot operated hidden power surfboard for aquatic activity that can be pervasive, have high safety, and easily controlled. In stores present markets or places such as sea, rivers, and lakes, at which some power surfboards with different designs can be seen. Their structural design only adds an exposed power propeller under a waterline of a tail of the power surfboard. A surfer stands on the power surfboard to operate the moving and speed of the power surfboard by means of wire control. Since the propeller normally belongs to a screw propeller exposed to the bottom of the power surfboard, the power surfboard may easily hurt people, and fishes or ecology under water when it moves along the coast. It can also be easily wound and struck by driftage or foreign matters to cause the damages. Moreover, since the tail and the head of the power surfboard are top-heavy, its integral center of gravity is not balanced. The power surfboard can be tipped over while facing waves, and the propeller exposed under water may take greater resistance. Therefore, if the power surfboard is taken as the normal surfboard for surfing, it easily becomes lumpish, heavy, slow speed and is difficultly controlled. The power surfboard is mostly used on the water with wave free or smaller waves to increase the recreation with power driving. The invention focuses on the foregoing shortcomings to allow the original power surfboard to have features of streamlined shape, light weight, safety and easy control after improving the structural and shape designs. The surfer does not need to use hands to operate the power surfboard by means of wire control and uses foot to operate the power surfboard. The improved power surfboard can be leisurely used in places with wave or wave free at any time for water recreation. In addition, the propeller of the invention is a newly jet (fluid) propeller. The jet propeller can be hidden in the power surfboard. The exterior portion of the jet propeller shows the streamlined shape conforming with hydromechanics. Therefore, the invention has environmental protection and safety and does not hurt people, and fishes or ecology under water and

is not easily wound and struck by driftage or foreign matters to cause the damage. Further, its integral center of gravity adopts uniform distribution. During the surfing activity, the invention can be easily balanced and may not be easily tipped over while facing waves. The invention also adopts a newly anti-skid device disposed to the surfboard bottom during tippling and has steady, easy control and safety by comparing with the conventional surfboard for aquatic activity. The anti-skid device of the foot operated hidden power surfboard for aquatic activity of the invention uses anti-skid channels (including chamfers and chamfer surfaces) on the bottoms of sides of the surfboard. When the surfboard turns or shakes and a tipping between the bottom of the surfboard and the contact surface (the water surface) happens to generate tilt angles, a cutting mark is generated between the chamfers of the anti-skid channels on the bottoms of the sides of the surfboard and the contact surface (the water surface) due to the centrifugal force. The friction of the cutting mark is performed in the cutting angle surface. Cutting channels are generated with respect to the contact surface (the water surface) communicating with the chamfers due to the gravity compression. The chamfers are caved in the cutting channels. A horizontal resistance is generated at the chamfers to counterbalance the centrifugal force. Phenomenon such as unstable center of gravity, out of control or slippage may not easily happen. Accordingly, the speed and safety of the invented power surfboard for aquatic activity can be improved during the marching or turning or shaking.

發明專利說明書

(本說明書格式、順序及組體字，請勿任意更動，※記號部分請勿填寫)

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腳操作隱藏式動力水上活動用板裝置

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(中文) 王化興

(英文) John Wang

國 籍：(中文/英文)

中華民國/R.O.C

四、聲明事項：

☐ 主張專利法第二十二條第二項☐第一款或☐第二款規定之事實，其事實發生日期為： 年 月 日。

☐ 申請前已向下列國家（地區）申請專利：

【格式請依：受理國家（地區）、申請日、申請案號 順序註記】

☐ 有主張專利法第二十七條第一項國際優先權：

☐ 無主張專利法第二十七條第一項國際優先權：

☐ 主張專利法第二十九條第一項國內優先權：

【格式請依：申請日、申請案號 順序註記】

☐ 主張專利法第三十條生物材料：

☐ 須寄存生物材料者：

國內生物材料 【格式請依：寄存機構、日期、號碼 順序註記】

國外生物材料 【格式請依：寄存國家、機構、日期、號碼 順序註記】

☐ 不須寄存生物材料者：

所屬技術領域中具有通常知識者易於獲得時，不須寄存。

九、發明說明：

【發明所屬之技術領域】

腳操作隱藏式動力水上活動用板裝置

本發明提供一種有浪或無浪皆可使用，且普及性較廣、安全性高、較易操控的腳操作隱藏式動力水上活動用板裝置。在現今市場上的商店或是海上、河上、湖上等地方，可以看到一些不同款式設計的動力水上活動用板，在其結構設計上只是在水上活動用板之尾端吃水線下加裝一外露式之動力推進器，衝浪者站在水上活動用板上以線控的方式操作動力水上活動用板前進及速度；由於推進器一般都是屬於螺旋槳式的推進器，外露於水上活動用板底部，所以在沿岸附近活動時較易傷到人與水下之魚類或生態，而且也易被水上之漂流物或雜物纏繞、撞擊造成毀損，再加上尾重頭輕，其整體性之重心較不平衡，萬一遇浪就易翻覆，以及推進器外露在水下的阻力較大，所以若要當成一般性的水上活動用板來滑，就易顯得笨拙、不輕巧、速慢與不易操作等情事發生，是故大多是使用在無浪或較小浪的水面上，以動力驅動水上活動用板來娛樂，看似像一個動力滑板。

本發明針對上述之各種缺失，經過結構性與外型設計之改良之後，讓原本之動力水上活動用板更加流線型、輕巧、安全、易操控，讓衝浪者可以不必使用線控的方式用手來操控動力水上活動用板，仍然可以用雙腳來操控它，有如像在衝浪般的自由自在，不論何時都可以在有浪或無浪之處悠閒地的戲水從事水上娛樂活動；另本發明的推進器是使用最新式的噴射流體集束推進器，它可以隱藏在水上活動用板之板體內，所以外部則呈現出合乎流體力學的流線型狀，因此兼具環保及安全，不會傷人與水下之魚類或生態，而且也不易被水上之漂流物或雜物纏繞、撞擊造成毀損，再加上其整體性之重心採平均分散的方式設計，所以在衝浪時較易平衡，遇浪則不易翻覆；另亦採用最新式的水上活動用板傾斜時防打滑裝置之板底外型設計，所以在使用

上均較現今的水上活動用板較穩、易控、且安全。

本發明腳操作隱藏式動力水上活動用板裝置上之水上活動用板傾斜時防打滑裝置，就是透過水上活動用板側邊的水上活動用板底部上之防滑溝（內含切角及切角面），當水上活動用板因轉彎或左右搖晃而其水上活動用板底部與接觸面（水面）之間發生傾斜狀而產生仰角時，在水上活動用板側邊之水上活動用板底部上的防滑溝內之切角，會因其離心力的加重力道關係與接觸面（水面）間會產生一切痕，而這個切痕的摩擦會在切角面內進行，因為重力壓擠的關係，進而與切角相接之接觸面（水面）會產生一切痕溝，而切角就陷在切痕溝內，於是切角處會產生一水平阻力而與離心力相互產生抵消作用，所以不易發生重心不穩、方向失控或打滑的現象，因此會提高水上活動用板在行進或是轉彎或是左右搖晃時的速率與安全。

【先前技術】

現代的人越來越喜愛戶外活動，而水上娛樂幾乎是老少咸宜，尤其是衝浪活動更是時下年輕男女非常熱門與極具挑戰的運動，衝浪活動是要有衝浪點的地方才能衝浪，所以也大大的縮限活動空間，再加上浪的大小也與潮汐或季節或颱風天有直間接的關係，因此想要從事衝浪活動需具備天時、地利、人和，如果平時亦可以在海上、河上或湖上的平浪時，享受一下乘風破浪之駕馭感，那將是一大樂趣。

本發明就是針對各種不同的天候、海象，不管有無浪都可以去做衝浪活動，讓天時不是問題，任何地方只要有水之處就可以安心、放心的去玩，有浪就去衝浪，無浪也可用本發明腳操作隱藏式動力水上活動用板裝置去尋樂。

本發明針對上述之各種問題，經過結構性與外型設計之改良之後，讓原本之動力水上活動用板更加流線型、輕巧、安全、易操控，讓衝浪者可以不必使用線控的方式用手來操控動力水上活動用板，仍然可以用雙腳來操控它，有如像在衝浪般的自由自在，不論何時都可

以在有浪或無浪之處悠閒地的戲水從事水上娛樂活動；另本發明的推進器是使用最新式的噴射流體集束推進器，它可以隱藏在水上活動用板之板體內，所以外部則呈現出合乎流體力學的流線型狀，因此亟具環保及安全，不會傷人與水下之魚類或生態，而且也不易被水上之漂流物或雜物纏繞、撞擊造成毀損，再加上其整體性之重心採平均分散的方式設計，所以在衝浪時較易平衡，遇浪則不易翻覆；另亦採用最新式的水上活動用板傾斜時防打滑裝置之板底外型設計，所以在使用上均較現今的水上活動用板較穩、易控、且安全。

水上活動用板最難掌控的就是平衡與側切浪滑行，為了讓衝浪者較輕鬆地使用，本發明的解決方案即在水上活動用板傾斜時的防滑控制，如果可以減少打滑，那對於行控來說就容易多了。

先前技術中有許多水上活動用板的發明在於操控水上活動用板的方向或是穩定左右兩邊之穩定度，如尾舵或尾鰭，但是卻沒有發明能夠在水上活動用板傾斜時的防打滑裝置。

本發明腳操作隱藏式動力水上活動用板裝置，就是透過水上活動用板側邊的水上活動用板底部上之防滑溝（內含切角及切角面），當水上活動用板因轉彎或左右搖晃而其水上活動用板底部與接觸面（水面）之間發生傾斜狀而產生仰角時，在水上活動用板側邊之水上活動用板底部上的防滑溝內之切角，會因其離心力的加重力道關係與接觸面（水面）間會產生一切痕，而這個切痕的摩擦會在切角面內進行，因為重力壓擠的關係，進而與切角相接之接觸面（水面）會產生一切痕溝，而切角就陷在切痕溝內，於是切角處會產生一水平阻力而與離心力相互產生抵消作用，所以不易發生重心不穩、方向失控或打滑的現象，因此會提高水上活動用板在行進或是轉彎或是左右搖晃時的速率與安全。

【發明內容】

本發明之目的在於提供一種具有至少一個防滑溝設於水上活動

用板底部的腳操作隱藏式動力水上活動用板裝置，以為該水上活動用板在與一接觸面（水面）發生傾斜時，使水上活動用板不易在接觸面上打滑之用，藉以提高水上活動用板在行進或是轉彎或是左右搖晃時的速率與安全。

本發明之目的在於提供一種具有感應裝置及隱藏式推進器的腳操作動力水上活動用板。

本發明之目的在於提供一種具有感應帶、感應線，以感應模式做為操控水上活動用板之開關及／或航速的腳操作動力水上活動用板。

本發明之目的在於提供一種具有推進器容置空間的水上活動用板，該推進器空間乃為一將該水上活動用板的推進器完全容納於內的空間。

一種腳操作動力水上活動用板，包含：

一水上活動用板，該水上活動用板底部與外在環境間有一接觸面，並且滑行於該接觸面上；

一感應裝置，該感應裝置置於水上活動用板的上部，使用者可以腳接觸操作水上活動用板之處；

一電源供應裝置；

一動力引擎裝置；

一推進器裝置。

上述腳操作動力水上活動用板，其中該水上活動用板包含：衝浪板、風帆板、滑水板等凡可承載人體重量從事水上活動的用板。

上述腳操作動力水上活動用板，其中該電源供應裝置，至少包含一電池及／或其它可供電之裝置。

上述腳操作動力水上活動用板，其中該推進器裝置，至少包含一噴射流體集束推進器及／或其它可供推力之推進器，該噴射流體集束推進器屬於一種壓力式的水中推進器，它是使用管狀螺旋轉動加壓的原

理，利用其管內中空之處，將扭集與加壓過的水，以高壓的方式自管狀體內噴出，而形成推力。

上述腳操作動力水上活動用板，其中該動力引擎裝置，至少包含一電動馬達及／或其它可供動能之裝置。

上述腳操作動力水上活動用板，其中該感應裝置進一步至少包含：感應帶、感應線，以感應模式做為操控水上活動用板之開關及／或航速。

上述腳操作動力水上活動用板，其中該感應帶至少包含：後感應帶、

上述腳操作動力水上活動用板，其中該感應線至少包含：加速感應線。

上述腳操作動力水上活動用板，其中該加速感應線至少包含：高速、中速、低速。

上述腳操作動力水上活動用板，進一步包含：至少一個防滑溝設於該水上活動用板底部，以為該水上活動用板在與一接觸面發生傾斜時，使水上活動用板不易在接觸面上打滑之用，藉以提高水上活動用板在行進或是轉彎或是左右搖晃時的速率與安全。

上述腳操作動力水上活動用板，其中該防滑溝至少包含：一切角及一切角面，該切角在水上活動用板發生傾斜時，即在接觸面上刻劃一痕跡，並在接觸面上留下一痕溝，且該痕溝內存在一切角，用以產生一水平阻力而與離心力相互產生抵消作用，以固定水上活動用板方向及防止水上活動用板打滑；一切角面用於處理切角在接觸面上刻劃痕跡之後的碎物，並將它依序推放在其內或排出，另外亦有支撐切角及水上活動用板的效用。

上述腳操作動力水上活動用板，其中該防滑溝設於水上活動用板側邊。

上述腳操作動力水上活動用板，進一步包含：太陽能電池板裝置、啟動按鈕、關機按鈕、尾鰭、尾舵、方向舵等。

上述腳操作動力水上活動用板，進一步包含：太陽能電源艙、電源供應艙、電動引擎艙、進水艙、防水軸承、進水網、推進器艙、交直流充電器座、電子設備裝置。

上述腳操作動力水上活動用板，其中該電動引擎艙進一步包含：電腦

控制系統裝置、電子設備盒變速器、一驅動器、一電動馬達、一萬象接頭、傳動軸。

上述腳操作動力水上活動用板，其中該感應裝置，只要使用者脫離不接觸該感應裝置及/或其部份裝置，則該腳操作動力水上活動用板將失去動力。

一種隱藏式動力水上活動用板，包含：

一底部具有推進器容置空間的水上活動用板，該推進器空間乃為一將該水上活動用板的推進器完全容納於內的空間；

一電源供應裝置；

一動力引擎裝置；

一可完全隱藏於該水上活動用板底部之內的推進器裝置。

上述腳操作動力水上活動用板，其中該推進器裝置，至少包含一噴射流體集束推進器及/或其它可供推力之推進器，該噴射流體集束推進器屬於一種壓力式的水中推進器，它是使用管狀螺旋轉動加壓的原理，利用其管內中空之處，將扭集與加壓過的水，以高壓的方式自管狀體內噴出，而形成推力。

上述腳操作動力水上活動用板，其中該水上活動用板包含：衝浪板、風帆板、滑水板等凡可承載人體重量從事水上活動的用板。

上述腳操作動力水上活動用板，其中該電源供應裝置，至少包含一電池及/或其它可供電之裝置。

上述腳操作動力水上活動用板，其中該動力引擎裝置，至少包含一電動馬達及/或其它可供動能之裝置。

上述腳操作動力水上活動用板，進一步包含：至少一個防滑溝設於該水上活動用板底部，以為該水上活動用板在與一接觸面發生傾斜時，使水上活動用板不易在接觸面上打滑之用，藉以提高水上活動用板在行進或是轉彎或是左右搖晃時的速率與安全。

上述腳操作動力水上活動用板，其中該防滑溝至少包含：一切角及一

切角面，該切角在水上活動用板發生傾斜時，即在接觸面上刻劃一痕跡，並在接觸面上留下一痕溝，且該痕溝內存在一切角，用以產生一水平阻力而與離心力相互產生抵消作用，以固定水上活動用板方向及防止水上活動用板打滑；一切角面用於處理切角在接觸面上刻劃痕跡之後的碎物，並將它依序推放在其內或排出，另外亦有支撐切角及水上活動用板的效用。

上述腳操作動力水上活動用板，其中該防滑溝設於水上活動用板側邊。上述腳操作動力水上活動用板，進一步包含：太陽能電池板裝置、啟動按鈕、關機按鈕、尾鰭、尾舵、方向舵等。

上述腳操作動力水上活動用板，進一步包含：太陽能電源艙、電源供應艙、電動引擎艙、進水艙、防水軸承、進水網、推進器艙、交直流充電器座、電子設備裝置。

上述腳操作動力水上活動用板，其中該電動引擎艙進一步包含：電腦控制系統裝置、電子設備盒變速器、一驅動器、一電動馬達、一萬象接頭、傳動軸。

【實施方式】

請參考第一圖，系顯示本發明之腳操作隱藏式動力水上活動用板裝置。在此實施例中，本發明腳操作隱藏式動力水上活動用板裝置 100 之水上活動用板上部示意圖 102，水上活動用板 250，為本發明裝置之主體結構，以供衝浪者站在上面衝浪使用，其至少包含一水上活動用板上部 120、一水上活動用板底部 130 及水上活動用板側邊 140。

在本實施例中，水上活動用板上部 120，就是水上活動用板 250 吃水線以上的部份，大部份都是漂浮在水面上，衝浪者可以站在上面衝浪，至少有一中心線 255，此為水上活動用板 250 寬度的二分之一中心位置處，標示出來好讓衝浪者或初學者可以準確的找到平衡處，以利衝浪操控；左腳 270，即為衝浪者之左腳位置部份；右腳 275，即為衝浪者之右腳位置部份；左右腳所置之位置，通常置於尾端之腳是

用來掌控水上活動用板 250 之方向，前端之腳則為掌控水上活動用板 250 行進時之平衡；在衝浪時則雙腳擺置之位置，則採與中心線 255 平行方式，將雙腳採一前一後置於水上活動用板 250 較易保持平衡的位置上進行衝浪；水上活動用板側邊 140，即為水上活動用板 250 之兩側邊之位置及／或廣義解說為其四周的邊緣地方。

另在在本實施例中，因本發明為屬於動力式之水上活動用板 250，所以需至少包含一太陽能電池板裝置 600，做為衝浪活動時之部份電力補充之用；後感應帶 830，在水上活動用板 250 較後方的感應裝置，是以腳或用身體某個部位或穿戴上某種的感應裝置來做感應模式，用以操控本發明的一種方法；前感應帶 840，在水上活動用板 250 之後感應帶 830 的前方感應裝置，是以腳及／或用身體某個部位及／或穿戴上某種的感應裝置來做感應模式，也是用以操控本發明的一種方法；加速感應線 845，在水上活動用板 250 上，其主要目的為以腳及／或用身體某個部位及／或穿戴上某種的感應裝置來做感應模式，是用以操控本發明動力水上活動用板 250 的速度快慢（低速 850、中速 860、高速 870）。前感應帶 840 及後感應帶 830 可以依水上活動用板 250 的長短或特殊用途而設於適當之處，且兩者之間的跨距是以不同衝浪者身高之腳的跨距做為最佳之設置處，亦可以採單獨或混合方式與加速感應線 845 共同來搭配使用，以便衝浪者站立如一般之衝浪活動般的操控行速。

在本實施例中之連結與操作方式為當衝浪者若有浪時要使用本發明從事水上活動時，只要將水上活動用板 250 置於有浪之水面上，將水上活動用板上部 120 朝上，把身體部份趴握在水上活動用板 250 上，然後用雙手划動左右兩邊之水面，將水上活動用板 250 划到浪頭之高點後，再將左右腳依個人之習慣，置放在水上活動用板 250 上之左腳 270、右腳 275 等之位置上，身體盡量保持平衡狀，即可依浪之行進方向進行衝浪活動。若在無浪時要使用本發明從事水上活動時，只要將水上活動用板 250 置於水面上，將水上活動用板上部 120

朝上，然後按下啟動按鈕 800，本裝置的電源就開啟，再把身體站立在水上活動用板 250 適當的操控位置上，並保持平衡狀，然後用左腳 270 或右腳 275 分別踩住前感應帶 840 或後感應帶 830 及加速感應線 845 之低速 850 或中速 860 或高速 870 上，本發明裝置就可順利的前進及左右轉彎進行衝浪活動；結束活動時，只要按下關機按鈕 810，本裝置的電源就停止。

請繼續參考第一圖，系顯示本發明之腳操作隱藏式動力水上活動用板裝置 100。在此實施例中，本發明腳操作隱藏式動力水上活動用板裝置 100 之水上活動用板底部示意圖 105，屬於在本圖前述之元件、連結、操作等，都已在前圖敘述過，故在此不再贅述，僅就尚未敘述之元件做一解說。

在本實施例中之一尾舵 260，其主要用途為操控水上活動用板 250 之方向；一尾鰭 265，其主要目的除具有穩定左右兩邊之穩定度之外，也可以讓水上活動用板 250 呈較直的方向前進，而不易產生漂移或側漂的狀況發生。尾舵 260 及尾鰭 265 的操作方式，則可依一般之常識、習慣操控即可，再此不再贅述。

另在本實施例中之一水上活動用板底部 130，就是水上活動用板 250 吃水線以下的部份，大部份都是浸泡在水面下，其至少包含一太陽能電源艙 500，提供存放一些與太陽能發電有關的器材或設備的空間；一電源供應艙 510，提供存放一些發電或電源儲存或電源管理或控制等有關的器材或設備的空間；一電動引擎艙 520，提供存放一些與動力引擎有關的器材或設備的空間；一進水艙 530，提供一些與進水有關的器材或設備的空間；一進水網 535，其主要目的就是設一濾網，過濾水質，以供推進器艙 540 使用；一推進器艙 540，提供一些與動力有關的器材或設備的空間；一螺絲 550，主要是將各艙與水上活動用板底部 130 之間相互鎖緊，以防漏水及保護艙內器材或設備不至損傷；一交直流充電器座 620，是將外界的交直流電透過本裝置輸入到電源供應艙 510 內有關之器材或設備之用或做為儲存電力用

途。

當然以上所述之各艙開口處，除了可以設置在水上活動用板底部 130 之外，亦可適實際之需求設計裝置於水上活動用板上部 120 或水上活動用板側邊 140 等皆可。

本圖所述僅為簡介，若要知其詳解敬請參考第二圖方塊圖內容。

請參考第二圖，系顯示本發明之腳操作隱藏式動力水上活動用板裝置之水上活動用板上部電子裝置圖。在本實施例中，本發明腳操作隱藏式動力水上活動用板裝置 100 之水上活動用板上部電子裝置圖 112，由於在本圖所述之元件、連結、操作等，都已在第一圖均已敘述過，故在此不再贅述，僅就尚未敘述之元件、連結、操作等敘述之。

在本實施例中，至少包含一電子設備裝置 655，本裝置內所裝置的器材或設備大都是屬於輔助性質之產品，如羅盤、方向儀、水平儀、測速器、GPS 導航器材、SOS 器材、求救設備、通訊器材、電力輸出等，皆可視衝浪者之需求而裝置，置於電子設備盒 660 內；一電源燈／警示燈 820，若電源之電力足夠時它會顯示電源燈，若電源之電力不足時它會顯示警示燈 820，以提醒衝浪者電力將會耗盡，請盡速返回充電；一低速 850，耗電量較低，續航力較久，一般來說即為正常的航速；一中速 860，耗電量稍為大一些，較低速 850 稍高的航速，通常用於快速離開或載較重之承載量時使用；一高速 870，耗電量較大，續航力較短，僅適合短時間的使用。

請繼續參考第二圖，系顯示本發明之腳操作隱藏式動力水上活動用板裝置之水上活動用板底艙裝置方塊圖。在此實施例中，本發明之腳操作隱藏式動力水上活動用板裝置 100 之水上活動用板底艙裝置方塊圖 115，由於在本圖所述之元件、連結、操作等，都已在第一圖及前圖敘述過，故在此不再贅述，僅就尚未敘述之元件敘述之。

在此實施例中至少包含一太陽能電整流裝置 610，置於太陽能電源艙 500 內，其主要用途就是將太陽能電源調整為可用的交直流電，一方面供應本發明所需元件之電力，另一方面也可將多餘的電力

儲存在電池 630 內，以供續用；一交直流充電器座 620，置於水上活動用板底部 130 或太陽能電源艙 500 內，其用圖就是將外界的交直流電力透過本裝置導入，一方面供應本發明所需元件之電力，另一方面也可將多餘的電力儲存在電池 630 內，以供續用；至少一電池 630，置於電源供應艙 510 內，提供儲存電力之用途，另一方面亦可將本身的電力供應本發明所需元件使用；一電壓穩定器裝置 640，亦置於電源供應艙 510 內，可以將太陽能電源、交直流電源或電池 630 所放出的電壓做一調整，以保護後續所使用的各種電子產品，不易因電壓的不穩定而遭受毀損；以下所述之元件或裝置均置於電動引擎艙 520 內，一電腦控制系統裝置 650，亦為本發明裝置之自動控管中樞，其中包含開起或關機、電子感應、電力管理及輸送、變頻、速控、電子產品等；一電子設備盒 660，放置前述之電子設備裝置 655 使用；一變速器 670，用調整變換電動馬達 700 所需的電力強弱；一驅動器 680，用以驅動電動馬達 700 的裝置；一電動馬達 700，俗稱電動引擎，是為產生旋轉動力來源的主要動能；一萬象接頭 710，其主要的用途為可以改變直線的動能傳輸方式，常與傳動軸 720 搭配使用；一傳動軸 720，是將電動馬達 700 所輸出的旋轉動能，經本裝置傳遞至其所要釋放之處；一防水軸承 730，置於進水艙 530 內，主要用途是將有水一方的傳動軸 720 經過本裝置之後，可以有效的將封住，而不會滲透進來，具有防水及運轉靈活的功效；一支架 740，主要是用來支撐或固定住傳動軸 720、噴射流體集束推進器 750 等之用；一噴射流體集束推進器 750，置於推進器艙 540 內，它是屬於一種壓力式的水中推進器，它是使用管狀螺旋轉動加壓的原理，利用其管內中空之處，將扭集與加壓過的水，以高壓的方式自管狀體內噴出，而形成推力，其設計方式與一般螺旋槳推進器、噴射推進器、其它推進器等有很大的不同，發展初期極適合近海、河或低速使用，不易對人及水底魚類或生態產生破壞，亦不會被漂流物、雜物或繩索纏繞而損毀，非常符合環保觀念；一推進器 770，包含一般螺旋槳推進器、噴射推進器、其它

推進器等，適合海、河、湖等地方使用；一感應裝置 880，包含開機按鈕 810、後感應帶 830、前感應帶 840、加速感應線 845 等，主要是用來操控行速。

在此實施例中，就尚未敘述之連結、操作等敘述之。

當水上活動用板 250 朝上放置時，水上活動用板上部 120 的太陽能電池板裝置 600，其所收集到的電源會傳輸到太陽能電源艙 500 內的太陽能電整流裝置 610，經其整流後然後再至電池 630 儲存。外界的交直流電源亦可透過交直流充電器座 620，將它導入電池 630 內儲存。當衝浪者要使用本發明裝置時，只要按下啟動按鈕 800 即可透過電腦控制系統裝置 650 發動電動馬達 700，然後經萬象接頭 710、傳動軸 720 的帶動，讓噴射流體集束推進器 750 開使旋轉而產生高壓水，因而產生推力，隨著用腳或身體某個部位或穿戴上某種的感應裝置與後感應帶 830 及／或前感應帶 840 與加速感應線 845 間的接觸來產生一感應訊號，隨後將此感應訊號傳至感應裝置 880 內，而再透過電腦控制系統裝置 650 的控管，而讓本發明裝置產生低速 850、中速 860、高速 870 等不同的航速，以滿足衝浪者的不同需求。另只要有任一的腳或身體某個部位或穿戴上某種的感應裝置與後感應帶 830 及／或前感應帶 840 與加速感應線 845 之間有脫離發生，則其動力將會立即停止運轉。衝浪者也可以因自我的需求，而去增裝電子設備裝置 655 使用，以滿足其安全上的需求。

請參考第三圖，系顯示本發明之腳操作隱藏式動力水上活動用板傾斜時防打滑裝置斷面圖 230。在此實施例中，本發明腳操作隱藏式動力水上活動用板傾斜時防打滑裝置 200 之主要構成要素為之腳操作隱藏式動力水上活動用板 106（水上活動用板上部 120、水上活動用板底部 130、水上活動用板側邊 140）、防滑溝 150（至少包含一切角 160、一切角面 170）、接觸面 180。

在此實施例中，本發明腳操作隱藏式動力水上活動用板傾斜時防打滑裝置斷面圖 230 之腳操作隱藏式動力水上活動用板裝置 100 之主要構成要素為腳操作隱藏式動力水上活動用板 106（水上活動用板上部 120、水上活動用板底部 130、水上活動用板側邊 140）、防滑溝

150 (至少包含一切角 160、一切角面 170)、接觸面 180。腳操作隱藏式動力水上活動用板傾斜時防打滑裝置 200, 至少包含垂直重量 186、水上活動用板上部 120、水上活動用板底部 130、水上活動用板側邊 140、防滑溝 150、切角 160、切角面 170、接觸面 180、切痕 165、痕溝 168; 一腳操作隱藏式動力水上活動用板 106, 其主要目的為在水上活動用板上部 120 上可承載至少一垂直重量 186 以做為載重之工具, 而在一水上活動用板底部 130 下可設計至少一防滑溝 150 與一接觸面 180 (水面) 相連接, 以便在行進時當腳操作隱藏式動力水上活動用板 106 在與一接觸面 180 發生傾斜時的防止滑行之用, 另在腳操作隱藏式動力水上活動用板 106 之兩側邊各有一水上活動用板側邊 140, 其上亦可設計至少包含一防滑溝 150 以為該腳操作隱藏式動力水上活動用板 106 在與一接觸面 180 發生傾斜時, 使腳操作隱藏式動力水上活動用板 106 不易在接觸面上打滑之用。

一垂直重量 186, 即為腳操作隱藏式動力水上活動用板 106 上所承載之總重量; 一接觸面 180, 是與腳操作隱藏式動力水上活動用板 106 之水上活動用板底部 130 及/或水上活動用板側邊 140 等相互接觸, 可為任何之水面及/或沼澤地等, 可實質相接觸及/或可承載重量之環境處所; 一接觸線 182, 即接觸面 180 上之表層線, 它存在於接觸面 180 與腳操作隱藏式動力水上活動用板 106 之水上活動用板底部 130 及/或水上活動用板側邊 140 等兩者之間; 一接觸面仰角 190, 即用來計量及/或表達傾斜角度之用語;

一防滑溝 150, 其主要用途為產生固定之走向及/或防止滑行之用, 其內至少包含一切角 160、切角面 170; 一切角 160, 其主要的目的為當腳操作隱藏式動力水上活動用板 106 發生傾斜時, 在接觸面 180 上刻劃一痕跡, 以確保固定之走向及/或防止打滑現象發生; 一切角面 170, 當切角 160 在接觸面 180 上刻劃一痕跡後, 將會產生碎物, 而本元件就是用以處理碎物, 將它依序推放在其內或排出之功效, 另亦有支撐切角 160、腳操作隱藏式動力水上活動用板 106 之效用。

一切痕 165, 經切角 160 在接觸面 180 上所刻劃過的痕跡; 一

痕溝 168，經切痕 165 所刻劃的痕跡，並在接觸面 180 上留下一溝，且該溝內存在一切角 160，用以產生一水平阻力而與離心力相互產生抵消作用，即可達到固定之走向及／或停止繼續打滑之動作。

當腳操作隱藏式動力水上活動用板 106 因轉彎或左右搖晃而其水上活動用板底部 130 與接觸面 180 之間發生傾斜狀而與接觸線 182 產生接觸面仰角 190 時，在水上活動用板側邊 140 之水上活動用板底部 130 上的防滑溝 150 內之切角 160，會因其離心力的加重力道關係與接觸面 180 間會產生一切痕 165，而這個切痕 165 的摩擦會在切角面 170 內進行，因為重力壓擠的關係，進而與切角 160 相接之接觸面 180 會產生一切痕溝 168，而切角 160 就陷在切痕溝 168 內，於是切角 160 處會產生一水平阻力而與離心力相互產生抵消作用，所以不易發生重心不穩、方向失控或打滑的現象，因此會提高腳操作隱藏式動力水上活動用板 106 在行進或是轉彎或是左右搖晃時的速率與安全。

在本實施力之連結與操作方式為當腳操作隱藏式動力水上活動用板 106 承載一重物時，其重量藉由垂直重量 186 的方式，將重量直接連結到水上活動用板上部 120 上，然後再由水上活動用板底部 130 把重量直接傳至接觸面 180 上而產生載重現象；一旦水上活動用板底部 130 與接觸面 180 相互接觸後，當腳操作隱藏式動力水上活動用板 106 在行進時，若水上活動用板 250 遇到要左、右轉彎及／或左、右晃動時，在水上活動用板側邊 140 之防滑溝 150 內的切角 160 便會與接觸面 180 上之接觸線 182 產生一接觸面仰角 190，於是切角 160 會與接觸面 180 發生摩擦，當切角 160 在接觸面 180 上刻劃一痕跡後，將會產生碎物，而切角面 170 的設計就是用以處理碎物，將它依序推放在其內或排出之功效，另亦有支撐切角 160、腳操作隱藏式動力水上活動用板 106 之效用。當切角 160 在接觸面 180 上刻劃一痕跡後，便在接觸面 180 上產生一切痕溝 168，而切角 160 就陷在切痕溝 168 內，因此切角 160 處會產生一水平阻力而與離心力相互產生抵消作用，因此腳操作隱藏式動力水上活動用板 106 即可達到固定之走向及

／或停止繼續打滑之動作。

在本實施例中一扶正力矩 172，為將腳操作隱藏式動力水上活動用板 106 失衡之一邊，所需扶正後保持平衡的力量多寡；一浮力範圍 174，整個腳操作隱藏式動力水上活動用板 106 所需要的浮力區域；一水平線 184，通常是指當水面靜止不動時的水線所在。

在本實施例中所談及的是一種隨時都在動的接觸面 180（水面）及隨時在漂蕩的腳操作隱藏式動力水上活動用板 106，所以要讓衝浪者在上面避免在衝浪時打滑墜落，及隨時保持一定的平衡、速度、方向等，實在是變數太多，非常難操控，這也是由於現今的動力水上活動用板 108 及水上活動用板 250，其底部是屬於一種較為扁平、側邊圓滑的設計所至，以此種設計方式是較不利於大仰角的側邊衝浪或切浪的模式，因為其扁平的底部在衝浪時會有一半以上無法與接觸面 180（水面）接觸，另一半則是懸空高掛於水浪之外，所以會形成較少的著力點及浮力面來支撐動力水上活動用板 108 及水上活動用板 250，以及一般來說側邊圓滑的弧形是較難在水浪中取得著力點，所以動力水上活動用板 108 及水上活動用板 250 在浪頭處要切進捲浪時，常因大仰角的關係，因此在切進浪邊時因著力點較弱，所以動力水上活動用板 108 及水上活動用板 250 易打滑或產生失速狀，導致衝浪失敗。

在本實施例中腳操作隱藏式動力水上活動用板傾斜時防打滑裝置 200，就是針對現今的動力水上活動用板 108 及水上活動用板 250 側邊及底部做一改進，經此一改進設計之後，讓水上活動用板 250 之側邊及底部與接觸面 180（水面）之間，更具易切側浪、防止打滑、提升浮力等功效，讓衝浪者更易掌控及操作腳操作隱藏式動力水上活動用板 106、動力水上活動用板 108 及水上活動用板 250。在未來設計、生產、製造腳操作隱藏式動力水上活動用板 106、動力水上活動用板 108 及水上活動用板 250 時，可以採一體成型的模式，將本腳操作隱藏式動力水上活動用板傾斜時防打滑裝置 200 與現今製作的腳操作隱

藏式動力水上活動用板 106、動力水上活動用板 108 及水上活動用板 250 等兩者相結合在一起，讓喜好衝浪的人更易操控、縮短練習時間、創造出更多的操控新方法及技術。

當衝浪者划水至浪頭高點時就在等待及判斷何處將可產生較大的浪頭，因為越高越大的浪頭其產生的浪高落差較大，相對的其仰角自然也越大，因此衝浪者在衝浪時，就易順勢穿越切進較高及較長的捲浪邊，而展現出衝浪者之膽大、反應、技巧與高超之技術。為了有效讓腳操作隱藏式動力水上活動用板 106、動力水上活動用板 108 及水上活動用板 250 等之側邊及底部與接觸面 180（水面）之間，更易在水浪產生大仰角時切側浪、防止打滑、提升浮力等功效，所以本發明在腳操作隱藏式動力水上活動用板 106、動力水上活動用板 108 及水上活動用板 250 等之水上活動用板底部 130 近水上活動用板側邊 140 處及／或水上活動用板底部 130 設計至少一防滑溝 150（切角 160、切角面 170）。當接觸面 180（水面）越高時其水上活動用板 250 與水平線 184 之間會產生大仰角的狀況，有時幾近 70~80 度或超過 80 度以上的大仰角，所以如何有效的在第一時間內進行側切浪，這將是邁出成功的第一步，因此本發明之防滑溝 150 內之切角 160 就可以很容易的將水上活動用板 250 切入大仰角的水浪中，並可藉由切痕 165 及痕溝 168 與觸面 180（水面）產生緊密勾勒的連結狀，所以可以有效的防止腳操作隱藏式動力水上活動用板 106、動力水上活動用板 108 及水上活動用板 250 等打滑現象發生，再加上防滑溝 150 內的切角面 170 可以將痕溝 168 內的接觸面 180（水面）直接往上頂，因此在水中形成一扶正力矩 172 的效應，一方面可以提升水上活動用板側邊 140 浮力，再一方面可以防止水上活動用板側邊 140 的側偏狀況發生以取得腳操作隱藏式動力水上活動用板 106、動力水上活動用板 108 及水上活動用板 250 等之平衡。

請繼續參考第三圖，系顯示本發明之腳操作隱藏式動力水上活

動用板傾斜時防打滑裝置仰視圖。在此實施例中，本發明腳操作隱藏式動力水上活動用板傾斜時防打滑裝置仰視圖 240，其目的就是將本圖所有列舉之元件名稱在水上活動用板底部 130 上標示出其位置以供參考之用，由於在本圖所述之元件、連結、操作等，都已在第一圖、第二圖及前圖敘述過，故在此不再贅述。

請參考第四圖，系顯示本發明之套戴式腳操作隱藏式動力水上活動用板傾斜時防打滑裝置斷面圖。在此實施例中，本發明動力水上活動用板套戴式傾斜時防打滑裝置 300 之套戴式腳操作隱藏式動力水上活動用板傾斜時防打滑裝置斷面圖 305，本圖與第三圖所敘內容及其功能是相同的，若要詳知所述之元件、連結、操作等，請至第一圖、第二圖、第三圖參閱，故在此不再贅述，僅就其不同之元件加以解說。

在此實施例中，本發明動力水上活動用板套戴式傾斜時防打滑裝置 300 至少包含一套戴式包裹在水上活動用板上 320，其主要目的就是將本裝置套用在未設有腳操作隱藏式動力水上活動用板傾斜時防打滑裝置 200 之動力水上活動用板 108 及水上活動用板 250 等上，好讓這些動力水上活動用板 108 及水上活動用板 250 等亦可在改變最少之下，可以立即享有在水浪產生大仰角時切側浪、防止打滑、提升浮力等功效；本動力水上活動用板套戴式傾斜時防打滑裝置 300，其材質或樣式之設計可由較具高浮力材質之材料為主，另亦可搭配使用 FRP、碳纖維或輕金屬材質或塑料、橡膠等，或硬度極高之其它輕質合成材料，或將其包裹在水上活動用板 250 上，或是採中空成型模式，或是以充氣模式，或是採模塊組裝模式，或是採壓模方式壓製，其材質以質輕、美觀與增加其抗酸鹼性、耐磨、耐碰、耐摔度、防晒、防海水侵蝕、防水，以及具安全性高、設計穩重、符合流體力學、不易翻覆的產品包裹在水上活動用板 250 上；吸盤 330，其主要的目的就是將動力水上活動用板套戴式傾斜時防打滑裝置 300 以外包裹的方式將它沾粘到水上活動用板 250 上，當然除此之外亦可採用其它的方式，如黏膠、鎖螺絲、壓黏、熱溶、綁繩、拉鍊等皆可，最主要的目

的就是運用各種簡易、便捷的方式來達到安裝或拆卸。

在使用時，衝浪者只要將本發明動力水上活動用板套戴式傾斜時防打滑裝置 300 以包裹及／或綁繩及／或拉鍊等的方式將它緊裹在動力水上活動用板 108 及水上活動用板 250 等上即可，若要拆卸時，則可依相反之程序依序拆除即可。為方便衝浪者選購，業者亦可依其現今生產動力水上活動用板 108 及水上活動用板 250 等的各種型號，特製動力水上活動用板套戴式傾斜時防打滑裝置 300，則更符合各型動力水上活動用板 108 及水上活動用板 250 等的需求，亦可開創更多、更大的市場規模或經濟效益。

請繼續參考第四圖，系顯示本發明之套戴式腳操作隱藏式動力水上活動用板傾斜時防打滑裝置仰視圖。在此實施例中，本發明套戴式腳操作隱藏式動力水上活動用板傾斜時防打滑裝置仰視圖 310，其目的就是將本圖所有列舉之元件名稱在水上活動用板底部 130 上標示出其位置以供參考之用，由於在本圖所述之元件、連結、操作等，都已在第一圖、第二圖、第三圖及前圖敘述過，故在此不再贅述。

在此實施例中，動力及推進器裝置 760，是指可產生水中推力的一種動能或引擎，或是與推進器相關的器材或設備。

在詳細說明本發明的較佳實施例之後，熟悉該項技術人士可清楚的瞭解，在不脫離下述申請專利範圍與精神下可進行各種變化與改變，亦不受限於說明書之實施例的實施方式。

【圖式簡單說明】

第一圖系顯示本發明之腳操作隱藏式動力水上活動用板裝置水上活動用板上部示意圖。

第一圖系顯示本發明之腳操作隱藏式動力水上活動用板裝置水上活動

用板底部示意圖。

第二圖系顯示本發明之腳操作隱藏式動力水上活動用板裝置水上活動用板上部電子裝置圖。

第二圖系顯示本發明之腳操作隱藏式動力水上活動用板裝置水上活動用板底部艙裝置方塊圖。

第三圖系顯示本發明之腳操作隱藏式動力水上活動用板傾斜時防打滑裝置斷面圖。

第三圖系顯示本發明之腳操作隱藏式動力水上活動用板傾斜時防打滑裝置仰視圖。

第四圖系顯示本發明之動力水上活動用板套戴式傾斜時防打滑裝置斷面圖。

第四圖系顯示本發明之動力水上活動用板套戴式傾斜時防打滑裝置仰視圖。

【主要元件符號說明】

100--- 腳操作隱藏式動力水上活動用板裝置

102--- 水上活動用板上部示意圖

105--- 水上活動用板底部示意圖

106--- 腳操作隱藏式動力水上活動用板

108--- 動力水上活動用板

112--- 水上活動用板上部電子裝置圖

115--- 水上活動用板底艙裝置方塊圖

120--- 水上活動用板上部

130--- 水上活動用板底部

140--- 水上活動用板側邊

150--- 防滑溝

160--- 切角

165--- 切痕

- 168--- 痕溝
- 170--- 切角面
- 172--- 扶正力矩
- 174--- 浮力範圍
- 180--- 接觸面
- 182--- 接觸線
- 184--- 水平線
- 186--- 垂直重量
- 190--- 接觸面仰角
- 200--- 腳操作隱藏式動力水上活動用板傾斜時防打滑裝置
- 230--- 腳操作隱藏式動力水上活動用板傾斜時防打滑裝置斷

面圖

- 240--- 腳操作隱藏式動力水上活動用板傾斜時防打滑裝置仰

視圖

- 250--- 水上活動用板
- 255--- 中心線
- 260--- 尾舵
- 265--- 尾鰭
- 270--- 左腳
- 275--- 右腳
- 300--- 動力水上活動用板套戴式傾斜時防打滑裝置
- 305--- 動力水上活動用板套戴式傾斜時防打滑裝置斷面圖
- 310--- 動力水上活動用板套戴式傾斜時防打滑裝置仰視圖
- 320--- 套戴式包裹在水上活動用板上
- 330--- 吸盤
- 500--- 太陽能電源艙
- 510--- 電源供應艙
- 520--- 電動引擎艙

- 530---- 進水艙
- 535---- 進水網
- 540---- 推進器艙
- 550---- 螺絲
- 600---- 太陽能電池板裝置
- 610---- 太陽能電整流裝置
- 620---- 交直流充電器座
- 630---- 電池
- 640---- 電壓穩定器裝置
- 650---- 電腦控制系統裝置
- 655---- 電子設備裝置
- 660---- 電子設備盒
- 670---- 變速器
- 680---- 驅動器
- 700---- 電動馬達
- 710---- 萬象接頭
- 720---- 傳動軸
- 730---- 防水軸承
- 740---- 支架
- 750---- 噴射流體集束推進器
- 760---- 動力及推進器裝置
- 770---- 推進器(一般螺旋槳推進器、噴射推進器、其它推進器)
- 800---- 啟動按鈕
- 810---- 關機按鈕
- 820---- 電源燈／警示燈
- 830---- 後感應帶
- 840---- 前感應帶
- 845---- 加速感應線

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850--- 低速

860--- 中速

870--- 高速

880--- 感應裝置

五、中文發明摘要：

腳操作隱藏式動力水上活動用板裝置

本發明提供一種有浪或無浪皆可使用，且普及性較廣、安全性高、較易操控的腳操作隱藏式動力水上活動用板裝置。在現今市場上的商店或是海上、河上、湖上等地方，可以看到一些不同款式設計的動力水上活動用板，在其結構設計上只是在水上活動用板之尾端吃水線下加裝一外露式之動力推進器，衝浪者站在水上活動用板上以線控的方式操作動力水上活動用板前進及速度；由於推進器一般都是屬於螺旋槳式的推進器，外露於水上活動用板底部，所以在沿岸附近活動時較易傷到人與水下之魚類或生態，而且也易被水上之漂流物或雜物纏繞、撞擊造成毀損，再加上尾重頭輕，其整體性之重心較不平衡，萬一遇浪就易翻覆，以及推進器外露在水下的阻力較大，所以若要當成一般性的水上活動用板來滑，就易顯得笨拙、不輕巧、速慢與不易操作等情事發生，是故大多是使用在無浪或較小浪的水面上，以動力驅動水上活動用板來娛樂，看似像一個動力滑板。

本發明針對上述之各種缺失，經過結構性與外型設計之改良之後，讓原本之動力水上活動用板更加流線型、輕巧、安全、易操控，讓衝浪者可以不必使用線控的方式用手來操控動力水上活動用板，仍然可以用雙腳來操控它，有如像在衝浪般的自由自在，不論何時都可以在有浪或無浪之處悠閒地的戲水從事水上娛樂活動；另本發明的推進器是使用最新式的噴射流體集束推進器，它可以隱藏在水上活動用板之板體內，所以外部則呈現出合乎流體力學的流線型狀，因此至具環保及安全，不會傷人與水下之魚類或生態，而且也不易被水上之漂流物或雜物纏繞、撞擊造成毀損，再加上其整體性之重心採平均分散的方式設計，所以在衝浪時較易平衡，遇浪則不易翻覆；另亦採用最新式的水上活動用板傾斜時防打滑裝置之板底外型設計，所以在使用上均較現今的水上活動用板較穩、易控、且安全。

本發明腳操作隱藏式動力水上活動用板裝置上之水上活動用板傾斜時防打滑裝置，就是透過水上活動用板側邊的水上活動用板底部上之防滑溝（內含切角及切角面），當水上活動用板因轉彎或左右搖晃而其水上活動用板底部與接觸面（水面）之間發生傾斜狀而產生仰角時，在水上活動用板側邊之水上活動用板底部上的防滑溝內之切角，會因其離心力的加重力道關係與接觸面（水面）間會產生一切痕，而這個切痕的摩擦會在切角面內進行，因為重力壓擠的關係，進而與切角相接之接觸面（水面）會產生一切痕溝，而切角就陷在切痕溝內，於是切角處會產生一水平阻力而與離心力相互產生抵消作用，所以不易發生重心不穩、方向失控或打滑的現象，因此會提高水上活動用板在行進或是轉彎或是左右搖晃時的速率與安全。

六、英文發明摘要：

十、申請專利範圍：

1. 一種腳操作動力水上活動用板，包含：

一水上活動用板，該水上活動用板底部與外在環境間有一接觸面，並且滑行於該接觸面上；

一感應裝置，該感應裝置置於水上活動用板的上部，使用者可以腳接觸操作水上活動用板；

一電源供應裝置；

一動力引擎裝置；

一推進器裝置。

2. 如申請專利範圍第 1 項所述之腳操作動力水上活動用板，其中該水上活動用板包含：衝浪板、風帆板、滑水板等凡可承載人體重量從事水上活動的用板。

3. 如申請專利範圍第 1 項所述之腳操作動力水上活動用板，其中該電源供應裝置，至少包含一電池及／或其它可供電之裝置。

4. 如申請專利範圍第 1 項所述之腳操作動力水上活動用板，其中該推進器裝置，至少包含一噴射流體集束推進器及／或其它可供推力之推進器，該噴射流體集束推進器屬於一種壓力式的水中推進器，它是使用管狀螺旋轉動加壓的原理，利用其管內中空之處，將扭集與加壓過的水，以高壓的方式自管狀體內噴出，而形成推力。

5. 如申請專利範圍第 1 項所述之腳操作動力水上活動用板，其中該動力引擎裝置，至少包含一電動馬達及／或其它可供動能之裝置。

6. 如申請專利範圍第 1 項所述之腳操作動力水上活動用板，其中該感應裝置進一步至少包含：感應帶、感應線，以感應模式做為操控水上活動用板之開關及／或航速。

7. 如申請專利範圍第 6 項所述之腳操作動力水上活動用板，其中該感應帶至少包含：後感應帶、前感應帶。

8. 如申請專利範圍第 6 項所述之腳操作動力水上活動用板，其中該感應線至少包含：加速感應線。

9. 如申請專利範圍第 6 項所述之腳操作動力水上活動用板，其中該加速感應線至少包含：高速、中速、低速。
10. 如申請專利範圍第 1 項所述之腳操作動力水上活動用板，進一步包含：至少一個防滑溝設於該水上活動用板底部，以為該水上活動用板在與一接觸面發生傾斜時，使水上活動用板不易在接觸面上打滑之用，藉以提高水上活動用板在行進或是轉彎或是左右搖晃時的速率與安全。
11. 如申請專利範圍第 10 項所述之腳操作動力水上活動用板，其中該防滑溝至少包含：一切角及一切角面，該切角在水上活動用板發生傾斜時，即在接觸面上刻劃一痕跡，並在接觸面上留下一痕溝，且該痕溝內存在一切角，用以產生一水平阻力而與離心力相互產生抵消作用，以固定水上活動用板方向及防止水上活動用板打滑；一切角面用於處理切角在接觸面上刻劃痕跡之後的碎物，並將它依序推放在其內或排出，另外亦有支撐切角及水上活動用板的效用。
12. 如申請專利範圍第 10 項所述之腳操作動力水上活動用板，其中該防滑溝設於水上活動用板側邊。
13. 如申請專利範圍第 1 項所述之腳操作動力水上活動用板，進一步包含：太陽能電池板裝置、啟動按鈕、關機按鈕、尾鰭、尾舵、方向舵等。
14. 如申請專利範圍第 1 項所述之腳操作動力水上活動用板，進一步包含：太陽能電源艙、電源供應艙、電動引擎艙、進水艙、防水軸承、進水網、推進器艙、交直流充電器座、電子設備裝置。
15. 如申請專利範圍第 14 項所述之腳操作動力水上活動用板，其中該電動引擎艙進一步包含：電腦控制系統裝置、電子設備盒變速器、一驅動器、一電動馬達、一萬象接頭、傳動軸。
16. 如申請專利範圍第 1 項所述之腳操作動力水上活動用板，其中該感應裝置，只要使用者脫離不接觸該感應裝置及/或其部份裝置，則該腳操作動力水上活動用板將失去動力。

17. 一種隱藏式動力水上活動用板，包含：

一底部具有推進器容置空間的水上活動用板，該推進器空間乃為一將該水上活動用板的推進器完全容納於內的空間；

一電源供應裝置；

一動力引擎裝置；

一可完全隱藏於該水上活動用板底部之內的推進器裝置。

18. 如申請專利範圍第 17 項所述之腳操作動力水上活動用板，其中該推進器裝置，至少包含一噴射流體集束推進器及／或其它可供推力之推進器，該噴射流體集束推進器屬於一種壓力式的水中推進器，它是使用管狀螺旋轉動加壓的原理，利用其管內中空之處，將扭集與加壓過的水，以高壓的方式自管狀體內噴出，而形成推力。

19. 如申請專利範圍第 17 項所述之腳操作動力水上活動用板，其中該水上活動用板包含：衝浪板、風帆板、滑水板等凡可承載人體重量從事水上活動的用板。

20. 如申請專利範圍第 17 項所述之腳操作動力水上活動用板，其中該電源供應裝置，至少包含一電池及／或其它可供電之裝置。

21. 如申請專利範圍第 17 項所述之腳操作動力水上活動用板，其中該動力引擎裝置，至少包含一電動馬達及／或其它可供動能之裝置。

22. 如申請專利範圍第 17 項所述之腳操作動力水上活動用板，進一步包含：至少一個防滑溝設於該水上活動用板底部，以為該水上活動用板在與一接觸面發生傾斜時，使水上活動用板不易在接觸面上打滑之用，藉以提高水上活動用板在行進或是轉彎或是左右搖晃時的速率與安全。

23. 如申請專利範圍第 22 項所述之腳操作動力水上活動用板，其中該防滑溝至少包含：一切角及一切角面，該切角在水上活動用板發生傾斜時，即在接觸面上刻劃一痕跡，並在接觸面上留下一痕溝，且該痕溝內存在一切角，用以產生一水平阻力而與離心力相互產生抵消作用，以固定水上活動用板方向及防止水上活動用板打滑；一切角面

用於處理切角在接觸面上刻劃痕跡之後的碎物，並將它依序推放在其內或排出，另外亦有支撐切角及水上活動用板的效用。

24. 如申請專利範圍第 22 項所述之腳操作動力水上活動用板，其中該防滑溝設於水上活動用板側邊。

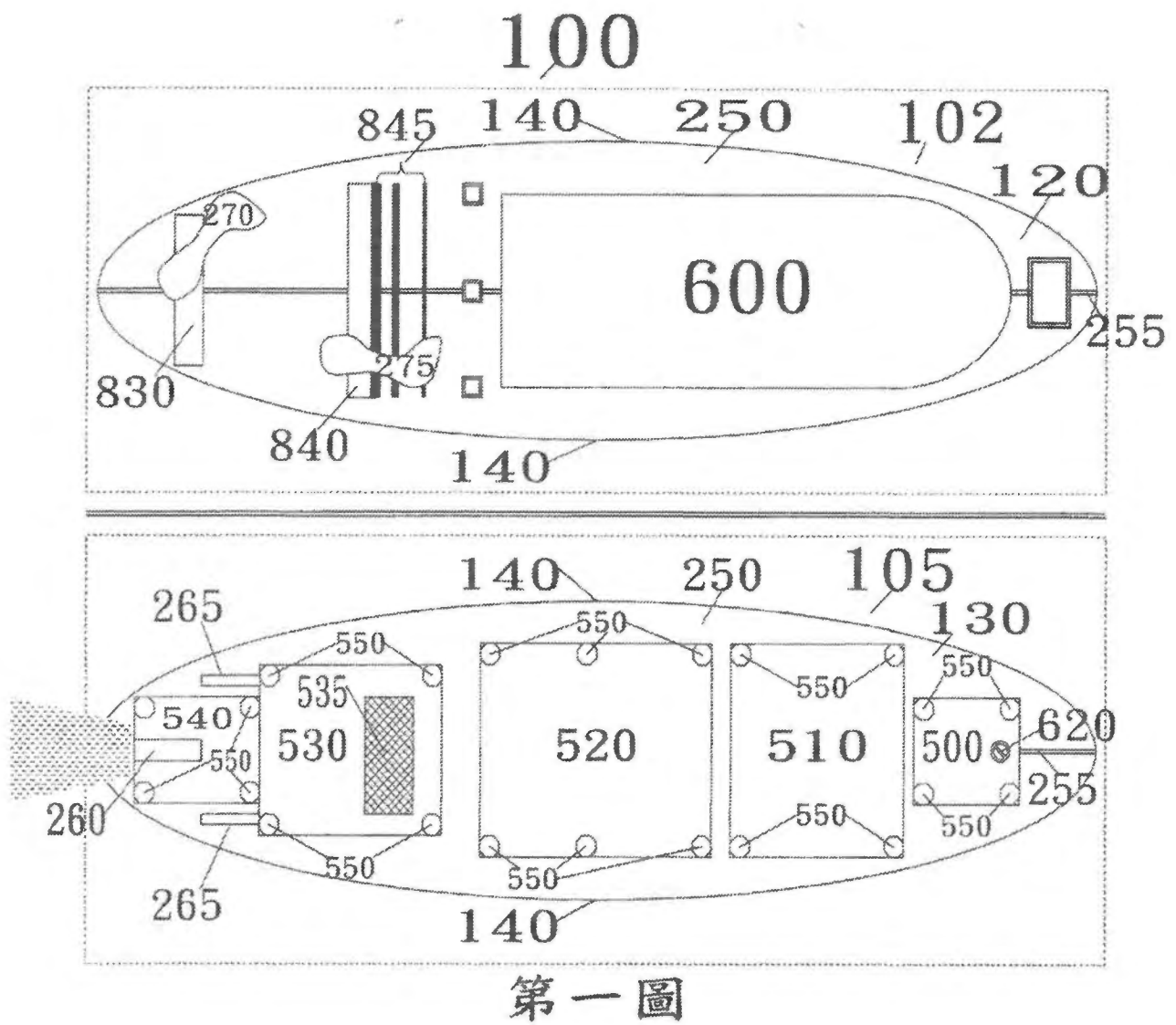
25. 如申請專利範圍第 17 項所述之腳操作動力水上活動用板，進一步包含：太陽能電池板裝置、啟動按鈕、關機按鈕、尾鰭、尾舵、方向舵等。

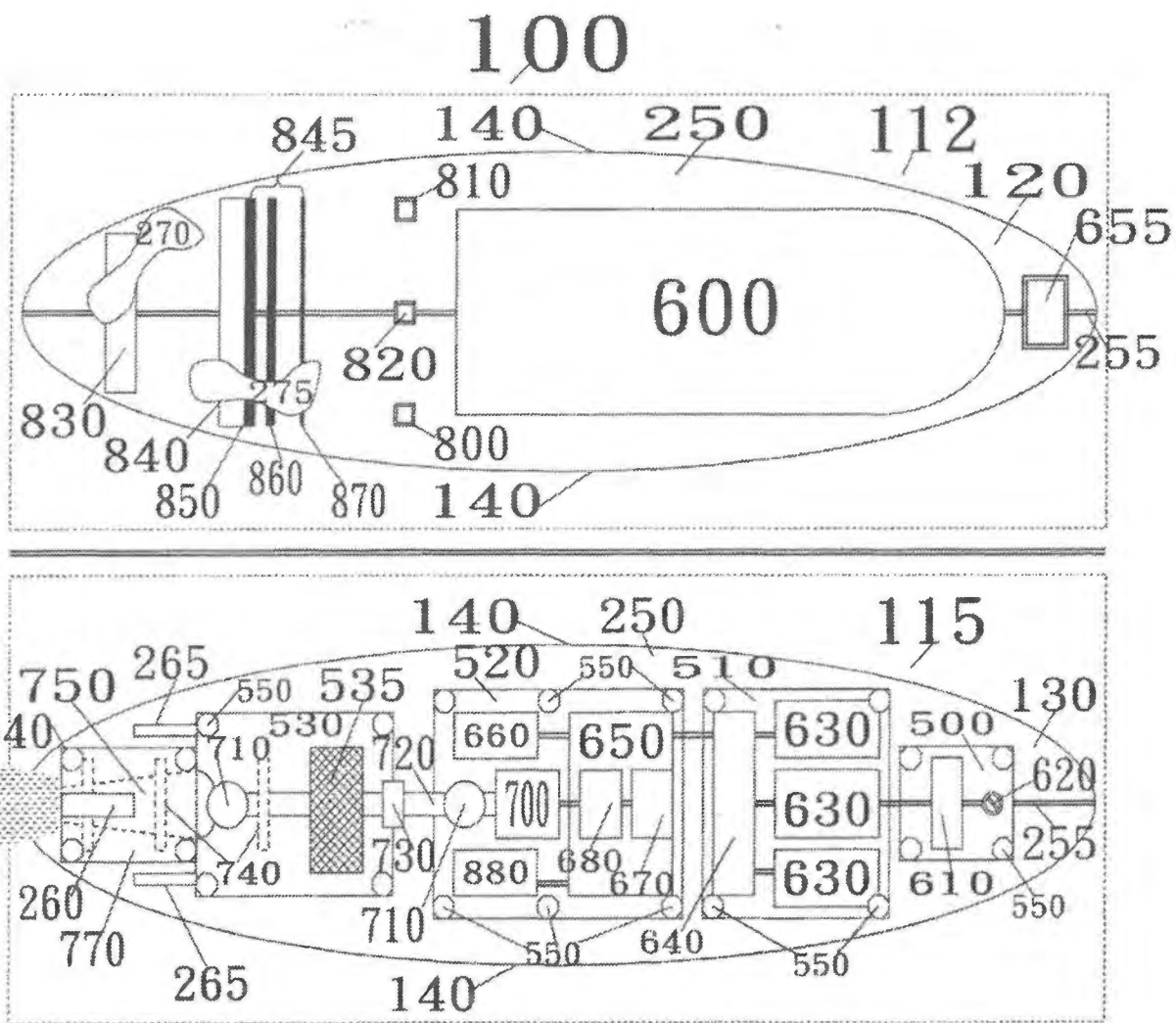
26. 如申請專利範圍第 17 項所述之腳操作動力水上活動用板，進一步包含：太陽能電源艙、電源供應艙、電動引擎艙、進水艙、防水軸承、進水網、推進器艙、交直流充電器座、電子設備裝置。

27. 如申請專利範圍第 26 項所述之腳操作動力水上活動用板，其中該電動引擎艙進一步包含：電腦控制系統裝置、電子設備盒變速器、一驅動器、一電動馬達、一萬象接頭、傳動軸。

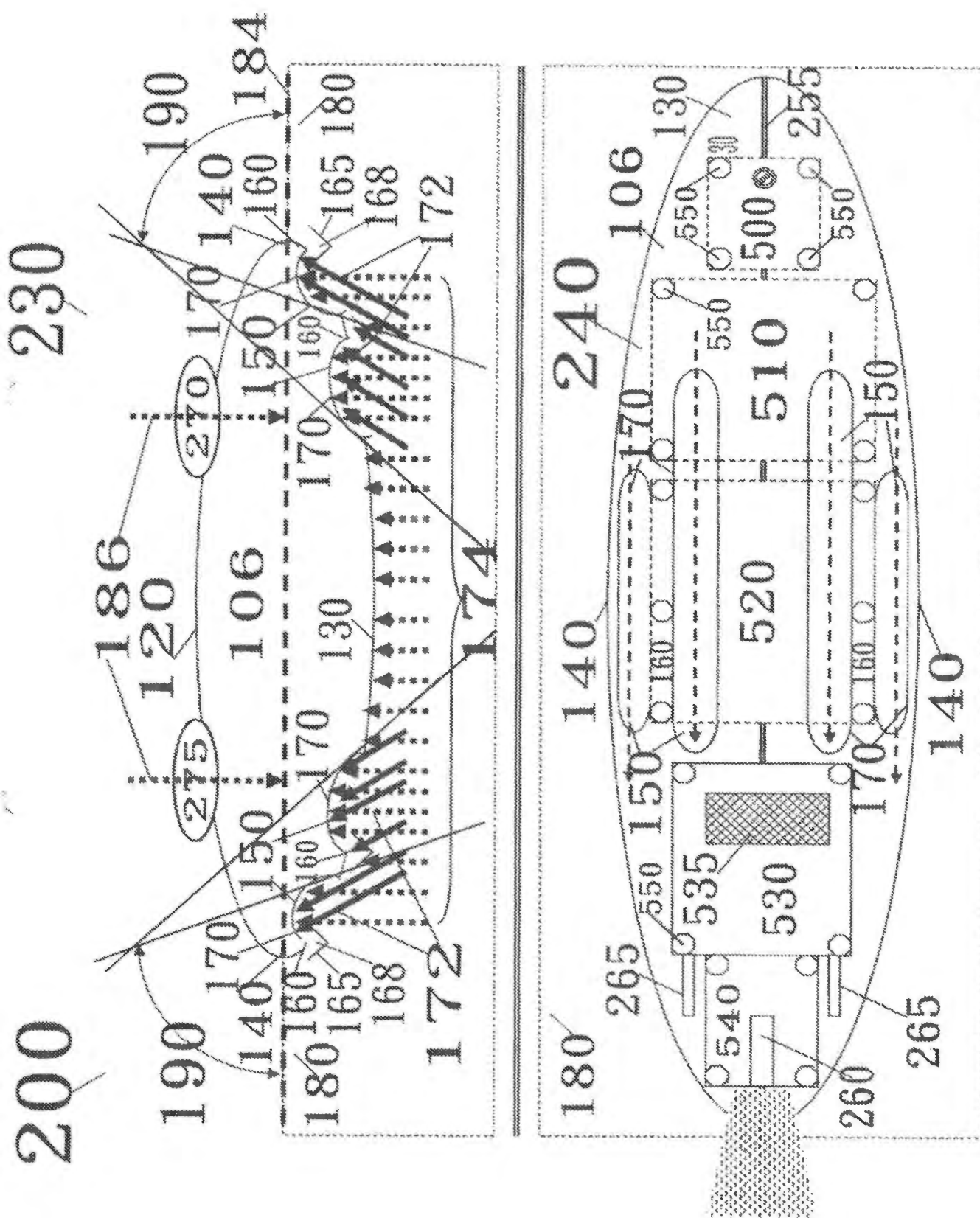
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十一、圖式：

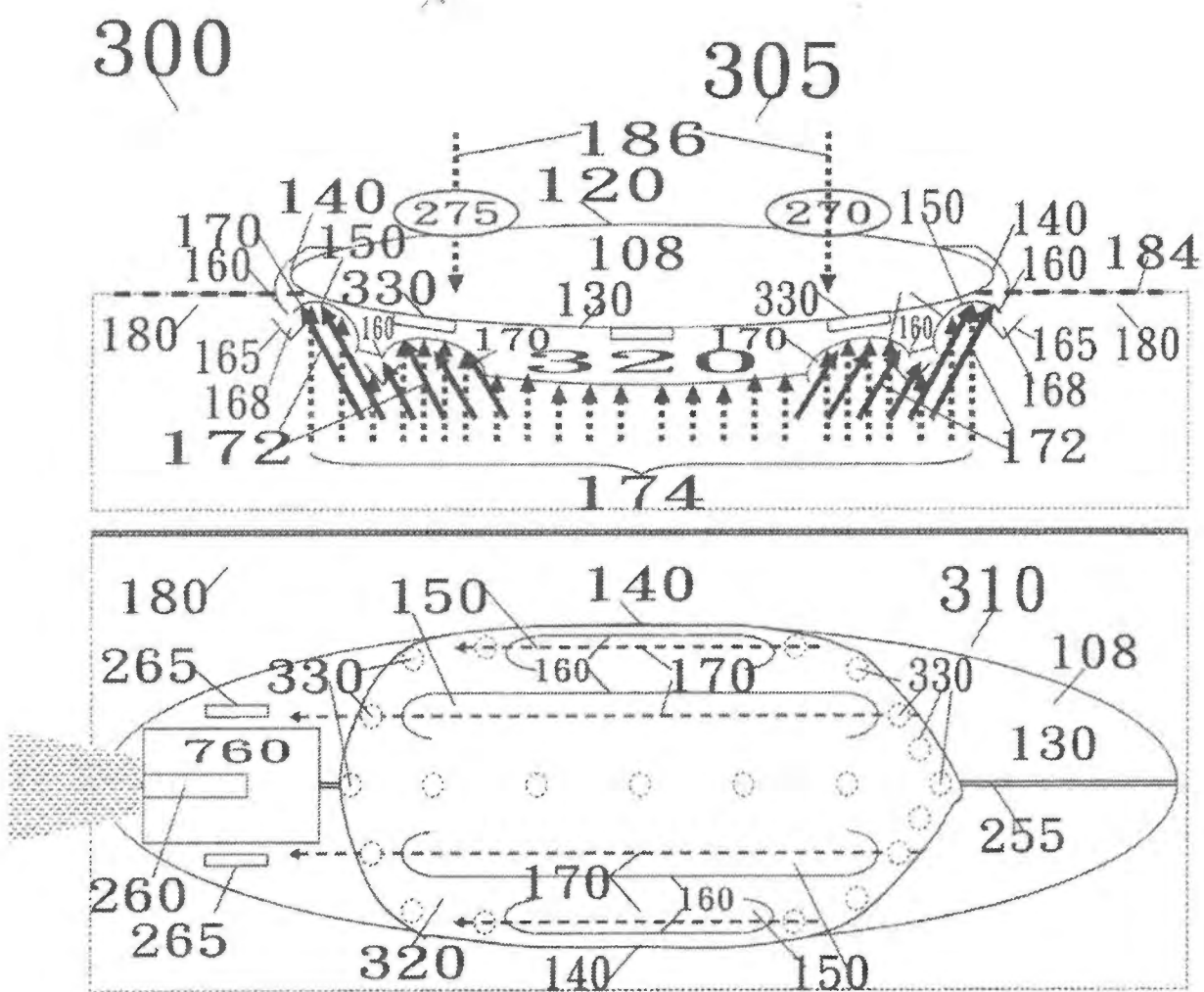




第二圖



第三



第四圖

七、指定代表圖：

(一)本案指定代表圖為：第(一)圖。

(二)本代表圖之元件符號簡單說明：

100--- 腳操作隱藏式動力水上活動用板裝置

102--- 水上活動用板上部示意圖

105--- 水上活動用板底部示意圖

120--- 水上活動用板上部

130--- 水上活動用板底部

140--- 水上活動用板側邊

250--- 水上活動用板

255--- 中心線

260--- 尾舵

265--- 尾鰭

270--- 左腳

275--- 右腳

500--- 太陽能電源艙裝置

510--- 電源供應艙

520--- 電動引擎艙

530--- 進水艙

535--- 進水網

540--- 推進器艙

550--- 螺絲

600--- 太陽能電池板裝置

620--- 交直流充電器座

830--- 後感應帶

840--- 前感應帶

845--- 加速感應線

八、本案若有化學式時，請揭示最能顯示發明特徵的化學式：