UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte MATTHEW EARLEY

Appeal 2019-000815
Application 12/925,235
Technology Center 2800

Before ROMULO H. DELMENDO, RAE LYNN P. GUEST, and MERRELL C. CASHION, JR., *Administrative Patent Judges.*

DELMENDO, *Administrative Patent Judge.*

DECISION ON APPEAL

Pursuant to 35 U.S.C. § 134(a), the Appellant[1] appeals from the Primary Examiner's final decision to reject claims 26–29.[2] We have jurisdiction under 35 U.S.C. § 6(b).

We affirm.

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[1] We use the word "Appellant" to refer to "applicant" as defined in 37 C.F.R. § 1.42. The Inventor, Matthew Earley, is the Applicant and also the real party in interest (Appeal Brief filed February 8, 2018 ("Appeal Br.") at 3).

[2] *See* Appeal Br. 4–11; Reply Brief filed November 5, 2018 ("Reply Br.") at 1–12; Final Office Action entered January 6, 2017 ("Final Act.") at 8–10; Examiner's Answer entered October 3, 2018 ("Ans.") at 3–17.

I. BACKGROUND

The subject matter on appeal relates to a fixed pitch wind turbine with centrifugal weight control (CWC) (original Specification filed October 18, 2010 ("Spec.") at 1, l. 6). The Specification explains that, in the prior art, the operating speed for wind turbines is typically up to 25 m/s but the rated power is typically reached at 14 or 15 m/s (*id.* at 1, ll. 18–19). Thus, "[c]urrent technology captures and transforms less than half of the energy content available" (*id.* at 1, ll. 16–17). According to the Specification, "fixed pitch rotor and centrifugal weight control will permit the generation of increasing amounts of energy for the full distribution of operating speeds in both wind and water scenarios" (*id.* at 1, ll. 14–16).

Figure 1, which illustrates an exemplary embodiment of a fixed pitch wind turbine with CWC (Spec. 1, l. 27), is reproduced from the Drawings filed October 18, 2010, as follows:

Figure # 1

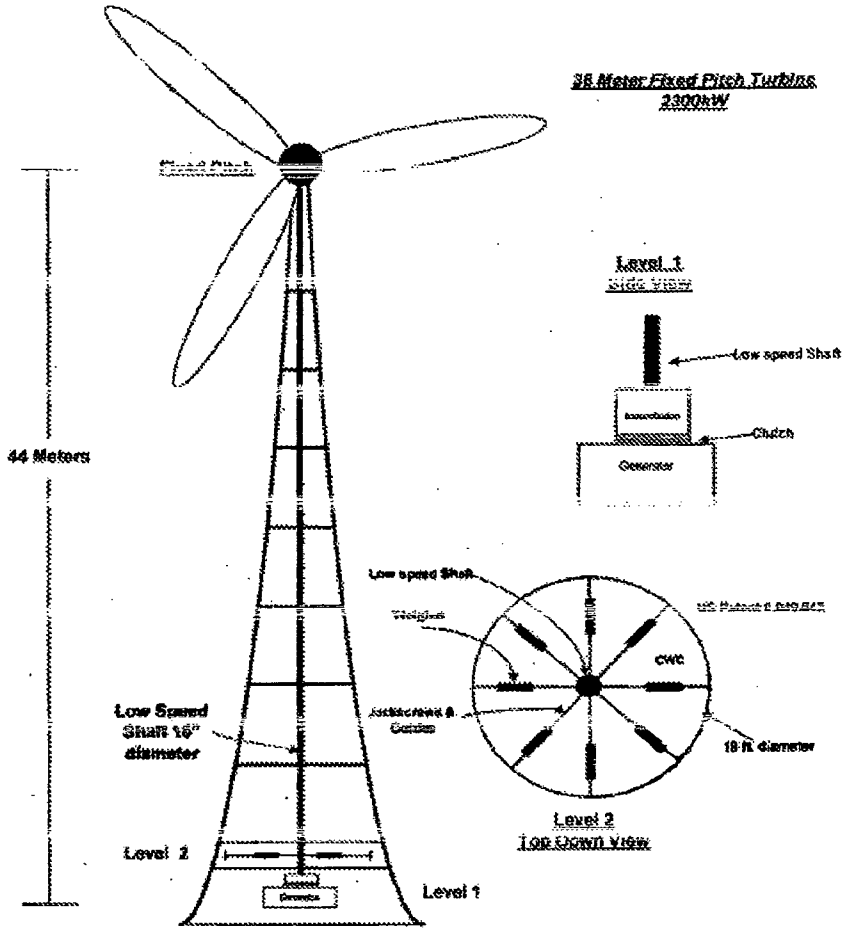

Figure 1 above depicts a fixed wind turbine, which uses a CWC as disclosed in the Appellant's earlier patent, Earley,[3] the principal prior art reference applied in the rejection on appeal (*id.* at 2, ll. 2–3). In addition to permitting the generation of increasing amounts of energy for the full distribution of operating speeds when used with a fixed pitch rotor, as we discussed above, the Specification states that "[e]mploying CWC (in lieu of pitch or stall solutions) in conjunction with induction generator torque, enables on

[3] US 6,949,842 B2, issued September 27, 2005.

demand control of necessary amounts of opposing torque to manage rotor speed in gusty and increasing wind speeds through cut-out . . . typically 25 meters per second" (*id.* at 2, ll. 24–27).

Representative claim 26 is reproduced from the Claims Appendix to the Appeal Brief, as follows:

> 26. A wind turbine ***for the production of increasing amounts of energy in increasing wind speeds up to cut-out at 25 m/s*** [c]omprising:
>
> a supporting framework including: an elevated platform for the swiveling movement about a vertical axis; a supporting tower;
>
> a rotor with fixed pitch blades;
>
> a horizontal low speed shaft that couples to said rotor for rotation with said rotor;
>
> a right angle gearbox that journals said horizontal shaft to input of said right angle gearbox;
>
> an extended vertical shaft that journals to output side of said right angle gearbox;
>
> a centrifugal weight control apparatus that drivingly connects to said extended vertical shaft at base of tower;
>
> a multi-geared transmission having a low speed input connected to said extended vertical shaft;
>
> a high speed output of said multi-geared transmission;
>
> a clutch that journals to said high speed output and;
>
> an induction generator that operatively connects to said clutch for rotation at desired speeds.

(Appeal Br. 12 (emphases and indentations added)).

II. REJECTION ON APPEAL

Claims 26–29 stand rejected under pre-AIA 35 U.S.C. § 103(a) as unpatentable over Earley, Carter,[4] and Simon[5] (Ans. 3–17; Final Act. 8–12).[6]

III. DISCUSSION

1. Grouping of Claims

Unless separately argued within the meaning of 37 C.F.R. § 41.37(c)(1)(iv), the rejected claims stand or fall with claim 26, which we select as representative pursuant to the rule.

2. The Examiner's Position

The Examiner finds that Earley describes an apparatus having most of the structural limitations recited in claim 26 but acknowledges several differences between the prior art and the claimed subject matter (Final Act. 8–9). Specifically, the Examiner finds that Earley does not disclose: (1) an extended vertical shaft; (2) a gearbox with a multi-geared transmission; and (3) an induction-type generator (*id.* at 9). Relying on Carter and Simon, however, the Examiner concludes that these differences would have been obvious to a person having ordinary skill in the art (*id.* at 9–10). Regarding difference (1), the Examiner concludes that "[i]t would have been obvious to one skilled in the art at the time the invention was made to use the extended vertical shaft disclosed by Carter on the supporting tower disclosed by

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[4] US 3,942,026, issued March 2, 1976.

[5] US 2010/0207396 A1, published August 19, 2010.

[6] All other rejections as set forth in the Final Action have been withdrawn (Ans. 3; Final Act. 5–7).

Earley for the purpose of providing mechanical power to a generator located at the base of a tower" (*id.* at 10). Regarding differences (2) and (3), the Examiner concludes:

> It would have also been obvious to one skilled in the art at the time the invention was made to use the multi-speed transmission (in lieu of the multi-geared transmission disclosed by Earley) and an induction generator (in lieu of the generator disclosed by Earley or the generator disclosed by Carter) disclosed by Simon on the wind turbine disclosed by Earley for the purpose of providing multiple high-speed outputs instead of a single high-speed output from the transmission and providing "*a cost-effective machine for converting the rotational energy to electricity*" (see paragraph [0026] of Simon).

(*Id.*)

Regarding claim 26's preamble limitation, the Examiner finds that the recitation "'*for the production of increasing amounts of energy in increasing wind speeds up to cut-out at 25 m/s*' merely recites an 'intended use' of a wind turbine within a range of naturally occurring wind speeds with the listed structural elements, elements which are found in the applied prior art" (Ans. 5). The Examiner explains that the functional limitation recited in the preamble has not been shown to result in a structural difference that distinguishes the claimed wind turbine over the wind turbine suggested by the prior art references (*id.* at 6–7). Relying on extrinsic documentary evidence, the Examiner further states that "worldwide mean wind speeds do not even reach 10 m/s, regardless of location" (*id.* at 8).

3. The Appellant's Contentions

The Appellant contends that claim 26's preamble recites a functional limitation that distinguishes the claimed invention over the prior art (Appeal Br. 4). According to the Appellant, "[c]urrent technology generates

increasing amounts of energy from start up to 15 m/s and continues operation at rated power up to a cut-out speed of 25 m/s" but "[t]he energy production curves for all HAWT's (horizontal axis wind turbine) go perfectly flat in the range from 15 m/s through 24 m/s and cut-out occurs at 25 m/s" (*id.* at 5). The Appellant argues that, by contrast, "[t]he claimed invention generates increasing amounts of energy from start up through 24 m/s and also cuts out at 25 m/s" and that "[t]he examiner errors [sic] when he does not accept the fact that increasing amounts of energy can be generated in the range of 15 to 24 m/s by the claimed invention" (*id.* at 6). Furthermore, the Appellant argues that the Examiner articulates an assembly of the claimed invention from elements found in the prior art references without providing any suggestion or motivation to do so (*id.* at 7). The Appellant also alleges that the claimed invention provides unexpected results (*id.* at 8).

Regarding dependent claim 29, the Appellant argues that an Examiner's statement that Earley discloses excitation of an induction generator "is completely false" (Appeal Br. 9–10).

4. Opinion

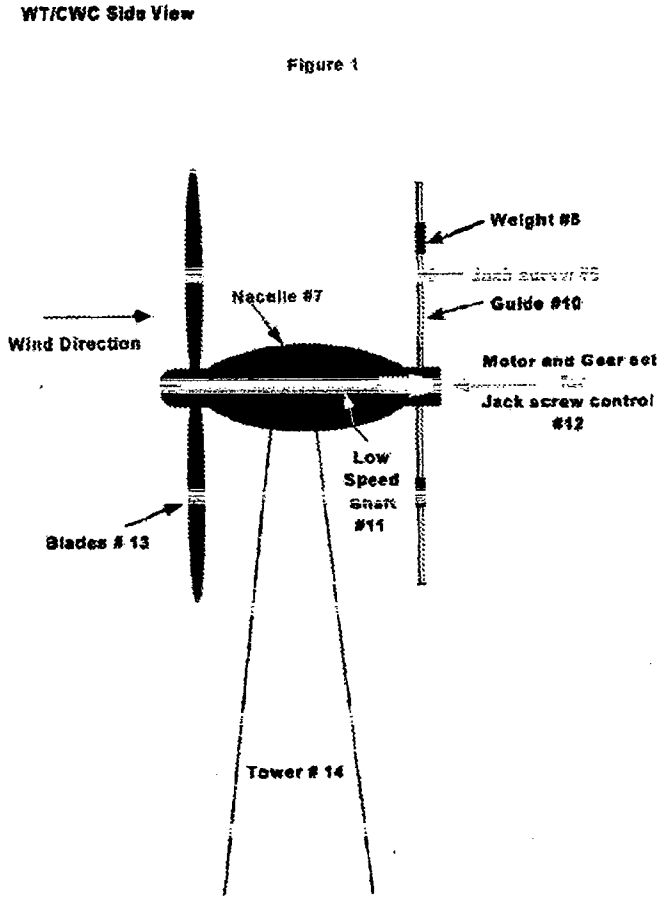
The Appellant's arguments fail to identify reversible error in the Examiner's rejection. *In re Jung*, 637 F.3d 1356, 1365 (Fed. Cir. 2011).

A. Preamble Limitation Issue

It is well-settled that a prior art reference's silence with respect to a function recited in a claim does not necessarily defeat a rejection over that prior art reference. *Cf. In re Schreiber*, 128 F.3d 1473, 1477 (Fed. Cir. 1997). "A patent applicant is free to recite features of an apparatus either structurally or functionally. . . . Yet, choosing to define an element

functionally, *i.e.*, by what it does, carries with it a risk." *Id.* at 1478. Where the PTO has reason to believe that a functional limitation asserted to be critical for establishing patentability in the claimed subject matter may, in fact, be an inherent characteristic of the prior art, it possesses the authority to require an applicant to prove that the subject matter shown in the prior art does not possess the specified characteristic. *Id.*

Earley's Figure 1 is reproduced as follows:



Earley's Figure 1 above depicts a wind turbine with CWC, which "permits the capture and transformation of energy in an increasing flow (wind or water) while maintaining a desired operating speed" and "permits capture

and transformation of additional offered kinetic energy" (Earley, col. 1, ll. 31–49). As the Appellant concedes, Earley's wind turbine includes a fixed pitch rotor and a CWC falling within claim 26's scope (Appeal Br. 7). Because Earley's wind turbine includes the same structural elements that the Appellant discloses are responsible for the functional limitations recited in claim 26's preamble (Spec. 1, ll. 14–16), the burden was on the Appellant to show that Earley's wind turbine as modified by the suggestions in the other prior art references would not inherently perform the same function recited in claim 26. The Appellant does not direct us to any objective evidence in satisfaction of meeting that burden. *See In re Best*, 562 F.2d 1252, 1255 (CCPA 1997) ("Whether the rejection is based on 'inherency' under 35 U.S.C. § 102, on 'prima facie obviousness' under 35 U.S.C. § 103, jointly or alternatively,[] the burden of proof is the same, and its fairness is evidenced by the PTO's inability to manufacture products or to obtain and compare prior art products.").

B. Articulated Reason for Combining References

The Appellant argues that the Examiner fails to articulate a sufficient reason for combining the references in the manner claimed (Appeal Br. 7). That is incorrect. The Examiner's explanation of the rejection articulates specific reasons in support of combining the references in the manner claimed by the Appellant (Final Act. 9–10).

Specifically, the Examiner relies on Carter for its disclosure of "an extended vertical [drive] shaft **80** connecting a right angle gearbox (gears **86** and **98**) to a multi-geared transmission (gears **94** and **96**) having a low speed input (first bevel gear **94**) and a high speed output (second bevel gear **96**) of said multi-geared transmission" with the high speed output being connected

to a first generator **100** (Final Act. 9 (bolding added); Carter, Fig. 1; col. 3, l. 41–col. 4, l. 13). Based on this finding, the Examiner concludes that "[i]t would have been obvious to one skilled in the art . . . to use the extended vertical [drive] shaft disclosed by Carter on the supporting tower disclosed by Earley for the purpose of providing mechanical power to a generator located at the base of a tower" (Final Act. 10).

The Examiner further relies on Simon for its disclosure of an induction generator, which provides a cost-effective machine for converting rotational energy to electricity (Final Act. 9; Simon ¶ 26). Based on this disclosure, the Examiner concludes that a person having ordinary skill in the art would have implemented an induction generator in Earley for the purpose of providing, *inter alia*, a cost-effective machine for converting the rotational energy to electricity (Final Act. 10).

The Appellant, on the other hand, does not identify the specific error(s) in the Examiner's articulated reasoning that warrants reversal. *Jung*, 637 F.3d at 1365–66 ("'reversible error' means that the applicant must identify to the Board what the examiner did wrong").

C. Unexpected Results

Although the Appellant argues that unexpected results are achieved, the Appellant does not direct us to objective, experimental data comparing the claimed invention against the closest prior art. Indeed, as we found above, Earley explicitly teaches that the disclosed wind turbine with CWC "permits the capture and transformation of energy in an increasing flow (wind or water) while maintaining a desired operating speed" and "permits capture and transformation of additional offered kinetic energy" (Earley, col. 1, ll. 31–49). Therefore, the Appellant's unsupported argument is

unpersuasive. *In re Baxter Travenol Labs.*, 952 F.2d 388, 392 (Fed. Cir. 1991) ("[W]hen unexpected results are used as evidence of nonobviousness, the results must be shown to be unexpected compared with the closest prior art. . . . Mere recognition of latent properties in the prior art does not render nonobvious an otherwise known invention.").

For these reasons, we uphold the Examiner's rejection as maintained against claim 26.

D. Claim 29

Regarding claim 29, the Appellant argues that Earley does not disclose an induction generator or excitation and that the Examiner's findings to the contrary are "completely false" (Appeal Br. 9–10). As the Examiner points out (Ans. 17) and as we discussed above, the rejection relies on Simon for the induction generator limitation.

Therefore, we also maintain the rejection as maintained against claim 29.

IV. CONCLUSION

In summary:

Claims Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
26–29	103(a)	Earley, Carter, Simon	26–29	

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a).

AFFIRMED

UNITED STATES PATENT AND TRADEMARK OFFICE

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Before ROMULO H. DELMENDO, RAE LYNN P. GUEST, and MERRELL C. CASHION, JR., *Administrative Patent Judges*.

DELMENDO, *Administrative Patent Judge*.

DECISION ON REQUEST FOR REHEARING

The Appellant[1] requests rehearing of our Decision on Appeal entered November 14, 2019 ("original Decision" or "original Dec."), in which we affirmed the Primary Examiner's final decision to reject claims 26–29 (Request for Rehearing filed November 27, 2019 ("Request" or "Req. Reh'g"). We have jurisdiction under 35 U.S.C. § 6.

The Appellant's arguments in the Request do not provide any substantive arguments on the merits to establish that we misapprehended or overlooked any point in our original Decision (Req. Reh'g 1). Rather, the

[1] We use the word "Appellant" to refer to "applicant" as defined in 37 C.F.R. § 1.42. The Inventor, Matthew Earley, is the Applicant and also the real party in interest (Appeal Brief filed February 8, 2018 ("Appeal Br.") at 3).

Appellant contends that we changed the ground of rejection to a new rejection under 35 U.S.C. § 102 because we cited to *In re Schreiber*, 128 F.3d 1473, 1477, 1478 (Fed. Cir. 1997) in our original Decision, whereas the Examiner cited to *Kropa v. Robie*, 187 F.2d 150, 152 (CCPA 1951) (Req. Reh'g 1). According to the Appellant, "[i]n the PTAB's Decision on Appeal[,] the [affirmance of the] rejection of . . . Claim 26 was based on [*Schreiber*,] stating that [the] function found in preamble is also found in prior art of Earley" and "that this is, in fact, an undesignated new ground of rejection" (*id.*). The Appellant states further that, should the Appellant "have an opportunity to respond to the new rejection, the necessary 'proof' may already be at hand" (*id.* (referring to arguments made on pages 3–6 in a Reply filed November 23, 2015, which is attached to the Request, and the Examiner's response in a Non-Final Office Action entered December 9, 2015 (paragraph 8)).

We maintain our affirmance of the Examiner's rejection for the reasons given in our original Decision. For the reasons discussed below, we also do not agree with the Appellant that we entered an undesignated new ground of rejection in our original Decision. But given the Appellant's *pro se* status and the complex nature of this prosecution, we hereby grant—out of an abundance of caution—the Appellant's request to designate our affirmance as a new ground of rejection to afford the Appellant with all the procedural safeguards. *See, e.g.*, 37 C.F.R. § 41.37(c)(1) ("[A] brief filed by an appellant who is not represented by a registered practitioner need only substantially comply with paragraphs (c)(1)(i), (c)(1)(ii), (c)(1)(iv), and (c)(1)(v) of this section.").

For completeness, we explain why our original Decision did not include an undesignated new ground of rejection. Although the Appellant is correct that *Schreiber* decided an anticipation rejection under 35 U.S.C. § 102(b), 128 F.3d at 1475, we cited to it using the signal "*Cf.*"[2] for the proposition that: (i) "[i]t is well-settled that a prior art reference's silence with respect to a function recited in a claim does not necessarily defeat a rejection over that prior art reference"; (ii) an applicant is free to recite features of an apparatus either structurally or functionally, but functional claiming carries with it a risk; and (iii) "[w]here the PTO has reason to believe that a functional limitation asserted to be critical for establishing patentability in the claimed subject matter may, in fact, be an inherent characteristic of the prior art, it possesses the authority to require an applicant to prove that the subject matter shown in the prior art does not possess the specified characteristic" (original Dec. 7–8). Furthermore, we cited to *In re Best*, 562 F.2d 1252, 1255 (CCPA 1997), for the proposition that this shifting in the burden of production may, if warranted, be appropriate in either a 35 U.S.C. § 102 or 35 U.S.C. § 103 context (original Dec. 9).

While it is true that the Examiner discussed the *Kropa* case (Ans. 4–5), the Examiner also pointed out that a claim to an apparatus must be distinguished patentably from the prior art in terms of structure rather than function (*id.* at 10). Indeed, the Examiner found that the Appellant failed to prove that the result recited in claim 26's preamble was sufficient to confer

[2] "*Cf.*" indicates that the cited authority supports a proposition different from the main proposition but sufficiently analogous to lend support—i.e., to compare. *The Bluebook®: A Uniform System of Citation* 59 (20th ed.).

novelty or "unexpected results" over the prior art (*id.* at 14). In this regard, the Examiner found that "Earley clearly teaches . . . a centrifugal weight control apparatus (CWC in Figures 1 and 3)" (Final Act. 8) and that "t]he only additional structural component added by the Appellant is the 'Centrifugal Weight Control' system, invented by the Appellant, p[l]aced between the vertical shaft and the input of the rotational speed and torque adjusting mechanism" (Ans. 13). We expounded upon the Examiner's position, but we did not alter it to the extent that our original Decision included an undesignated new ground of rejection—i.e., we did not change the basic thrust of the Examiner's rejection. *In re Jung*, 637 F.3d 1356, 1365 (Fed. Cir. 2011) (explaining that limiting the Board's decision to "verbatim repetition of the examiner's office actions . . . would ill-serve the Board's purpose as a reviewing body"); *In re Kronig*, 539 F.2d 1300, 1302–03 (CCPA 1976) (no new ground of rejection where an appellant has had an opportunity to react to the thrust of the rejection).

As we stated above, in view of the Appellant's *pro se* status and the complex nature of this prosecution, it is appropriate to designate our affirmance as a new ground of rejection pursuant to 37 C.F.R. § 41.50(b). 37 C.F.R. § 41.50(b) provides "[a] new ground of rejection pursuant to this paragraph shall not be considered final for judicial review."

37 C.F.R. § 41.50(b) also provides that the Appellant, WITHIN TWO MONTHS FROM THE DATE OF THIS DECISION, must exercise one of the following two options with respect to the new ground of rejection to avoid termination of the appeal as to the rejected claims:

(1) *Reopen prosecution.* Submit an appropriate amendment of the claims so rejected or new evidence relating to the claims so rejected, or both, and have the matter reconsidered by the examiner, in which event the proceeding will be remanded to the examiner. . . .

(2) *Request rehearing.* Request that the proceeding be reheard under § 41.52 by the Board upon the same record. . . .

IV. CONCLUSION

In summary:

Outcome of Decision on Rehearing

Claims Rejected	35 U.S.C. §	Reference(s)/Basis	Denied	Granted
26–29	103(a)	Earley, Carter, Simon		26–29 (newly rejected)

Outcome of Appeal after Rehearing:

Claims Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed	New Ground
26–29	103(a)	Earley, Carter, Simon	26–29		26–29

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a).

GRANTED/AFFIRMED; 37 C.F.R. § 41.50(b)

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte MATTHEW EARLEY

Appeal 2019-000815
Application 12/925,235
Technology Center 2800

Before ROMULO H. DELMENDO, RAE LYNN P. GUEST, and MERRELL C. CASHION, JR., *Administrative Patent Judges*.

DELMENDO, *Administrative Patent Judge*.

SECOND DECISION ON REQUEST FOR REHEARING

The Appellant[1] requests a rehearing, based upon the same record pursuant to 37 C.F.R. § 41.50(b)(2) (Second Request for Rehearing filed February 12, 2020; "Second Req. Reh'g"), of our first Decision on Request for Rehearing Appeal entered January 27, 2020 ("First Dec. Req. Reh'g").[2] We have jurisdiction under 35 U.S.C. § 6. For the reasons given below, we deny the Appellant's second Request for Rehearing.

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[1] We use the word "Appellant" to refer to "applicant" as defined in 37 C.F.R. § 1.42. The Inventor, Matthew Earley, is the Applicant and also the real party in interest (Appeal Brief filed February 8, 2018 ("Appeal Br.") at 3).

[2] In our first Decision on Request for Rehearing, we reaffirmed the Primary Examiner's final decision to reject claims 26–29 but designated our decision as including a new ground of rejection given the Appellant's *pro se* status and the complex nature of this prosecution (First Dec. Req. Reh'g. 2).

According to the Appellant, the arguments in the second Request for Rehearing are "directed exclusively at independent claim 26 with a focus on disclosed and inherent characteristics of prior art related to size, function, operation, and structure of the claimed invention" (Second Req. Reh'g 1). Therefore, all claims on appeal stand or fall with claim 26. 37 C.F.R. § 41.37(c)(1)(iv).

We have fully considered the Appellant's arguments in this Second Request for Rehearing, but these arguments are unpersuasive to establish that we misapprehended or overlooked any point in our First Decision on Request for Rehearing. 37 C.F.R. § 41.52(a).

The Appellant argues that Simon,[3] which the Examiner cites for the "induction generator" limitations in claim 26 (Final Act. 9), "is sized to reach rated power at approximately 12 m/s" and, therefore, "would not permit the production of increasing amounts of electrical energy through 24 m/s as is accomplished in the claimed invention" (Second Req. Reh'g 2). According to the Appellant, "[a]n induction generator with a 12 m/s rating would render the claimed invention inoperable for its intended use"—i.e., where "[t]he claimed invention is unique in its ability to generate increasing amounts of energy through 24 m/s" (*id.* at 2–3).

The Appellant's argument regarding Simon's induction generator, however, is not supported by objective evidence (e.g., a sworn declaration).[4]

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[3] US 2010/0207396 A1, published August 19, 2010.

[4] *In re De Blauwe*, 736 F.2d 699, 705 (Fed. Cir. 1984) ("Mere argument or conclusory statements in the specification does not suffice."); *In re Lindner*, 457 F.2d 506, 508 (CCPA 1972) ("[M]ere conclusory statements in the specification and affidavits are entitled to little weight when the Patent Office questions the efficacy of those statements.").

Simon teaches that an induction generator provides a cost-effective machine for converting rotational energy to electricity for power to an electric grid (Simon ¶ 26). According to Simon, "[t]he input energy from [a] turbine . . . provides rotational power to the output . . . that attempts to force the induction generator to rotate faster than its reference speed" and that "[t]his places the induction generator in a positive slip condition and causes it to generate power" (*id.*). Given that (i) Simon does not place any limitations on wind speed (*id.* ¶ 63 (teaching that "[s]pecific sizing of the generators is dependent upon turbine size and efficiency" and also showing an exemplary turbine size of 10 m radius and 45% efficiency only), and (ii) Earley teaches that the centrifugal weight control (CWC) described therein permits additional energy to be transformed into electricity at higher than conventional flow speeds (Earley, col. 1, ll. 15–33; col. 2, ll. 14–20), we conclude that a person having ordinary skill in the art would have found it obvious to size and select an induction generator as suggested by Simon to match the enhanced capabilities of Earley's CWC.[5] The Appellant does not offer objective evidence that such a modification of Earley's system would have been beyond the technical grasp of a person having ordinary skill in the art.[6] Thus, although we appreciate that claim 26's preamble language recites a new capability rather than merely an intended use, this capability was

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[5] *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 420 (2007) ("[F]amiliar items may have obvious uses beyond their primary purposes, and in many cases a person of ordinary skill will be able to fit the teachings of multiple patents together like pieces of a puzzle.").

[6] *KSR*, 550 U.S. at 421 ("When there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill has good reason to pursue the known options within his or her technical grasp.").

already disclosed in Earley, as we recounted above and in our prior Decisions, and when Earley and Simon are combined, the advantages latent in Earley would reasonably be expected to flow from their combination.

The Appellant argues that "[i]n the claimed invention[,] the CWC acts as a buffer, accommodates gear changes, and *plays a minor role* in controlling and stopping the wind turbine as wind speeds approach 25 m/s" (Second Req. Reh'g at 3 (emphasis added)). In addition, referring to arguments offered earlier in the prosecution, the Appellant argues that "current wind turbines" generate increasing amounts of energy up to a wind speed of 15 m/s but then energy generation flattens beyond that wind speed (*id.*) (emphasis omitted). With specific reference to Earley's Figures 1 and 3, the Appellant argues that Earley's CWC functions as an air brake and would inhibit the kind of energy production that is quantified in the current application (*id.* at 7). According to the Appellant, the rotating CWC guides, jackscrews, and weights will impart a certain amount of drag that would increase as the weights extend during routine operation (*id.*). This allegation, however, amounts to mere argument, not objective evidence, *relative to Earley's system including an improved CWC.*[7] In this regard, the Appellant's argument appears to be at odds with the disclosures found in Earley and the current Specification (Earley, col. 1, ll. 15–33; col. 2, ll. 14–20; Specification filed October 18, 2010 ("Spec.") 1, ll. 14–16). The Appellant does not direct us to any language in claim 26 that would positively exclude rotating CWC guides, jackscrews, or weights.

The Appellant argues:

[7] *In re Baxter Travenol Labs.*, 952 F.2d 388, 392 (Fed. Cir. 1991).

> Figure 1 . . . in prior art of Earley discloses CWC with an identical diameter to rotor/blade assembly. In the claimed invention this would be 36 meters. It is inherently a very large air brake. The prior art of Earley discloses both an electro-mechanical and (inherent) aerodynamic means for speed control through 24 m/s.
>
> The claimed invention is operationally unique in that it has no aerodynamic means of controlling rotor speed. It offers two electromechanical means of speed control. They are opposing torque of the induction generator rated at 25 m/s and CWC. CWC in the claimed invention is at the bottom of the tower; has a ten ft. diameter; extends and retracts weights totaling 8 thousand pounds.
>
> Examiner does not modify the induction generator so that it would be effective in the claimed invention. Per figure 6 of the claimed invention the Simon generator sized for rated power at 12 m/s would have a rating of 479 kW. The induction generator employed in the claimed invention would have a rating of approximately 2,308 kW. (See fig. #6 / power column – in specification).

(Second Req. Reh'g 5).

Again, the Appellant's argument is based merely on conclusory statements that are not accompanied by any objective evidence (e.g., declaration evidence) providing detailed specifics of the systems used for comparison.[8] But even if this argument had been supported by objective evidence, claim 26 does not recite any of the argued features (e.g., a limitation on air brake size, the exclusion of an aerodynamic means, a CWC diameter, ability to extend or retract weights totaling eight thousand pounds,

[8] *De Blauwe*, 736 F.2d at 705; *Lindner*, 457 F.2d at 508.

or induction generator rating) relied on for patentability.[9] Also, the Appellant points to Figure 6 of the subject application, but that Figure is described as "a 20-year projection for a 36-meter system with power totals at 15 m/s for current solution and 25 m/s for the discussed solution" (Spec. 1, ll. 20–21). The specific details of the "current solution" and the "discussed solution" are not provided, so a meaningful comparison of the claimed invention against the closest prior art, which is Earley, cannot be undertaken.

For these reasons and those provided in our earlier Decisions, we uphold the Examiner's rejection.

IV. CONCLUSION

In summary:

Outcome of Decision on Rehearing

Claims Rejected	35 U.S.C. §	Reference(s)/Basis	Denied	Granted
26–29	103(a)	Earley, Carter, Simon	26–29	

Outcome of Appeal after Rehearing:

Claims Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
26–29	103(a)	Earley, Carter, Simon	26–29	

[9] *In re Self*, 671 F.2d 1344, 1348 (CCPA 1982) ("[A]ppellant's arguments fail from the outset because . . . they are not based on limitations appearing in the claims.").

NOTE: This disposition is nonprecedential.

United States Court of Appeals for the Federal Circuit

IN RE: MATTHEW EARLEY,
Appellant

2020-1816

Appeal from the United States Patent and Trademark Office, Patent Trial and Appeal Board in No. 12/925,235.

Decided: December 14, 2020

MATTHEW EARLEY, Allenwood, NJ, pro se.

MARY L. KELLY, Office of the Solicitor, United States Patent and Trademark Office, Alexandria, VA, for appellee Andrei Iancu. Also represented by MICHAEL S. FORMAN, THOMAS W. KRAUSE, AMY J. NELSON, FARHEENA YASMEEN RASHEED.

Before PROST, *Chief Judge*, CLEVENGER and TARANTO, *Circuit Judges*.

PER CURIAM.

Matthew Earley is the named inventor on U.S. Patent Application No. 12/925,235 (the '235 application), titled "Fixed Pitch Wind (or Water) Turbine with Centrifugal

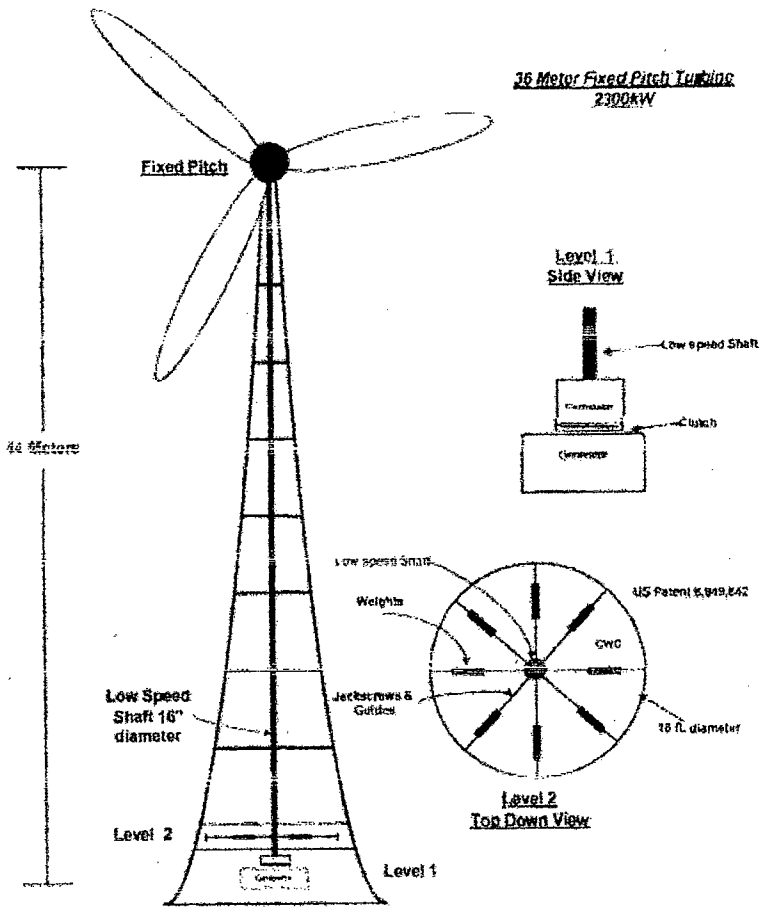
Weight Control (CWC)." The examiner rejected claims 26–29 of the '235 application for obviousness based on one of Mr. Earley's prior patents, *i.e.*, U.S. Patent No. 6,949,842 (the '842 patent), in combination with U.S. Patent No. 3,942,026 (Carter) and U.S. Patent Publication No. 2010/0207396 (Simon). The Patent Trial and Appeal Board affirmed the examiner's rejections. We affirm the Board.

I

The '235 application, filed on October 18, 2010, involves fixed-pitch wind or water turbines with centrifugal weight control. J.A. 30. For this appeal, the application's disclosures on wind turbines are most relevant. The application builds on Mr. Earley's '842 patent and uses that earlier patent's "control solution"—a centrifugal-weight-control assembly. J.A. 31. This application describes "an implementation" that "extend[s] the low speed shaft down the length of the tower" of a wind turbine. J.A. 31. According to the '235 application, "extending the low speed shaft down the length of the tower also means you can move other major components down, including [a] generator and [a] gearbox," resulting "in several compelling advantages." J.A. 31. The centrifugal-weight-control "configuration is horizontal (perpendicular to [the] vertical low speed shaft)." J.A. 32.

Figure 1 illustrates the wind-turbine embodiment:

Figure # 1



J.A. 35.

The specification asserts that this configuration is an improvement over the prior art. It says: "Employing [centrifugal weight control] (in lieu of pitch or stall solutions) in conjunction with induction generator torque, enables on demand control of necessary amounts of opposing torque to manage rotor speed in gusty and increasing wind speeds through cut-out . . . typically 25 meters per second." J.A.

31 (second alteration in original). "Current technology captures and transforms less than half of the energy content available," the specification states, explaining that, in the prior art, "the operating speed [for wind turbines] is typically up to 25 m/s" but the "rated power is typically reached at 14 or 15 m/s." J.A. 30. The arrangement in the '235 application purports to use more of the available energy.

Claim 26 is representative and recites:

> A wind turbine **for the production of increasing amounts of energy in increasing wind speeds up to cut-out at 25 m/s** [c]omprising:
>
> a supporting framework including:
>
> an elevated platform for the swiveling movement about a vertical axis;
>
> a supporting tower;
>
> a rotor with fixed pitch blades;
>
> a horizontal low speed shaft that couples to said rotor for rotation with said rotor;
>
> a right angle gearbox that journals said horizontal shaft to input of said right angle gearbox;
>
> an extended vertical shaft that journals to output side of said right angle gearbox;
>
> a centrifugal weight control apparatus that drivingly connects to said extended vertical shaft at base of tower;
>
> a multi-geared transmission having a low speed input connected to said extended vertical shaft;
>
> a high speed output of said multi-geared transmission;

> a clutch that journals to said high speed output[; and]
>
> an induction generator that operatively connects to said clutch for rotation at desired speeds.

J.A. 756 (emphasis added).

II

A

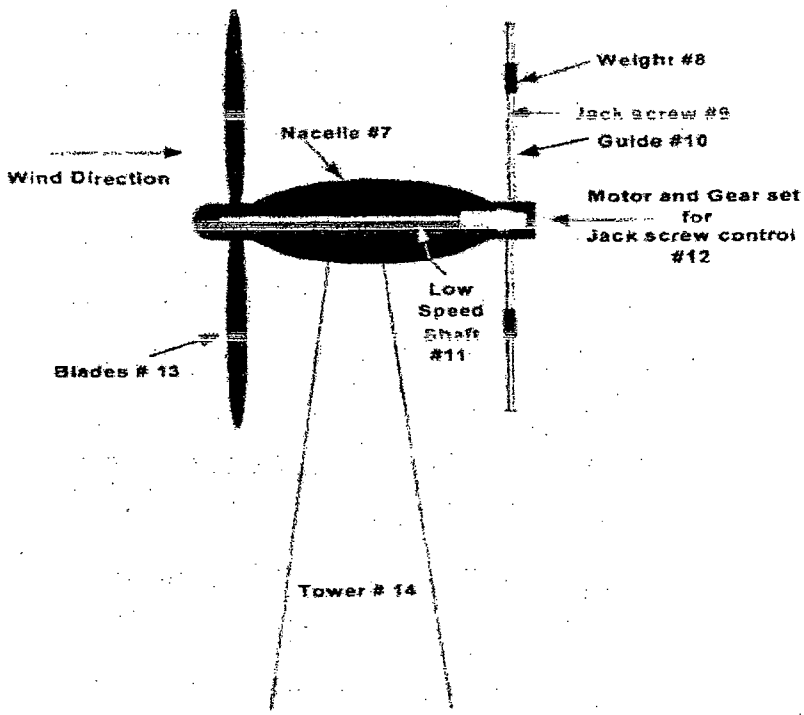
The examiner and the Board relied on three prior-art references—the '842 patent, Carter, and Simon—for rejecting representative claim 26.

The '842 patent: "Centrifugal Weight Control for a Wind or Water Turbine." The '842 patent lists Mr. Earley as the inventor and describes a "centrifugal weight control" assembly that "control[s] rotor speed" while wind (or water) speed changes. '842 patent, col. 2, lines 14–18. The assembly includes weights that can be moved away from or toward the rotational axis to change the inertial force. *Id.*, col. 2, lines 30–50. By adjusting the location of the weights while the overall assembly rotates, the centrifugal-weight-control assembly can maintain the wind turbine's operating speed while increasing rolling torque, which allows generators to capture energy. *Id.* The general concept is similar to changing gears on a bike. Unlike the '235 application, the centrifugal-weight-control assembly of the '842 patent is essentially parallel to the blades of a wind turbine and not connected to a vertical shaft.

Figure 1 shows the placement of the assembly:

WT/CWC Side View

Figure 1

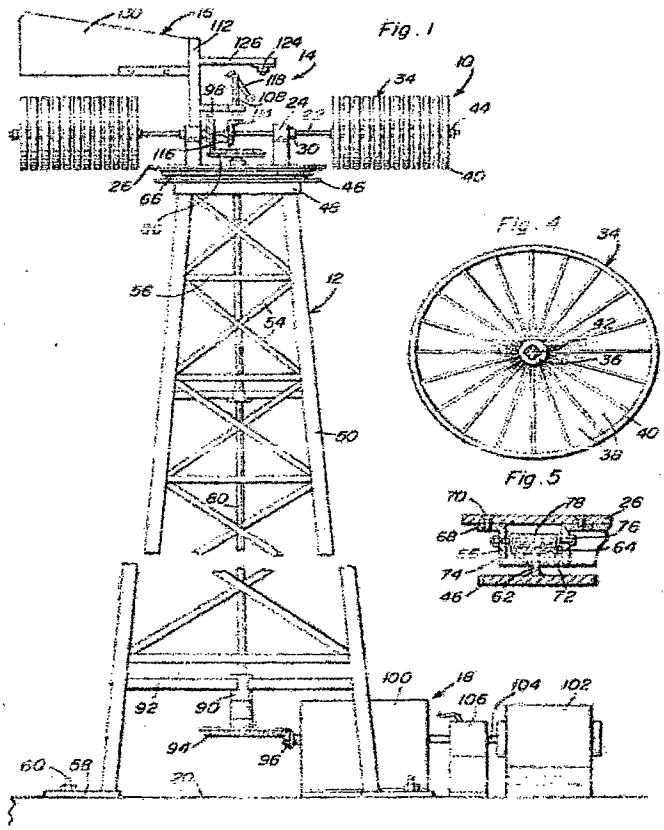


'842 patent, fig. 1.

Carter: "Wind Turbine with Governor." Carter "generally relates to a wind driven turbine assembly for driving a generator or generators in a manner to produce electrical energy in response to rotation of the wind turbine." Carter, col. 1, lines 6–9. Carter describes "a wind turbine assembly including a single vertical drive shaft drivingly connected to a generator assembly and a governor assembly for controlling the rotational speed of the drive shaft by connecting additional generators to the drive shaft for increasing

the load thereon." *Id.*, col. 1, lines 37–43. "The horizontal shaft is drivingly connected to a vertical shaft which drives a generator assembly at the lower end of the supporting framework. A wind vane assembly is connected to the turntable and a governor assembly is drivingly connected to the horizontal shaft for controlling the rotational speed of the wind wheels and horizontal shaft." *Id.*, Abstract.

Figure 1 shows the location of the transmission and generator at the base of the turbine:



Carter, fig. 1.

Simon: "Power Generating System." This prior-art reference describes "[a] system for converting wind power to

electrical power comprising a transmission module with multiple power flows to an output and a first generator coupled to the output." Simon, Abstract. In particular, Simon describes a "power conversion module 18" with "an induction generator, which provides a cost-effective machine for converting the rotational energy to electricity for power to the grid 22." *Id.*, ¶ 26. Simon also describes a multi-geared transmission, namely, "a transmission 30 selectable between at least two gear ratios, for example[,] a three (or more) speed transmission, coupled between the turbine 10 for receiving wind energy and at least one generator 36 in the power conversion module 18." *Id.*, ¶ 30.

B

On January 6, 2017, the examiner issued Mr. Earley a final rejection of claims 26–29 for obviousness over the combination of the '842 patent, Carter, and Simon. J.A. 598 (Final Rejection). The examiner determined that the '842 patent disclosed all claim elements except (1) an extended vertical shaft, (2) a gearbox with a multi-geared transmission, and (3) an induction-type generator. J.A. 598–99. As to "an extended vertical shaft," the examiner concluded that "[i]t would have been obvious to one skilled in the art at the time the invention was made to use the extended vertical shaft disclosed by Carter on the supporting tower disclosed by [the '842 patent] for the purpose of providing mechanical power to a generator located at the base of a tower." J.A. 600. As to "a gearbox with a multi-geared transmission" and "an induction-type generator," the examiner determined:

> It would have also been obvious to one skilled in the art at the time the invention was made to use the multi-speed transmission (in lieu of the multi-geared transmission disclosed by [the '842 patent]) and an induction generator (in lieu of the generator disclosed by [the '842 patent] or the generator disclosed by Carter) disclosed by Simon on

> the wind turbine disclosed by [the '842 patent] for the purpose of providing multiple high-speed outputs instead of a single high-speed output from the transmission and providing "*a cost-effective machine for converting the rotational energy to electricity*."

J.A. 600 (quoting Simon, ¶ 26).

On November 14, 2019, the Board affirmed the examiner's rejections. *Ex parte Earley*, 2019 Pat. App. LEXIS 10527, *2 (P.T.A.B. November 14, 2019). In reaching that result, the Board rejected three arguments. The Board first explained that the '842 patent's "wind turbine includes the same structural elements that [Mr. Earley] discloses are responsible for the functional limitations recited in claim 26's preamble." *Id.* at *9–10 (citation omitted). For that reason, explained the Board, "the burden was on [Mr. Earley] to show that [the '842 patent's] wind turbine as modified by the suggestions in the other prior art references would not inherently perform the same function recited in claim 26." *Id.* at *10. Because Mr. Earley did not "direct" the Board "to any objective evidence," he did not meet the burden. *Id.* Next, the Board rejected Mr. Earley's challenge of the motivation to combine the three prior-art references. The Board accepted the examiner's explanation that a relevant artisan would have used the vertical shaft taught in Carter "for the purpose of providing mechanical power to a generator located at the base of a tower." *Id.* at *5–6. As to Simon, the Board found that a relevant artisan "would have implemented an induction generator in [the '842 patent] for the purpose of providing, inter alia, a cost-effective machine for converting the rotational energy to electricity." *Id.* at *11–12. Last, the Board rejected Mr. Earley's contention that the '235 application's claimed invention achieves unexpected results. *Id.* at *12–13. The Board reasoned that Mr. Earley did "not direct us to objective, experimental data comparing the claimed

invention against the closest prior art," so his argument was "unsupported" and "unpersuasive." *Id.* at *12.

Mr. Earley requested a rehearing, arguing that the Board relied on a new ground of rejection. On January 27, 2020, the Board maintained its affirmance of the examiner's rejection, but because of Mr. Earley's "pro se status and the complex nature of this prosecution," the Board thought it was "appropriate to designate [its earlier] affirmance as a new ground of rejection pursuant to 37 C.F.R. § 41.50(b)." *Ex parte Earley*, Appeal 2019-000815, 2020 WL 489476, at *3 (P.T.A.B. Jan. 27, 2020). Based on that designation, the Board gave Mr. Earley two options to address the ground: reopen prosecution or request a rehearing. *Id.*

Mr. Earley chose to request a rehearing. On March 11, 2020, the Board denied that (second) request for rehearing on the merits. *Ex parte Earley*, Appeal 2019-000815, 2020 WL 1286056, at *2–3 (P.T.A.B. Mar. 11, 2020). Mr. Earley contended that Simon's induction generator could not meet the capability in the preamble because "[a]n induction generator with a 12 m/s rating would render the claimed invention inoperable for its intended use—*i.e.*, where [t]he claimed invention is unique in its ability to generate increasing amounts of energy through 24 m/s." *Id.* at *1 (internal quotation marks omitted). The Board rejected that contention because it was "not supported by objective evidence (*e.g.*, a sworn declaration)." *Id.* Mr. Earley also asserted that the '842 patent's centrifugal-weight-control assembly would "inherently" act as "a very large air brake," causing the capability requirement of the new application's preamble not to be met. *Id.* at *2. The Board rejected the assertion, stating that it was "based merely on conclusory statements that are not accompanied by any objective evidence (*e.g.*, declaration evidence) providing detailed specifics of the systems used for comparison." *Id.*

Mr. Earley timely appealed. We have jurisdiction under 35 U.S.C. § 141(a) and 28 U.S.C. § 1295(a)(4)(A).

III

Accepting that claim 26 is representative, Mr. Earley challenges the Board's determination of obviousness of claim 26 based on the '842 patent, Carter, and Simon. The ultimate obviousness determination under 35 U.S.C. § 103 is a matter of law based on underlying factual findings, which include "the scope and content of the prior art, the differences between the prior art and the claimed invention, the level of ordinary skill in the art, the presence or absence of a motivation to combine or modify with a reasonable expectation of success, and objective indicia of nonobviousness." *Ariosa Diagnostics v. Verinata Health, Inc.*, 805 F.3d 1359, 1364 (Fed. Cir. 2015). We review the Board's ultimate obviousness determination de novo and its underlying factual findings for substantial-evidence support. *In re Varma*, 816 F.3d 1352, 1359 (Fed. Cir. 2016). Our review for substantial-evidence support "ask[s] whether a reasonable fact finder could have arrived at the agency's decision, which requires examination of the record as a whole, taking into account evidence that both justifies and detracts from an agency's decision." *Personal Web Technologies, LLC v. Apple, Inc.*, 848 F.3d 987, 991 (Fed. Cir. 2017) (cleaned up).

A

Mr. Earley challenges the Board's finding that a relevant artisan would have a motivation to combine teachings of the '842 patent, Carter, and Simon to arrive at claim 26's structure with a reasonable expectation that the result would be capable, as required by claim 26's preamble, of "the production of increasing amounts of energy in increasing wind speeds up to cut-out at 25 m/s." First, Mr. Earley asserts that use of Simon's induction generator would make the combination inoperable. Second, Mr. Earley asserts that the '842 patent's centrifugal-weight-control

assembly is "very different" from the claimed invention and would not have the preamble-required capability. Op. Br. 8. We reject these contentions.

At the core of these contentions, which focus as a substantive matter on a reasonable expectation of success, is a challenge to the Board's demand for objective evidence. We address that challenge through the framework applicable during prosecution (in contrast to district-court litigation). "[T]he concept of prima facie obviousness establishes the framework for the obviousness determination and the burdens the parties face" during patent examination. *ACCO Brands Corp. v. Fellowes, Inc.*, 813 F.3d 1361, 1365 (Fed. Cir. 2016); *see also In re Brandt*, 886 F.3d 1171, 1176 (Fed. Cir. 2018) (describing the prima facie framework as well). "Under this framework, the patent examiner must first set forth a prima facie case, supported by evidence, showing why the claims at issue would have been obvious in light of the prior art." *ACCO Brands*, 813 F.3d at 1365. "Once the examiner sets out this prima facie case, the burden shifts to the patentee to provide evidence, in the prior art or beyond it, or argument sufficient to rebut the examiner's evidence." *Id.* at 1365–66. "The examiner then reaches the final determination on obviousness by weighing the evidence establishing the prima facie case with the rebuttal evidence." *Id.* at 1366. "If this weighing shows obviousness by a preponderance of the evidence, then the claims at issue were unpatentable." *Id.* "This burden-shifting framework makes sense during patent examination because an examiner typically has no knowledge of objective considerations, and those considerations 'may not be available until years after an application is filed.'" *In re Brandt*, 886 F.3d at 1176.

"The reasonable expectation of success requirement refers to the likelihood of success in combining references to meet the limitations of the claimed invention." *Intelligent Bio-Systems, Inc. v. Illumina Cambridge Ltd.*, 821 F.3d 1359, 1367 (Fed. Cir. 2016). A relevant artisan's

"expectation of success need only be reasonable, not absolute." *Pfizer, Inc. v. Apotex, Inc.*, 480 F.3d 1348, 1364, 1367–68 (Fed. Cir. 2007). "This court has long rejected a requirement of conclusive proof of efficacy for obviousness." *Acorda Therapeutics, Inc. v. Roxane Labs., Inc.*, 903 F.3d 1310, 1333 (Fed. Cir. 2018) (cleaned up).

1

Substantial evidence supports the Board's finding that a relevant artisan would "modif[y]" Simon's induction generator—specifically, would "size and select an induction generator as suggested by Simon to match the enhanced capabilities of [the '842 patent's centrifugal-weight-control assembly]" in order to produce more energy, *Ex parte Earley*, 2020 WL 1286056, at *1, *i.e.*, "increasing amounts of energy increasing wind speeds up to cut-out at 25 m/s," as required in claim 26's preamble. Mr. Earley disputes that finding because Simon's generator could not be *physically* combined with the '842 patent. But the correct inquiry is not limited to "an actual, physical substitution of elements"; "the test for obviousness is what the combined teachings of the references would have suggested to" a relevant artisan. *In re Mouttet*, 686 F.3d 1322, 1332–33 (Fed. Cir. 2012); *see also In re Applied Materials, Inc.*, 692 F.3d 1289, 1298 (Fed. Cir. 2012) ("A reference must be considered for everything that it teaches, not simply the described invention or a preferred embodiment."); *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007) (obviousness inquiry must "take account of the inferences and creative steps that a person of ordinary skill in the art would employ"). The Board here properly relied on the "technical grasp of a person having ordinary skill in the art." *Ex parte Earley*, 2020 WL 1286056, at *1.

The Board could reasonably determine that there was no evidence that justified a different finding about a relevant artisan's modification of the specific Simon generator. Mr. Earley, who relies only on Simon's specification, has

not shown otherwise. Mr. Earley repeatedly notes that Simon's specification is in miles per hour rather than meters per second. *See* Op. Br. 1 ("Examiner does err when he fails to understand that the quantitative work found in the prior art of Simon is accomplished in mph (miles per hour) and not m/s (meters per second)."); *see also* Op. Br. 3–4. To the extent that Mr. Earley suggests that the Board's finding fails because a relevant artisan would not convert the units from mph to m/s based on a very simple multiplicative relationship, he has not pointed to any evidence to support that implausible suggestion. Mr. Earley otherwise relies on aspects of Simon's specific induction generator, but that reliance does not undermine the Board's finding that a relevant artisan would alter Simon's specific generator to achieve the 25 m/s capability.

2

Mr. Earley argues that the Board erred in failing to accept his assertion that a relevant artisan would not have a reasonable expectation of success in using the '842 patent's disclosure of a centrifugal weight control. Mr. Earley gives two reasons. We find neither sufficient to show error.

First, Mr. Earley asserts that using the '842 patent's centrifugal-weight-control assembly on a vertical shaft would render the combination "inoperable." Op. Br. 6–7. Specifically, Mr. Earley asserts that "[t]he jackscrews and guides" of the '842 patent could not "support the amount of weight that is called for" in the claimed invention. Op. Br. 7. The Board properly rejected this assertion as "based merely on conclusory statements that are not accompanied by any objective evidence (*e.g.*, declaration evidence) providing detailed specifics of the systems used for comparison." *Ex parte Earley*, 2020 WL 1286056, at *2. The Board also properly explained that Mr. Earley's arguments about what the '842 patent's centrifugal-weight-control assembly could not do relied on properties or features not actually required by claim 26—"*e.g.*, a limitation on air brake size,

the exclusion of an aerodynamic means, a [centrifugal-weight-control] diameter, ability to extend or retract weights totaling eight thousand pounds, or induction generator rating." *Id.* at *2.

Second, Mr. Earley contends that a relevant artisan would "certainly see" the centrifugal-weight-control assembly in the '842 patent as an "air brake" that would cause a "drag force," preventing the combined prior art from having the capability required by claim 26's preamble. Op. Br. 8; Reply Br. 4. Like his arguments for Simon's induction generator, Mr. Earley's contention addresses the wrong question. It focuses only on the specific apparatus of the '842 patent. It does not undermine the Board's finding about the '842 patent's overall teachings on the centrifugal-weight-control assembly and Carter's teachings on the location of the assembly, among other components, at the base of the support staff.

B

Mr. Earley also presents two challenges to the Board's inherency reasoning in finding that the combination of the prior-art teachings would be a structure having the capability required by claim 26's preamble. We reject both challenges.

1

Mr. Earley argues that the Board issued a new ground of rejection when, in rejecting his second request for rehearing on the merits, the Board stated: "although we appreciate that claim 26's preamble language recites a new capability rather than merely an intended use, this capability was already disclosed in [the '842 patent] . . . ." *Ex parte Earley*, 2020 WL 1286056, at *1; Op. Br. 5. We disagree.

When the Board relies on "a new ground of rejection not relied upon by the examiner, the applicant is entitled to reopen prosecution or to request a rehearing." *In re*

Leithem, 661 F.3d 1316, 1319 (Fed. Cir. 2011) (citing 37 C.F.R. § 41.50(b)). "Whether the Board relied on a new ground of rejection is a legal question that we review de novo." *In re Stepan Co.*, 660 F.3d 1341, 1343 (Fed. Cir. 2011). "The ultimate criterion of whether a rejection is considered new in a decision by the Board is whether applicants have had fair opportunity to react to the thrust of the rejection." *In re Leithem*, 661 F.3d at 1319 (cleaned up); *see also In re Jung*, 637 F.3d 1356, 1365 (Fed. Cir. 2011) ("It is well-established that the Board is free to affirm an examiner's rejection so long as 'appellants have had a fair opportunity to react to the thrust of the rejection.'"). Mr. Earley had such an opportunity in his second rehearing.

In its first rehearing decision, the Board specifically explained how the examiner properly "pointed out that a claim to an apparatus must be distinguished patentably from the prior art in terms of structure rather than function"—the same point made in the second rehearing decision. *Ex parte Earley*, 2020 WL 489476, at *2. Because of Mr. Earley's "pro se status and the complex nature of this prosecution," the Board in the first rehearing decision "designated" its reasoning a new ground of rejection and gave Mr. Earley "two options": (1) reopen prosecution or (2) request a rehearing. *Id.* at *3. By taking the rehearing option, Mr. Earley had a fair opportunity to address this ground of rejection—which was not materially changed by the Board's second rehearing decision. *See In re Black*, 778 F. App'x 911, 918 (Fed. Cir. 2019) (concluding that the applicant's "opportunity to respond to the Board's grounds for rejection in the Request for Rehearing" was sufficient).

2

On the merits, the Board did not commit reversible error. "We have recognized that inherency may supply a missing claim limitation in an obviousness analysis." *PAR Pharm., Inc. v. TWI Pharm., Inc.*, 773 F.3d 1186, 1194–95 (Fed. Cir. 2014). Inherency is a question of fact. *Id.* at

1194; *In re Napier*, 55 F.3d 610, 613 (Fed. Cir. 1995). "Inherency . . . may not be established by probabilities or possibilities." *PAR Pharm.*, 773 F.3d at 1195. "The mere fact that a certain thing may result from a given set of circumstances is not sufficient." *Id.* A party must instead "show that the *natural result flowing* from the operation as taught would result in the performance of the questioned function." *Id.*

In the present case, the Board stated that Mr. Earley's own application points to certain structural features as responsible for the preamble-required functional capability, that the '842 patent (being combined with teachings from Carter and Simon) had the same structural features, and that the combination therefore would have the functional capability, unless objective evidence showed otherwise:

> Because [the '842 patent] wind turbine includes the same structural elements that [Mr. Earley's present application] discloses are responsible for the functional limitations recited in claim 26's preamble, the burden was on [Mr. Earley] to show that [the '842 patent's] wind turbine as modified by the suggestions in the other prior art references would not inherently perform the same function recited in claim 26. [Mr. Earley] does not direct us to any objective evidence in satisfaction of meeting that burden.

Ex parte Earley, 2019 Pat. App. LEXIS 10527, at *9–10. That inherency reasoning is proper under the prima facie framework.

Indeed, the Board needs only a "sound basis for believing" that the combined teachings of the prior art's structure results in the functional limitation. *In re Spada*, 911 F.2d 705, 708 (Fed. Cir. 1990) ("[W]hen the PTO shows sound basis for believing that the products of the applicant and the prior art are the same, the applicant has the burden of showing that they are not."); *see also In re Ikeda Food*

Research Co., Ltd., 758 F. App'x 952, 957 (Fed. Cir. 2019) (obviousness case citing *In re Spada*, 911 F.2d at 708, for the sound-basis proposition); *In re Best*, 562 F.2d 1252, 1255 (C.C.P.A. 1977) ("Where, as here, the claimed and prior art products are identical or substantially identical, or are produced by identical or substantially identical processes, the PTO can require an applicant to prove that the prior art products do not necessarily or inherently possess the characteristics of his claimed product."); *Southwire Co. v. Cerro Wire LLC*, 870 F.3d 1306, 1311 (Fed. Cir. 2017) (adopting *In re Best*'s burden-of-production framework). The burden thus shifted to Mr. Earley to produce evidence to rebut the Board's initial finding. Mr. Earley did not do so. The Board's finding is supported by substantial evidence.

IV

We have considered Mr. Earley's other arguments and find them unpersuasive. For the reasons we have stated, we affirm the Board's conclusion that claims 26–29 of the '235 application are unpatentable for obviousness.

Each party shall bear its own costs.

AFFIRMED

NOTE: This order is nonprecedential.

United States Court of Appeals for the Federal Circuit

IN RE: MATTHEW EARLEY,
Appellant

2020-1816

Appeal from the United States Patent and Trademark Office, Patent Trial and Appeal Board in No. 12/925,235.

ON PETITION FOR PANEL REHEARING

Before PROST, *Chief Judge,* CLEVENGER and TARANTO, *Circuit Judges.*

PER CURIAM.

O R D E R

Matthew Earley filed a petition for panel rehearing.

Upon consideration thereof,

IT IS ORDERED THAT:

The petition for panel rehearing is denied.

The mandate of the court will issue on February 24, 2021.

FOR THE COURT

February 17, 2021
Date

/s/ Peter R. Marksteiner
Peter R. Marksteiner
Clerk of Court

US006949842B2

(12) **United States Patent**
Earley

(10) **Patent No.: US 6,949,842 B2**
(45) **Date of Patent: Sep. 27, 2005**

(54) **CENTRIFUGAL WEIGHT CONTROL FOR A WIND OR WATER TURBINE**

(76) Inventor: **Matthew Earley**, 3226 Atlantic Ave., P.O. Box 213, Allenwood, NJ (US) 08720

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 25 days.

(21) Appl. No.: **10/967,456**

(22) Filed: **Sep. 28, 2004**

(65) **Prior Publication Data**

US 2005/0062291 A1 Mar. 24, 2005

Related U.S. Application Data

(63) Continuation-in-part of application No. 10/091,088, filed on Mar. 6, 2002, now abandoned.
(60) Provisional application No. 60/303,884, filed on Jul. 10, 2001.

(51) **Int. Cl.**[7] **F03D 9/00**
(52) **U.S. Cl.** ..... **290/55**; 290/44; 74/572; 74/573 R; 74/89.23; 322/4
(58) **Field of Search** ..... 290/55; 74/572, 74/573 R, 89.23; 322/4

(56) **References Cited**

U.S. PATENT DOCUMENTS

3,248,967 A * 5/1966 Lewis 74/572
4,926,107 A * 5/1990 Pinson 322/4

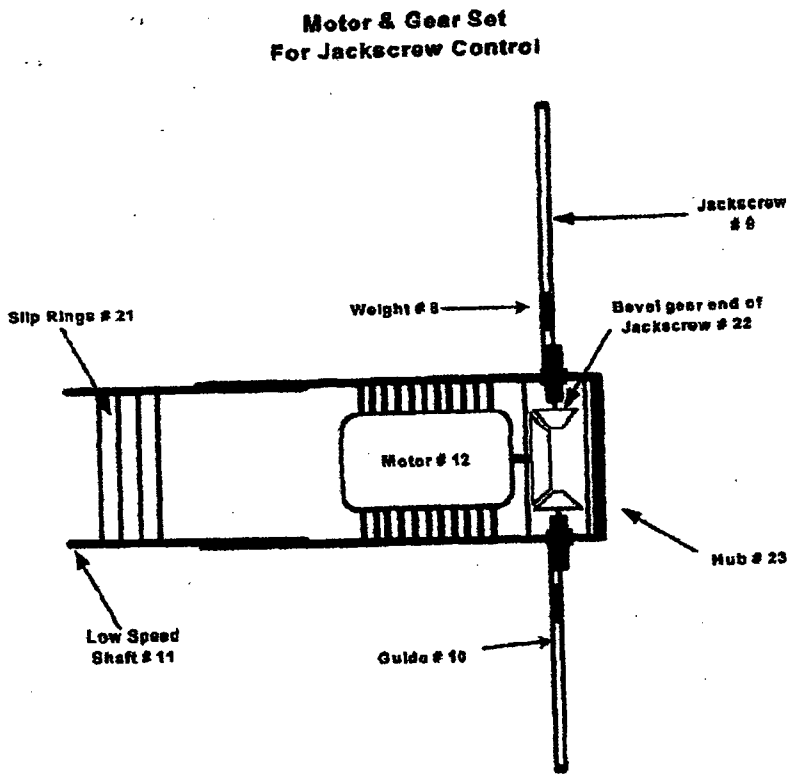
* cited by examiner

Primary Examiner—Nicholas Ponomarenko
Assistant Examiner—Yahveh Comas

(57) **ABSTRACT**

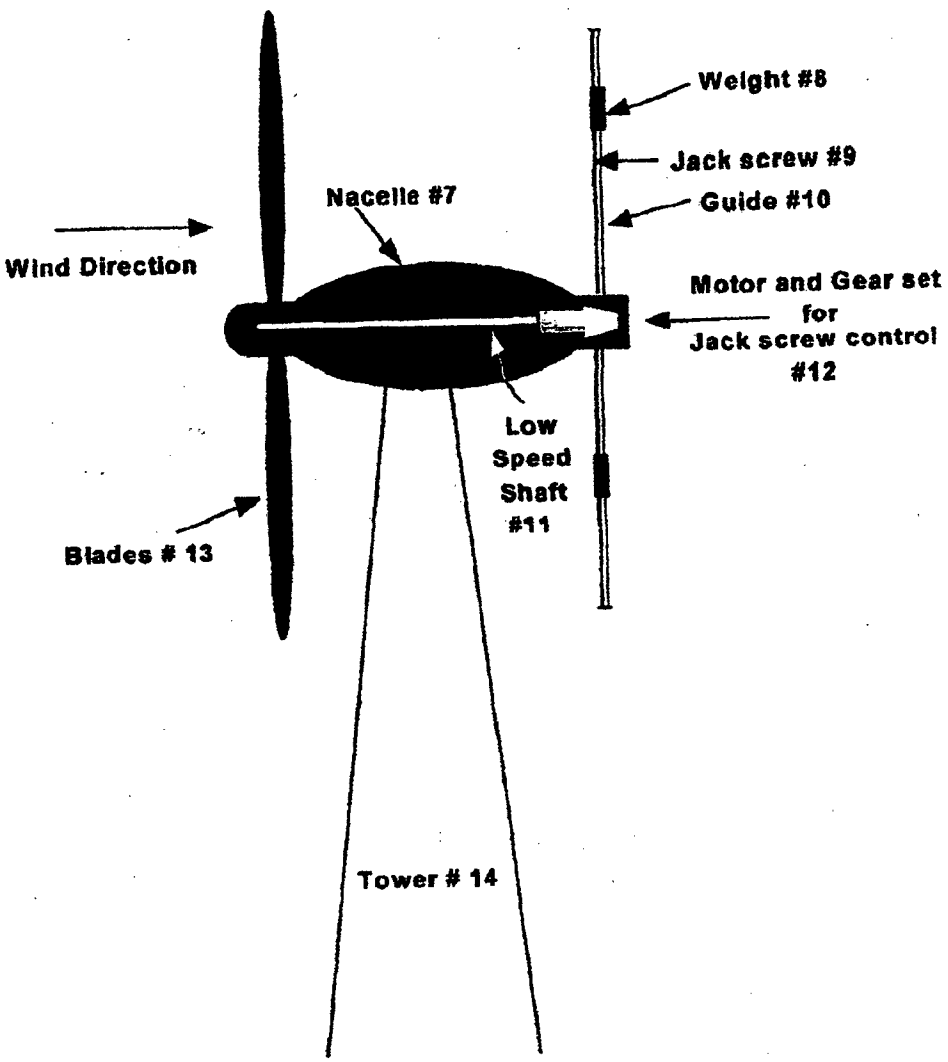
The centrifugal weight control is a means of regulating rpm's on the low speed shaft in a changing wind (or water) speed. As wind speed increases the weights are extended farther from their hub. This extension as wind speed increases does bring into play a greater inertial force. It is this greater inertial force that holds rpm's constant and, at the same time, increases rolling torque on the low speed shaft. With sufficient increase in rolling torque additional generators can be clutched into operation. Common knowledge in the business is that the energy content of the wind increases eight fold with each doubling of wind speed.

3 Claims, 6 Drawing Sheets

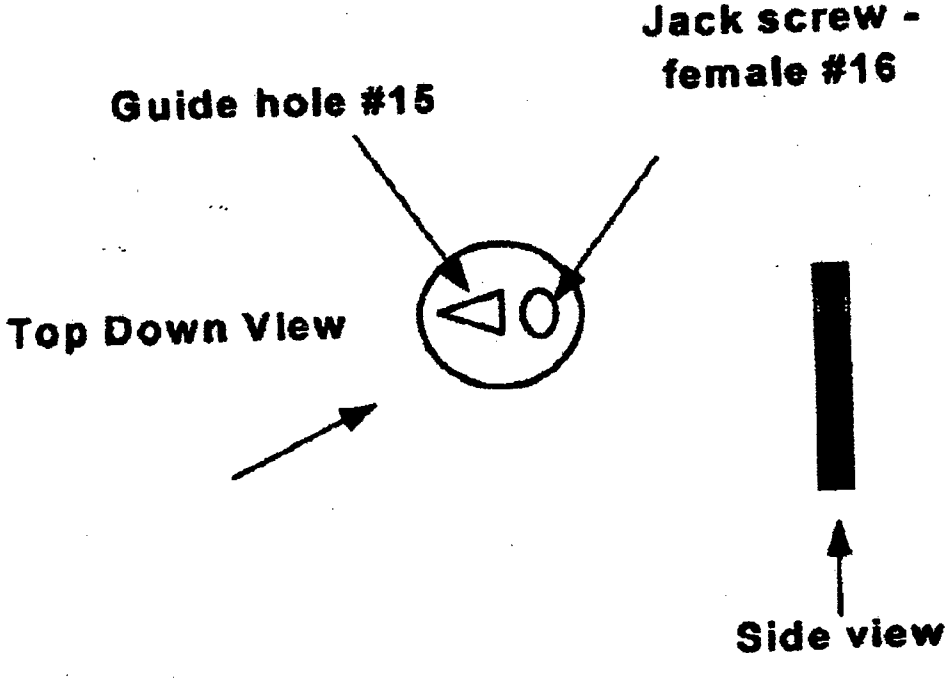


WT/CWC Side View

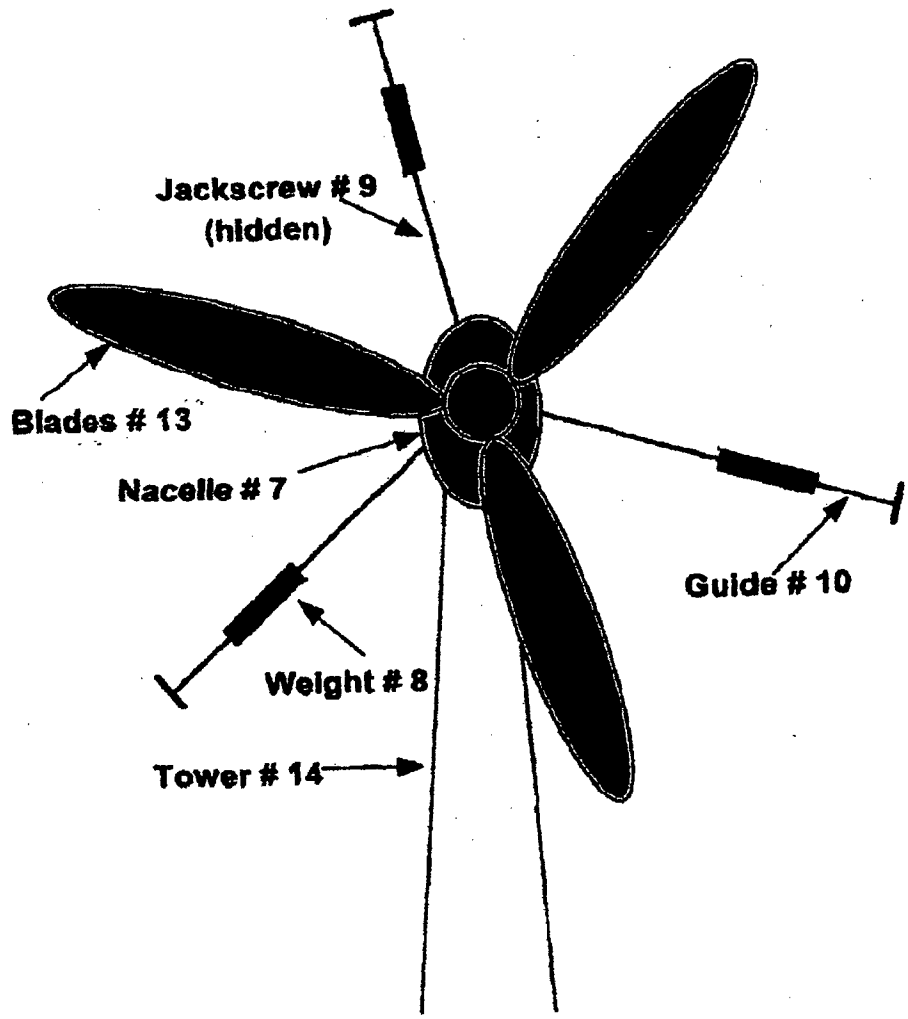
Figure 1



Centrifugal Weight
Top & Side View
Figure 2

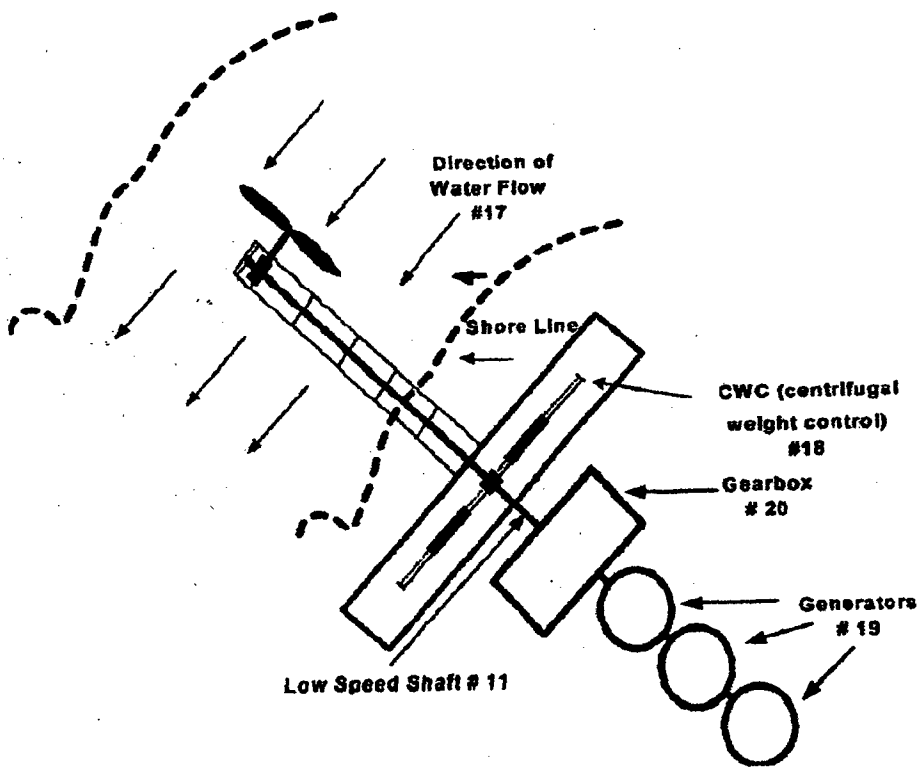


WT/CWC Front
View
Figure 3



Water Turbine with Centrifugal Weight Control

Figure 4



Block Diagram
Weight Position Control
Figure 5

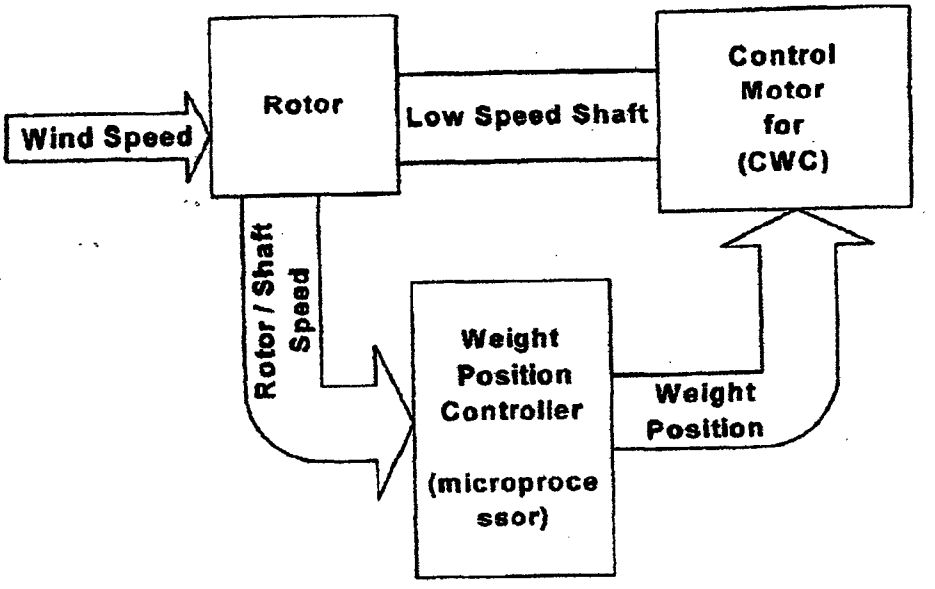
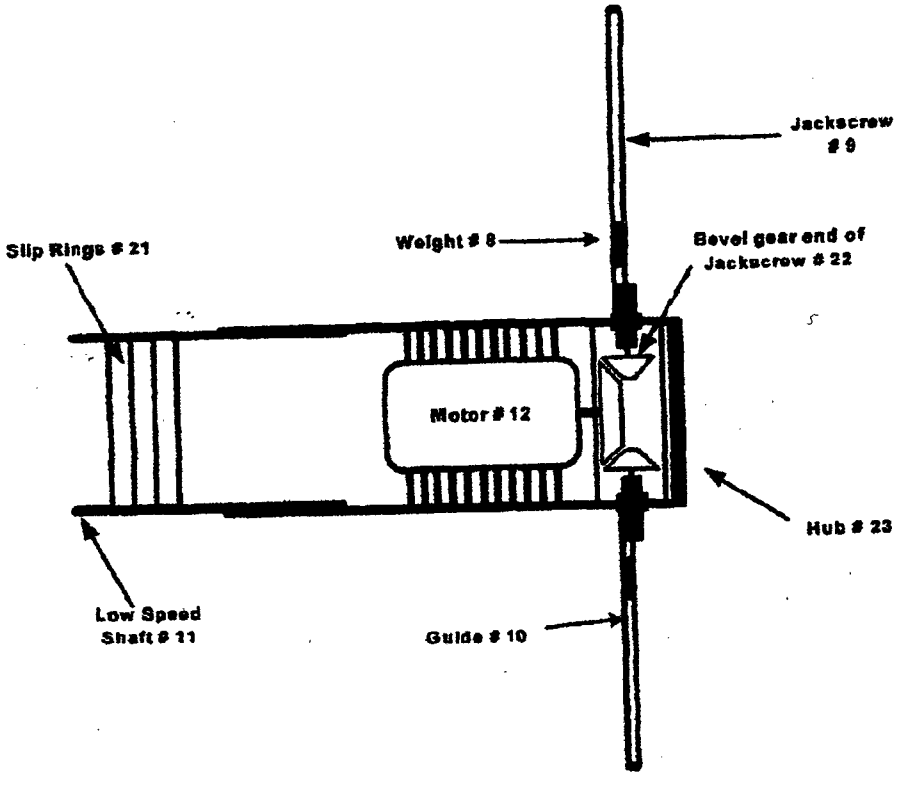


Figure 6

Motor & Gear Set
For Jackscrew Control



CENTRIFUGAL WEIGHT CONTROL FOR A WIND OR WATER TURBINE

This Continuation in Part does reference and claim benefit of an earlier non-provisional application having a 03/06/2002 filing date and application Ser. No. 10/091,088, now abandoned, which in turn referenced a provisional application having a 07/10/2001 filing date and application No. 60/303,884.

BACKGROUND OF INVENTION

This invention is applicable to USPTO Classification 290 Sub-Classifications 43-44-53-55.

Today's wind and water turbines employ a variety of solutions to insure a constant operating speed (RPM). These include passive stall, active stall, pitch control and guide vanes. Each of these techniques effectively avoids capture of additional energy in an increasing flow so that rpm's can remain constant. A constant operating speed is necessary for 60 and 50 cycle (cycles per second) electrical environments on and off shore. Wind (and water) speeds above a given range are taken out of play in that these solutions do not transform additional energy into electricity at higher flow speeds. In a wind assumption the blades are pitched such that less surface is presented to an increasing wind. In a water assumption guide vanes are further closed to deflect the increased flow of water.

BRIEF SUMMARY OF INVENTION

The WT/CWC permits the capture and transformation of energy in an increasing flow (wind or water) while maintaining a desired operating speed. It does not, like other systems, avoid or deflect increases in flow to maintain operating speed. As the speed of a flow increases the weights of the CWC are extended. Such extension increases the rolling torque on the low speed shaft while maintaining desired rpm's. This CWC action permits capture and transformation of additional offered kinetic energy. Said extension of weights result in increases in inertial forces that are responsible for maintaining speed (rpm's) while increasing available rolling torque on the low speed shaft. This additional rolling torque is employed to drive additional generators under clutch control.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

FIG. 1—side view complete wind system

FIG. 2—top & side view of centrifugal weight

FIG. 3—front view of complete wind system

FIG. 4—top down view of complete water system

FIG. 5—block diagram

FIG. 6—motor & gear set

In both drawings the CWC has a vertical position relative to rotors & wheels. This is principally for illustrative purpose and incidental to claims made.

REFERENCE NUMERALS

7. Nacelle
8. Weight
9. Jackscrew
10. Guide
11. Low Speed Shaft
12. Motor and Gear set for Jackscrew Control
13. Blades

14. Tower
15. Guide hole
16. Jackscrew—female
17. Direction of Water Flow
18. CWC (centrifugal weight control assembly) FIG. 4
19. Gearbox
20. Generators
21. Slip Rings
22. Gear end of jackscrew
23. Hub

DETAILED DESCRIPTION OF THE INVENTION

The WT/CWC design, which manipulates centrifugal weight to control rotor speed (and consequently generator speed) will deliver more energy as wind (or water) speeds increase while maintaining a desired operating speed (rpm's). At higher wind or water speed increments, additional generators will be brought into play as the foot-pounds of rolling torque on the low speed shaft increase.

In a water assumption, operating speed is typically controlled by guide vanes that open and close to regulate the amount of water that flows past the wheel (typical operation of a Francis Wheel). In a water turbine with CWC the low speed shaft would extend onto shore where CWC would then be applied. Only the rotor, low speed shaft and necessary infrastructure would be in the water (see FIG. 4). All other components (CWC/gearbox/generators/control/etc.) would be on shore.

Description of WT/CWC: (see FIGS. 1,2, & 3)

1. At the far end of an extended low speed shaft (FIG. 1#10) are weights that extend up and down on their guides as wind speeds increase or decrease. These weights are on guides and move up and down with a "jack screw" type gear (FIG. 1#7-8-9). The guides anchor on a hub that is at the downwind end of the low speed shaft. The guides are simply steel rods on which the weights (FIG. 2#14-15-16-17) extend or retract as a function of wind speed. This "controlled action" will deliver a constant rotor speed and increasing foot-pounds of rolling torque as wind speeds increase above minimum (1st cut-in) speed.
2. In an increasing wind, extending weights farther away from the hub delivers an increasing centrifugal force (inertial force) that in turn holds rotor speed constant while delivering more rolling torque. As available rolling torque increases, additional generators (FIG. 4 #21) are brought into play and greater amounts of electrical energy are realized.
3. The "controlled action" is the synchronous movement of the centrifugal weights closer to or farther from their hub depending on wind speed. The weights, guides and jackscrews have minimal aerodynamic impact. In below figures and in bench test three weights, guides and jackscrews radiate from the hub. Having twice as many may prove to be a more stable and responsive design in full scale.
4. The jackscrews are under motor control that is, in turn, under microprocessor control. Maintaining desired rpm's, weight position and clutch control for 2nd & 3rd cut-in intervals will necessitate re-calibration/modification of existing algorithms that control multiple operations.

As one skilled in the art will appreciate, current control systems for active pitch can be re-employed to accommodate CWC (centrifugal weight control) in lieu of pitch.

Today's turbine systems having active pitch control (or active stall) employ hydraulics or stepper motors to change pitch of the blades. Necessary information for such control (which may vary by product and manufacturer) typically includes rotor revolutions, generator revolutions, shaft torque and/or generator current. With this empirical information, a computer (microprocessor) will, appropriately, signal the pitch change mechanism to increase or diminish the angle of attack of blades to maintain constant rpm's on the low speed shaft in a changing wind.

Moving weights along their jackscrews, as with changing pitch angle of the blades in current art, is a positioning application. One skilled in the art will appreciate this and choose to use same hardware and software to control weights along their jackscrews as they are currently used to control pitch.

A variety of pitch control solutions in service today could be re-employed to sense a shaft speed and then signal a motor accordingly for appropriate weight position. A diagram (FIG. 5) in block form reflecting same control is attached. Available control solutions including those from Bosch Rexroth AG and MLS Electro Systems could readily be employed.

The existing microprocessor, programs, signaling, collectors, interfaces, gears, and hydraulic system or stepper motor can be re-employed for turning jackscrews in unison to control weight position that in turn control rpm's in lieu of traditional pitch or stall methods for same rpm control.

One example of motor control with centrifugal weight control (as reflected in FIG. #6) would be to terminate the hub end of the jackscrews as bevel gears with bearings that then mesh with a common bevel gear fixed to the shaft of a stepper motor. This motor, under program control, would turn jackscrews for appropriate positioning of weights to maintain rpm's as changes occur in the speed of a flow (wind or water). Other motors could be used including, for example, a rotary hydraulic motor. More sophisticated solutions typically found in large-scale wind turbine systems including independent movement of blades would not be necessary or appropriate.

The hub assembly to control the rotation of jackscrews of CWC (centrifugal weight control) in unison can be a simpler assembly with fewer moving parts than assemblies necessary for controlling rotation of blades in unison. Significant thrust and axial forces that must be dealt with in an active pitch or stall solution do not come into play with CWC (centrifugal weight control).

I claim:

1. A speed and torque control system for a turbine of a wind and water power generating assembly comprising:

a fluid turbine driving a low speed shaft;

a hub positioned at the end portion of said low speed shaft and rotating with the same speed as said shaft;

a plurality of centrifugal weight assemblies extending in radial direction from the hub each having a weight, a guide and a rotating jackscrew, wherein said guide and said jackscrew are passing through said weight;

a gear box positioned inside said hub for rotating said jackscrew;

a motor positioned inside the hub for rotating said jackscrew through said gear;

an electrical controller for controlling said motor and positioning said weights along radial guide in dependence on the required rotational speed of said shaft.

2. Apparatus as set forth in claim 1;

wherein the increase in inertial force, due to weight extension, both controls the rpm's and increases rolling torque on the low speed shaft.

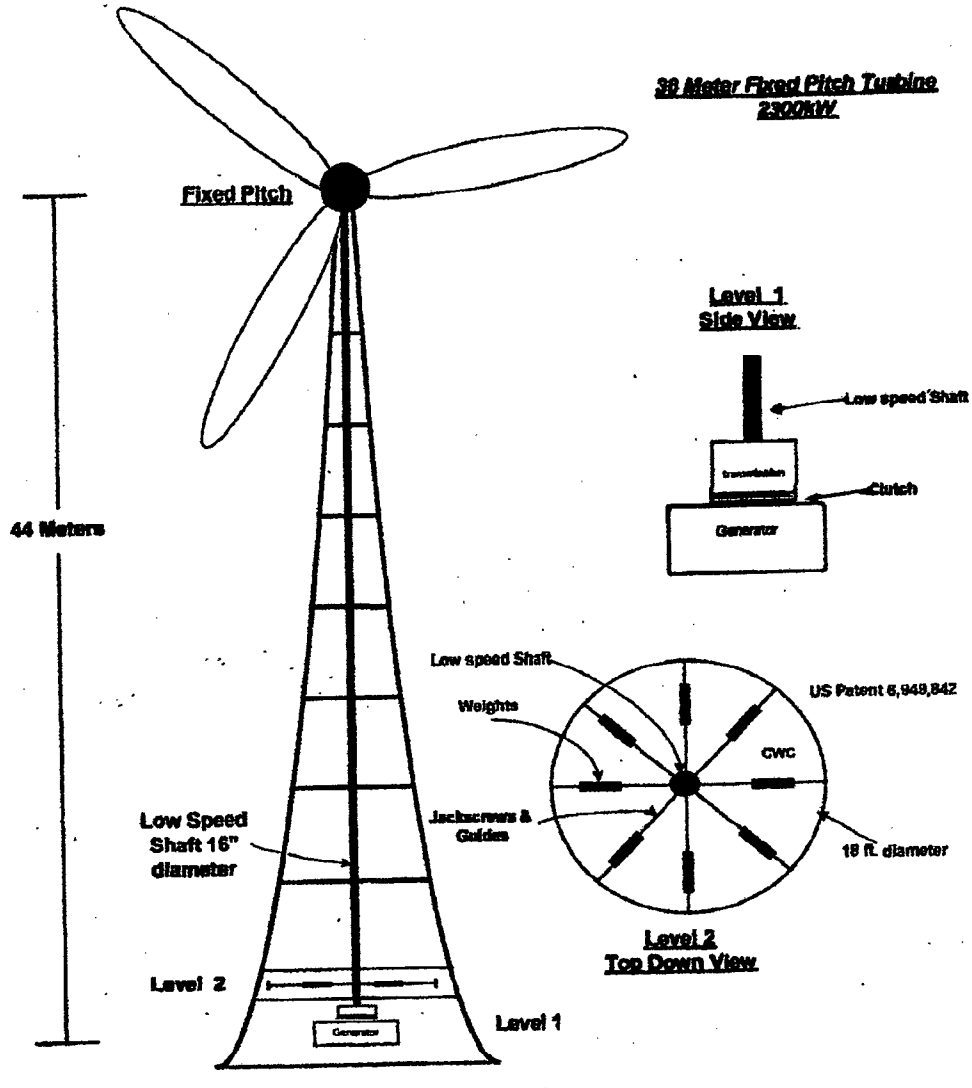
3. Apparatus as set forth in claim 2;

wherein controlled centrifugal weights, being an inertial force, deliver increased rolling torque on the low speed shaft as wind speeds increase while maintaining desired rpm's; the increased energy content found in an increasing wind manifests it self as greater rolling torque on the low speed shaft.

* * * * *

Matthew Earley 732-528-9201

Figure # 1



Matthew Earley
732-528-9201

Figure #6

38 Meter System

w/speed	rpm's	tip speed	tsr	Velocity 3x	Cp	Area	Power	w/s distribution	24 hour factor	20 year prod.
6	25.48	48.41	8.07	216	0.450	1018	60,607	0.020	0.480	63,710
7	29.72	56.48	8.07	343	0.450	1018	98,241	0.032	0.768	161,670
8	33.97	64.54	8.07	512	0.450	1018	143,660	0.060	1.440	453,047
9	38.22	72.61	8.07	729	0.450	1018	204,547	0.080	1.920	860,081
10	42.46	80.68	8.07	1000	0.450	1018	280,566	0.085	2.040	1,253,547
11	46.71	88.75	8.07	1331	0.450	1018	373,460	0.100	2.400	1,962,907
12	46.69	88.71	7.39	1728	0.445	1018	479,466	0.103	2.460	2,583,074
13	46.71	88.76	6.83	2197	0.442	1018	605,489	0.094	2.256	2,991,503
14	46.74	88.81	6.34	2744	0.435	1018	744,264	0.085	2.040	3,325,076
15	46.74	88.80	5.92	3375	0.412	1018	887,012	0.075	1.800	3,417,759
Current Technology										17,072,573
16	46.71	88.75	5.55	4096	0.400	1018	1,021,583	0.060	1.440	3,221,665
17	46.74	88.81	5.22	4913	0.380	1018	1,164,084	0.050	1.200	3,059,212
18	46.72	88.77	4.93	5832	0.370	1018	1,345,467	0.040	0.960	2,828,710
19	46.69	88.72	4.67	6859	0.340	1018	1,454,098	0.032	0.768	2,445,676
20	46.71	88.75	4.44	8000	0.320	1018	1,596,224	0.020	0.480	1,677,951
21	46.70	88.74	4.23	9261	0.312	1018	1,801,633	0.018	0.432	1,704,489
22	46.71	88.75	4.03	10648	0.290	1018	1,925,395	0.010	0.240	1,011,988
23	46.76	88.84	3.86	12167	0.270	1018	2,048,336	0.010	0.240	1,078,605
24	46.75	88.83	3.70	13824	0.250	1018	2,154,902	0.009	0.216	1,019,355
25	46.71	88.75	3.55	15625	0.237	1018	2,308,991	0.005	0.188	950,658
Proposed Technology										36,088,682

improper definition of a process, i.e., results in a claim which is not a proper process claim under 35 U.S.C. 101. See for example *Ex parte Dunki*, 153 USPQ 678 (Bd.App. 1967) and *Clinical Products, Ltd.* v. *Brenner*, 255 F. Supp. 131, 149 USPQ 475 (D.D.C. 1966).

23. In the event the determination of the status of the application as subject to AIA 35 U.S.C. 102 and 103 (or as subject to pre-AIA 35 U.S.C. 102 and 103) is incorrect, any correction of the statutory basis for the rejection will not be considered a new ground of rejection if the prior art relied upon, and the rationale supporting the rejection, would be the same under either status.

Claim Rejections - 35 USC § 103

24. The following is a quotation of pre-AIA 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

25. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under pre-AIA 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.

2. Ascertaining the differences between the prior art and the claims at issue.

3. Resolving the level of ordinary skill in the pertinent art.

4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

26. Claims 26-29 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,949,842 B2 to Earley in view of U.S. Patent No. 3,942,026 to Carter and U.S. Patent Application Publication No. 2010/0207396 A1 to Simon.

Earley clearly teaches, in Figures 1 and 3, a centrifugal weight control for a wind turbine, comprising:

a supporting framework (see Figures 1 and 3) including:

a supporting tower (Tower #14 in Figures 1 and 3);

a rotor with fixed pitch blades (see Figure 3);

a horizontal low speed shaft (#11 in Figure 1) that couples to said rotor for rotation with said rotor; and

a centrifugal weight control apparatus (CWC in Figures 1 and 3) that drivingly connects to said horizontal low speed shaft at opposite end of said elevated platform.

Earley also clearly teaches, in Figure 4, a centrifugal weight control for a water turbine, comprising:

a right angle gearbox having a low speed input connected to said horizontal low speed shaft;

an extended horizontal shaft (see Figure 4) that journals to output side of said right angle gearbox;

a gearbox (#20 in Figure 4) having a low speed input connected to said extended horizontal shaft;

a high speed output of said gearbox;

a clutch (see ABSTRACT; column 1, line 44; column 2, line 61) that journals to said high speed output (see Figure 4); and

a generator (#19) that operatively connects to said clutch for rotation at desired speeds.

However, Earley fails to disclose:

said extended horizontal shaft being vertically oriented;

said gearbox being a multi-geared transmission; and

said generator being an induction type generator.

Carter discloses a wind turbine with governor, comprising:

an extended vertical shaft (80) connecting a right angle gearbox (gears 86 and 98) to a multi-geared transmission (gears 94 and 96) having a low speed input (first bevel gear 94) and a high speed output (second bevel gear 96) of said multi-geared transmission;

wherein said high speed output is connected to the input of a generator (100) placed on a supporting platform (20) at the base of a framework (12) (see Figure 1).

Simon discloses a power generating system, comprising:

a multi-speed transmission (30) having multiple gears (see Figures 3-7); and

a induction generator (36; see paragraph [0026] – "*the power conversion module 18 includes an induction generator, which provides a cost-effective machine for converting the rotational energy to electricity for power to the grid 22.*").

It would have been obvious to one skilled in the art at the time the invention was made to use the extended vertical shaft disclosed by Carter on the supporting tower disclosed by Earley for the purpose of providing mechanical power to a generator located at the base of a tower.

It would have also been obvious to one skilled in the art at the time the invention was made to use the multi-speed transmission (in lieu of the multi-geared transmission disclosed by Earley) and an induction generator (in lieu of the generator disclosed by Earley or the generator disclosed by Carter) disclosed by Simon on the wind turbine disclosed by Earley for the purpose of providing multiple high-speed outputs instead of a single high-speed output from the transmission and providing "*a cost-effective machine for converting the rotational energy to electricity*" (see paragraph [0026] of Simon).

27. With regards to claim 27, Carter discloses the tower also supporting an integrated vertical chassis (see Figure 1) to carry vertical and lateral loads of the low speed shaft.

28. With regards to claim 28, both Carter and Simon disclose a multi-geared transmission for maintaining a desired generator speed in an increasing (or decreasing) wind speeds.

29. With regards to claim 29, Earley discloses the extension or retraction of weights in the centrifugal weight control apparatus and excitation of induction generator will, under program control (see column 3, lines 21-28), offer enough opposing torque to control rotor speed up to cut-out at 25 m/s, if and when said wind turbine is exposed to such wind speeds.

Conclusion

30. This action is a **final rejection** and is intended to close the prosecution of this application. Applicant's reply under 37 CFR 1.113 to this action is limited either to an appeal to

FIXED PITCH WIND (OR WATER) TURBINE WITH CENTRIFUGAL WEIGHT CONTROL (CWC)

[0001] This non-provisional application does reference and claim benefit of an earlier provisional application having an Nov. 6, 2009 filing date and application No. 61/280,606.

BACKGROUND OF INVENTION

[0002] The invention incorporates a unique and patented means of controlling rotor speed and is in lieu of traditional aerodynamic solutions (pitch or stall). In current systems pitch or stall in conjunction with generator torque is the typical solution for speed control. In the proposed system the weight scheme in conjunction with generator torque will control rotor speed.

BRIEF SUMMARY OF INVENTION

[0003] The fixed pitch rotor and centrifugal weight control will permit the generation of increasing amounts of energy for the full distribution of operating speeds in both wind and water scenarios. Current technology captures and transforms less than half of the energy content available in the discussed distribution. In wind, operating speed is typically up to 25 m/s though rated power is typically reached at 14 or 15 m/s. In water, highest flow rate is typically 3.4 m/s though rated power is usually at 2.4 m/s. The table in FIG. 6 shows a 20-year projection for a 36-meter system with power totals at 15 m/s for current solution and 25 m/s for the discussed solution.

[0004] Further, this same weight control scheme permits use of a transmission (in lieu of gearbox). In so doing the rotor can continue to increase speed (rpm's) in an increasing flow (wind or water) while generator speed can be held constant via gear ratio reductions offered by the transmission.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS AND TABLES

[0005] FIG. 1 Fixed Pitch Wind Turbine w/CWC
[0006] FIG. 2 Fixed Pitch Water Turbine w/CWC
[0007] FIG. 3 CWC System/Wind Implementation
[0008] FIG. 4 CWC Storage Calculations
[0009] FIG. 5 Nacelle top down view
[0010] FIG. 6 Power/Energy Tables

DETAILED DESCRIPTION OF THE INVENTION

[0011] This fixed pitch wind (or water) turbine makes use of a patented (U.S. Pat. No. 6,949,842) control solution know as "Centrifugal Weight Control"—or CWC. Such an implementation presents an opportunity to extend the low speed shaft down the length of the tower (wind turbine) or up above the water line (water turbine). See FIGS. 1 & 2 respectively.

[0012] In the wind implementation, extending the low speed shaft down the length of the tower also means you can move other major components down, including generator and gearbox. Doing so results in several compelling advantages as outlined below:

[0013] Significant reductions in top head mass (weight at top of tower) can be realized.

[0014] Moving the generator(s) to the base of the tower permits the use of a larger, heavier and less costly generator product.

[0015] At the base of the tower available space will accommodate a generator(s) having a greater number of pole pairs.

[0016] The need for lightweight technology employing rare earth elements will no longer be necessary.

[0017] More pole pairs in the generator will permit lower gear ratios in the gearbox (or transmission).

[0018] Economies in the built phase and ongoing operation and maintenance of the system will be realized.

[0019] An inherently stronger fixed pitch solution will accommodate increases in blade solidity. Solidity increases equate to increases in torque that, in turn equate to increases in power.

[0020] Employing CWC (in lieu of pitch or stall solutions) in conjunction with induction generator torque, enables on demand control of necessary amounts of opposing torque to manage rotor speed in gusty and increasing wind speeds through cut-out . . . typically 25 meters per second. The sum of opposing torques found in full extension of weights and generator(s) at rated power must be greater than rotor torque at 25 m/s.

[0021] CWC will dampen and temporally store energy. FIG. 4 demonstrates storage capability of CWC with eight weights (each at 1000 lbs). Such temporary storage will relieve stresses currently known to damage gearboxes. Downtime and costly repairs or replacement can be avoided.

[0022] Under program control CWC will be used in response to two recurring operating conditions:

[0023] In response to wind gusts or turbulent flows (water), the plurality of weights on jackscrews in conjunction with generator torque will be employed to control rotor speed through 25 m/s (3.4 m/s water). Generator torque will increase only at a rate that the gearboxes can easily tolerate. This parallel extension of weights and use of generator torque will assure control of rotor speed and its rate of increase. When adequate control is achieved generator torque will be further increased to take additional energy from what is stored in the extended weights and accordingly the weights will retract.

[0024] CWC will control rotor speed while gear changes occur. CWC will temporarily displace generator torque (during disengagement) while the clutch operates for gear change.

[0025] In both wind and water implementations the CWC configuration is horizontal (perpendicular to vertical low speed shaft). A rotating and circular guide/sled on roller bearings will be necessary to carry the CWC weights as they extend or retract for routine operation. See FIG. 3.

[0026] In the wind implementation stopping/parking the rotor at cutout will employ both yaw and conventional brakes.. In the water implementation yaw may be used to reduce load, but braking to overcome rotor forces will not be employed. When flows in excess of 3.4 m/s are encountered the rotor and low speed shaft will disengage from generator (via clutch) and weights will fully retract. Rotor will turn freely until normal operating conditions return.

[0027] In both wind and water implementations a vertical chassis integral to tower or monopile, will be necessary to carry vertical and lateral loads of the low speed shaft.

[0028] Clutch operation for gear changes will be under program control. This control will extend or retract weights to control rotor speed and manage generator speed while disengaged to accommodate a gear change. Gear changes will

PTO/SB/05 (08-08)
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UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Attorney Docket No.	
First Inventor	Matthew Earley
Title	Fixed Pitch Wind (Water) turbine w/
Express Mail Label No.	

APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents.

1. [✓] **Fee Transmittal Form** (e.g., PTO/SB/17)
2. [✓] **Applicant claims small entity status.** See 37 CFR 1.27.
3. [✓] **Specification** [*Total Pages* 5]
   Both the claims and abstract must start on a new page
   (For information on the preferred arrangement, see MPEP 608.01(a))
4. [✓] **Drawing(s)** (*35 U.S.C. 113*) [*Total Sheets* 6]
5. **Oath or Declaration** [*Total Sheets* 3]
   a. [✓] Newly executed (original or copy)
   b. [ ] A copy from a prior application (37 CFR 1.63(d))
   (for continuation/divisional with Box 18 completed)
   i. [ ] DELETION OF INVENTOR(S)
   Signed statement attached deleting inventor(s) name in the prior application, see 37 CFR 1.63(d)(2) and 1.33(b).
6. [ ] **Application Data Sheet.** See 37 CFR 1.76
7. [ ] **CD-ROM or CD-R** in duplicate, large table or Computer Program *(Appendix)*
   [ ] Landscape Table on CD
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 or CD-R (2 copies); or
      ii. [ ] Paper
   c. [ ] Statements verifying identity of above copies

ADDRESS TO: **Commissioner for Patents**
P.O. Box 1450
Alexandria VA 22313-1450

ACCOMPANYING APPLICATION PARTS

9. [ ] **Assignment Papers** (cover sheet & document(s))
   Name of Assignee _____
10. [ ] **37 CFR 3.73(b) Statement** *(when there is an assignee)* [ ] **Power of Attorney**
11. [ ] **English Translation Document** *(if applicable)*
12. [ ] **Information Disclosure Statement** (PTO/SB/08 or PTO-1449)
    [ ] Copies of citations attached
13. [ ] **Preliminary Amendment**
14. [✓] **Return Receipt Postcard** (MPEP 503)
    (Should be specifically itemized)
15. [ ] **Certified Copy of Priority Document(s)**
    (if foreign priority is claimed)
16. [ ] **Nonpublication Request** under 35 U.S.C. 122(b)(2)(B)(i). Applicant must attach form PTO/SB/35 or equivalent.
17. [ ] Other: _____

18. If a CONTINUING APPLICATION, *check appropriate box, and supply the requisite information below and in the first sentence of the specification following the title, or in an Application Data Sheet under 37 CFR 1.76:*

[ ] Continuation [ ] Divisional [ ] Continuation-in-part (CIP) of prior application No.: .....

Prior application information: *Examiner* _____ *Art Unit:* _____

19. CORRESPONDENCE ADDRESS

[ ] The address associated with Customer Number: [ ] OR [✓] Correspondence address below

Name	Matthew Earley				
Address	3226 Atlantic Ave PO Box 213				
City	Allenwood	State	New Jersey	Zip Code	08720
Country	USA	Telephone	732-528-9201	Email	earleymatt@aol.com

Signature	Matthew Earley	Date	October 10, 2010
Name (Print/Type)	Matthew Earley	Registration No. (Attorney/Agent)	

This collection of information is required by 37 CFR 1.53(b). 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 1.11 and 1.14. This collection is estimated to take 12 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: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in *d select option 2.*

Specification:

This non-provisional application does reference and claim benefit of an earlier provisional application having an 11/6/2009 filing date and application number 61/280,606.

Title of Invention:

Fixed Pitch Wind (or Water) Turbine with Centrifugal Weight Control (CWC}

Background of Invention:

The invention incorporates a unique and patented means of controlling rotor speed and is in lieu of traditional aerodynamic solutions (pitch or stall). In current systems pitch or stall in conjunction with generator torque is the typical solution for speed control. In the proposed system the weight scheme in conjunction with generator torque will control rotor speed.

Brief Summary of Invention:

The fixed pitch rotor and centrifugal weight control will permit the generation of increasing amounts of energy for the full distribution of operating speeds in both wind and water scenarios. Current technology captures and transforms less than half of the energy content available in the discussed distribution. In wind, operating speed is typically up to 25 m/s though rated power is typically reached at 14 or 15 m/s. In water, highest flow rate is typically 3.4 m/s though rated power is usually at 2.4 m/s.
The table in Figure # 6 shows a 20-year projection for a 36-meter system with power totals at 15 m/s for current solution and 25 m/s for the discussed solution.
Further, this same weight control scheme permits use of a transmission (in lieu of gearbox). In so doing the rotor can continue to increase speed (rpm's) in an increasing flow (wind or water) while generator speed can be held constant via gear ratio reductions offered by the transmission.

Brief Description of the Several Views of the Drawings and Tables:

Figure – 1 Fixed Pitch Wind Turbine w/CWC
Figure – 2 Fixed Pitch Water Turbine w/CWC
Figure – 3 CWC System / Wind Implementation
Figure – 4 CWC Storage Calculations
Figure – 5 Nacelle top down view
Figure – 6 Power / Energy Tables

Detailed Description of the Invention:

This fixed pitch wind (or water) turbine makes use of a patented (US 6,949,842) control solution know as "Centrifugal Weight Control" – or CWC. Such an implementation presents an opportunity to extend the low speed shaft down the length of the tower (wind turbine) or up above the water line (water turbine). See figures 1 & 2 respectively. In the wind implementation, extending the low speed shaft down the length of the tower also means you can move other major components down, including generator and gearbox. Doing so results in several compelling advantages as outlined below:

- Significant reductions in top head mass (weight at top of tower) can be realized.
- Moving the generator(s) to the base of the tower permits the use of a larger, heavier and less costly generator product.
- At the base of the tower available space will accommodate a generator(s) having a greater number of pole pairs.
- The need for lightweight technology employing rare earth elements will no longer be necessary.
- More pole pairs in the generator will permit lower gear ratios in the gearbox (or transmission).
- Economies in the built phase and ongoing operation and maintenance of the system will be realized.
- An inherently stronger fixed pitch solution will accommodate increases in blade solidity. Solidity increases equate to increases in torque that, in turn equate to increases in power.

Employing CWC (in lieu of pitch or stall solutions) in conjunction with induction generator torque, enables on demand control of necessary amounts of opposing torque to manage rotor speed in gusty and increasing wind speeds through cut-out ... typically 25 meters per second. The sum of opposing torques found in full extension of weights and generator(s) at rated power must be greater than rotor torque at 25m/s.

CWC will dampen and temporally store energy. Figure # 4 demonstrates storage capability of CWC with eight weights (each at 1000 lbs). Such temporary storage will relieve stresses currently known to damage gearboxes. Downtime and costly repairs or replacement can be avoided.

Under program control CWC will be used in response to two recurring operating conditions:

- In response to wind gusts or turbulent flows (water), the plurality of weights on jackscrews in conjunction with generator torque will be employed to control rotor speed through 25 m/s (3.4 m/s water). Generator torque will increase only at a rate that the gearboxes can easily

tolerate. This parallel extension of weights and use of generator torque will assure control of rotor speed and its rate of increase. When adequate control is achieved generator torque will be further increased to take additional energy from what is stored in the extended weights and accordingly the weights will retract.

- CWC will control rotor speed while gear changes occur. CWC will temporarily displace generator torque (during disengagement) while the clutch operates for gear change.

In both wind and water implementations the CWC configuration is horizontal (perpendicular to vertical low speed shaft). A rotating and circular guide / sled on roller bearings will be necessary to carry the CWC weights as they extend or retract for routine operation. See Figure # 3.

In the wind implementation stopping / parking the rotor at cutout will employ both yaw and conventional brakes. In the water implementation yaw may be used to reduce load, but braking to overcome rotor forces will not be employed. When flows in excess of 3.4m/s are encountered the rotor and low speed shaft will disengage from generator (via clutch) and weights will fully retract. Rotor will turn freely until normal operating conditions return.

In both wind and water implementations a vertical chassis integral to tower or monopile, will be necessary to carry vertical and lateral loads of the low speed shaft.

Clutch operation for gear changes will be under program control. This control will extend or retract weights to control rotor speed and manage generator speed while disengaged to accommodate a gear change. Gear changes will routinely occur to maintain desired generator rpm's across the distribution of operating wind speeds. Same control will be applied to the water turbine.

Centrifugal weight control, fixed pitch, an extended low speed shaft and transmission distinguish the discussed solution from present day wind and water turbines.

Claim or Claims:

1. A wind (water) turbine power generating assembly comprising:

   a fixed pitch blade / rotor assembly;
   an extended low speed shaft with 1:1 gearbox for 90° turn;
   a centrifugal weight control assembly;
   a clutch and transmission assembly in lieu of traditional gearbox;
   an assembly at the tower base including CWC, transmission, and generator(s);

2. Apparatus as set forth in claim 1;

   wherein increasing amounts of power will be generated in the 15 to 25 m/s range for wind and the 2.4 to 3.4 m/s range for tidal (bi-directional flow);
   wherein optimized tip speed ratio can be maintained for the entire operating range of the flow (wind or water).

3. Apparatus as set forth in claim 2;

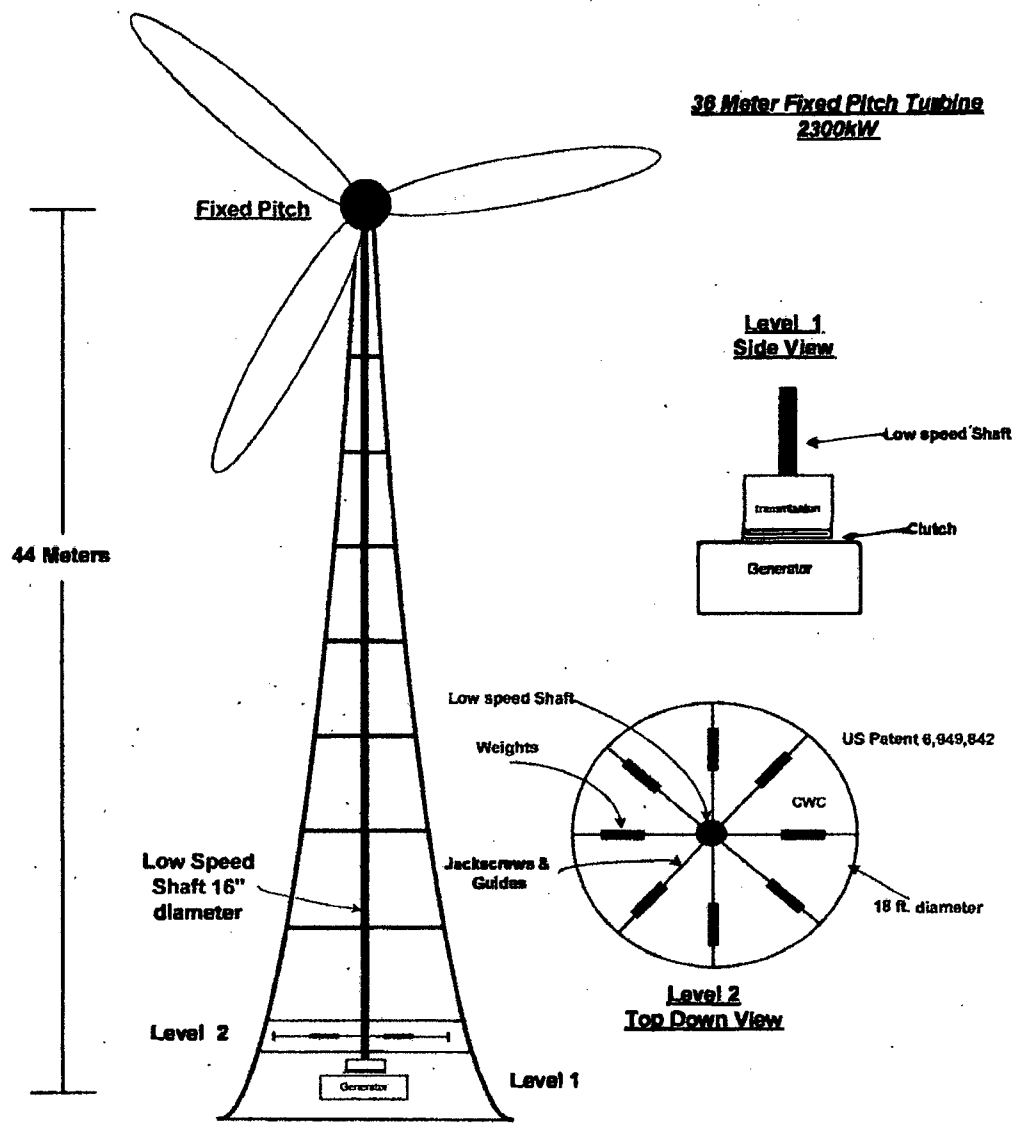
   wherein initial build and ongoing operational and maintenance costs will be significantly less than current technology.

Abstract of the Disclosure:

The Fixed Pitch Wind (Water) turbine is a more productive system than current technology in that it extracts increasing amounts of energy from wind (or water) flows throughout typical operating ranges (25 m/s for wind and 3.4 m/s for tidal). Further, an inherently stronger fixed pitch solution can have greater blade solidity that will, in turn increase torque across the entire operating range.
Extending the low speed shaft brings major and heavy system components to the tower base (for wind) or above water line (tidal) for reduced cost, both initially and on an ongoing basis.
The weight control system acts as a buffer for energy storage that will accommodate gusty or turbulent conditions and also facilitate gear changes as the speed of the rotor changes.

Matthew Earley 732-528-9201

Figure # 1



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Figure#2

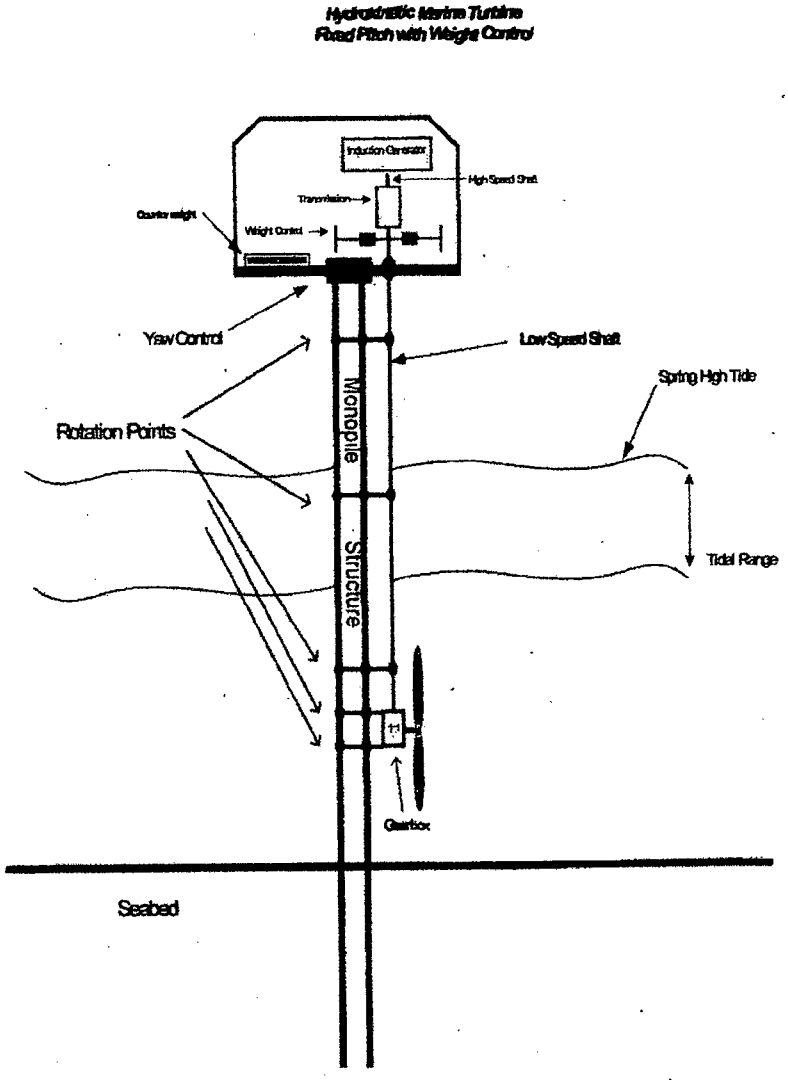

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Figure # 3

CWC Side View

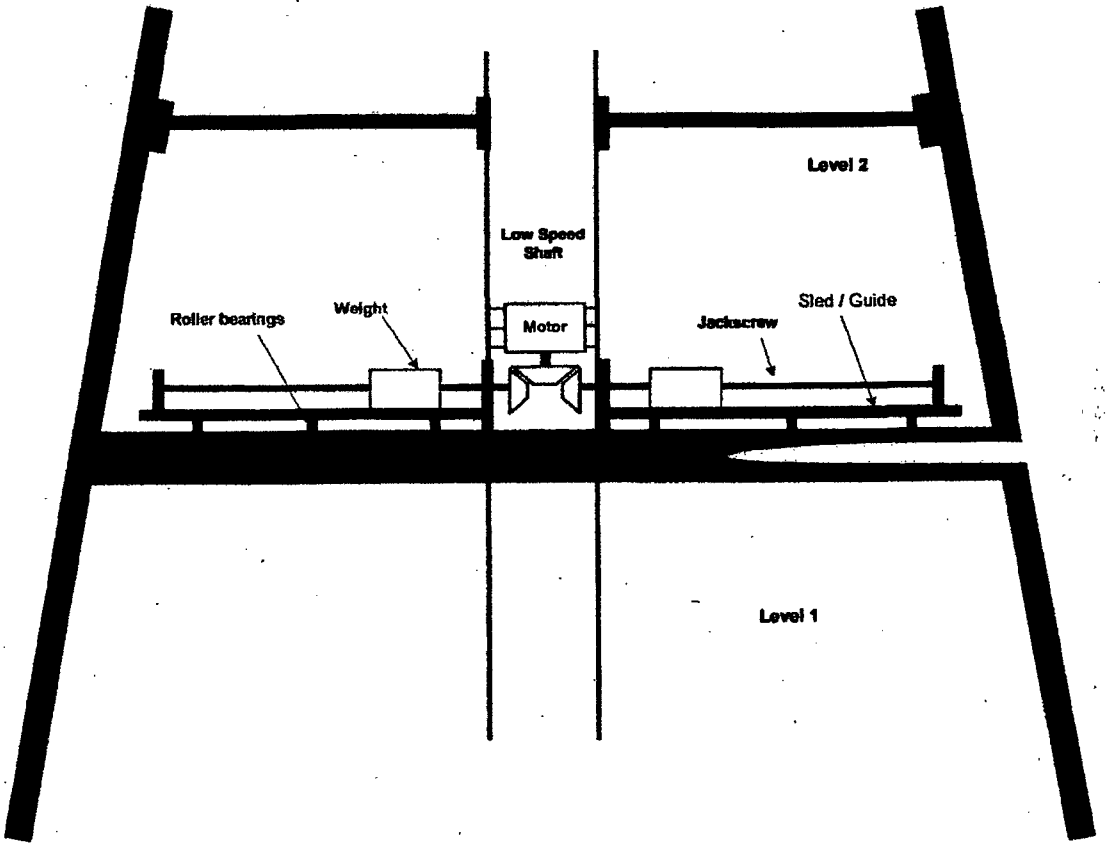

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Figure # 4

CWC calculations

Convert weights to kg 8 weights @1000	1000	3,628.7
Convert feet to meters	2	0.61
	10	3.05
Moment of inertia I1		1,348.5
Moment of inertia I8		33,711.9
RPM's / Radians	25	2.6
Stored 2 ft radius (joules)		4,612.8
Stored 10 ft radius (joules)		115,319.5
Net energy (joules)		110,706.7
Convert lbs weight to mass in slugs	8000	248.4
Inertia MR^2	2 ft	993.8
Inertia MR^2	10 ft	24,844.7
In MKS find energy stored		
Stored Energy at 2 ft radius		3,399.5
Stored Energy at 10 ft radius		84,987.2
Net Energy Stored (FT-pd)		81,587.7
Net Energy 110,706 joules or 30.8 kWh		30.8

Turbulent Flow 10kw / sec

Time / Seconds	Energy (f)t-pds
0	0.0
1	3,685.0
2	14,740.0
3	33,165.0
4	58,960.0
5	92,125.0

Turbulent Flow 10kW or 3846 nt-m

RVr =3846 nt-m / 2 x 3628kg x 2.6 radians=meters per second
Weights must move at 0.203 m/sec or .66 ft/sec

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Figure # 5

Nacelle
Top Down View

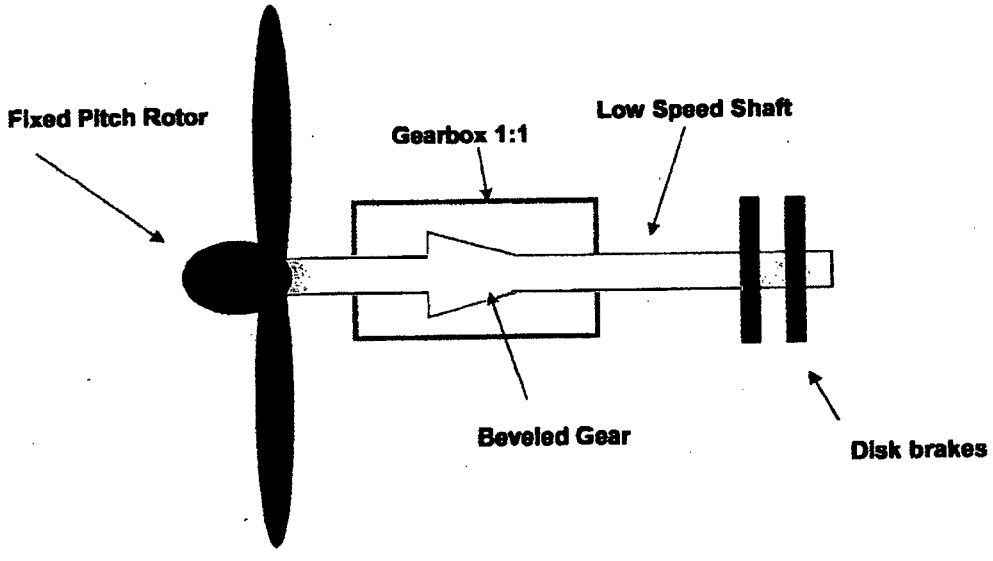

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Figure # 6

36 Meter System

w/speed	rpm's	tip speed	tsr	Velocity 3x	Cp	Area	Power	w/s distribution	24 hour factor	20 year prod.
6	25.48	48.41	8.07	216	0.450	1018	60,607	0.020	0.480	63,710
7	29.72	56.48	8.07	343	0.450	1018	96,241	0.032	0.768	161,670
8	33.97	64.54	8.07	512	0.450	1018	143,660	0.060	1.440	453,047
9	38.22	72.61	8.07	729	0.450	1018	204,547	0.060	1.920	860,081
10	42.46	80.68	8.07	1000	0.450	1018	280,586	0.085	2.040	1,253,547
11	46.71	88.75	8.07	1331	0.450	1018	373,460	0.100	2.400	1,962,907
12	46.69	88.71	7.39	1728	0.445	1018	479,466	0.103	2.460	2,583,074
13	46.71	88.76	6.83	2197	0.442	1018	605,489	0.094	2.256	2,991,503
14	46.74	88.81	6.34	2744	0.435	1018	744,264	0.085	2.040	3,325,076
15	46.74	88.80	5.92	3375	0.412	1018	867,012	0.075	1.800	3,417,759
Current Technology										17,072,573
16	46.71	88.75	5.55	4096	0.400	1018	1,021,583	0.060	1.440	3,221,665
17	46.74	88.81	5.22	4913	0.380	1018	1,164,084	0.050	1.200	3,059,212
18	46.72	88.77	4.93	5832	0.370	1018	1,345,467	0.040	0.960	2,828,710
19	46.69	88.72	4.67	6859	0.340	1018	1,454,098	0.032	0.768	2,445,676
20	46.71	88.75	4.44	8000	0.320	1018	1,596,224	0.020	0.480	1,677,951
21	46.70	88.74	4.23	9261	0.312	1018	1,801,633	0.018	0.432	1,704,489
22	46.71	88.75	4.03	10648	0.290	1018	1,925,395	0.010	0.240	1,011,988
23	46.76	88.84	3.86	12167	0.270	1018	2,048,336	0.010	0.240	1,076,605
24	46.75	88.83	3.70	13824	0.250	1018	2,154,902	0.009	0.216	1,019,355
25	46.71	88.75	3.55	15625	0.237	1018	2,308,991	0.005	0.188	950,658
Proposed Technology										36,068,882

Appendix