

**REMARKS**

***Status of the Claims***

This amendment is filed in response to the Office Action mailed June 14, 2024.

Claims 1-20 are pending and stand rejected.

Claims 1, 12, 13, 16, and 19 are amended.

Support for the amendments to claims 1, 12, 16, and 19 is found at least at paragraphs [0028], and [0051] of the application as filed. Support for the amendments to claim 13 is found at least at paragraphs [0027], [0039], and [0043] of the application as filed.

No new matter is added.

For at least the reasons presented below, Applicant respectfully submits that each of the pending claims is in condition for allowance.

***35 U.S.C. § 102***

**Claims 1-7 and 13-15** are rejected under 35 U.S.C. 102(a)(1) as being anticipated by **Phillips** (US 20190203579A1) (hereinafter “Phillips”).

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Brothers v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). The identical invention must be shown in as complete detail as is contained in the claim. *Richardson v. Suzuki Motor Co.*, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

Unless a single prior art reference describes “all of the limitations claimed” *and* “all of the limitations *arranged or combined in the same way* as recited in the claim, it cannot be said to prove prior invention of the thing claimed and, thus, cannot anticipate under 35 U.S.C. § 102.” *Net MoneyIN Inc. v. VeriSign Inc.*, 545 F.3d 1359, 1371 (Fed. Cir. 2008) (emphasis added). A single prior art reference must “clearly and unequivocally” describe the claimed invention “without *any* need for picking, choosing, and combining various disclosures not directly related to each other by the teachings of the cited reference.” *Id.* (citing *In re Arkley*, 455 F.2d 586, 587 (C.C.P.A. 1972)).

Claims 1-7

Applicant respectfully asserts that claims 1-7 are not anticipated by Phillips under 35 U.S.C. § 102(a)(1) at least because Phillips does not describe each and every element of independent claim 1, as currently amended.

For example, Phillips does not describe a “*magnetometer* to be coupled to the at least one component of the downhole pumping system and to *measure axial movement* of the at least one component of the downhole pumping system based on variations in a magnet field detected by the magnetometer” as recited in claim 1.

Phillips describes a sensing device that includes a magnetometer and that “[t]he magnetometer is effectively a compass that identifies a *radial orientation* of the sensor relative to a fixed external location such as true north.” *Phillips*, ¶ [0022] (emphasis added).

Phillips does not appear to describe, however, that the magnetometer is used to “*measure axial movement* of the at least one component of the downhole pumping system based on variations in a magnet field detected by the magnetometer” as recited in claim 1.

While Phillips appears to make some contradictory statements regarding movement of polished rod, at best, Phillips only appears to be capable of detecting whether the rod is moving or not. However, the configurations of Phillips do not appear to be capable of measuring axial movement with the magnetometer.

Further, Phillips does not disclose “determin[ing] rotational velocity of the at least one component of the downhole pumping system with the rotation sensor subsystem *by sampling rotational velocity values* generated by the rotation of the at least one component of the downhole pumping system *with only the gyroscope*,” as further recited in amended claim 1.

Thus, claims 1, and claims 2-7 depending therefrom, are believed to be in condition for allowance.

Claims 13-15

Applicant respectfully asserts that claims 13-15 are not anticipated by Phillips under 35 U.S.C. § 102(a)(1) at least because Phillips does not describe each and every element of independent claim 13, as currently amended.

For example, Phillips does not describe “a *vibration sensor* subsystem for monitoring vibration of the at least one component of the downhole pumping system *in three axes*,” or deriving “a *vibrational baseline* of the at least one component of the downhole pumping system from the vibration sensor subsystem *in three axes* during normal operation” as recited in claim 13.

As recognized in the Office Action, Phillips fails to teach a vibration sensor subsystem. *Office Action*, page 11.

Thus, claims 13, and claims 14 and 15 depending therefrom, are believed to be in condition for allowance.

**35 U.S.C. § 103**

**Claims 10 and 11** are rejected under 35 U.S.C. 103 as being unpatentable over **Phillips**.

To establish a *prima facie* case of obviousness, the prior art reference itself (or references when combined) or “the inferences and creative steps that a person of ordinary skill in the art would [have] employ[ed]” at the time of the invention must teach or suggest all of the claim elements. *K.S.R. Intern. Co. v. Teleflex Inc.*, 550 U.S. 398, 418, 82 U.S.P.Q.2d 1385 (2007); *see also* M.P.E.P. § 2143.03. Additionally, the Examiner must determine whether there is “an apparent reason to combine the known elements in the fashion claimed by the patent at issue.” *Id.* “[A] patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art.” *Id.* Further, rejections on obviousness grounds “cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” *Id.* (quoting *In re Kahn*, 441, F.3d 977, 988 (Fed. Cir. 2006)). Finally, to establish a *prima facie* case of obviousness there must be a reasonable expectation of success. *In re Merck & Co., Inc.*, 800 F.2d 1091, 1097 (Fed. Cir. 1986). Furthermore, the reason that would have prompted the combination and the reasonable expectation of success must be found in the

prior art, common knowledge, or the nature of the problem itself, and not based on the Applicant's disclosure. *DyStar Textilfarben GmbH & Co. Deutschland KG v. C. H. Patrick Co.*, 464 F.3d 1356, 1367 (Fed. Cir. 2006); MPEP § 2144. Underlying the obvious determination is the fact that hindsight cannot be used. *KSR*, 550 U.S. at 421; *DyStar*, 464 F.3d at 1367.

Applicant respectfully asserts that claims 10 and 11 could not have been obvious to a person of ordinary skill in the art at the time the invention was made considering Phillips at least because Phillips does not teach or suggest each and every element as recited in independent claim 1, as currently amended.

For example, Phillips does not teach or suggest a “*magnetometer* to be coupled to the at least one component of the downhole pumping system and to *measure axial movement* of the at least one component of the downhole pumping system based on variations in a magnet field detected by the magnetometer” as recited in claim 1.

Phillips teaches a sensing device that includes a magnetometer and that “[t]he magnetometer is effectively a compass that identifies a *radial orientation* of the sensor relative to a fixed external location such as true north.” *Phillips*, ¶ [0022] (emphasis added). Phillips does not appear to teach or suggest, however, that the magnetometer is used to “*measure axial movement* of the at least one component of the downhole pumping system based on variations in a magnet field detected by the magnetometer” as recited in claim 1.

Thus, claim 1, and claims 10 and 11 depending therefrom, are believed to be in condition for allowance.

**Claims 8, 9, and 16-18** are rejected under 35 U.S.C. 103 as being unpatentable over Phillips in view of **Hurst** et al. (US9140113B2) (hereinafter “Hurst”).

Applicant respectfully asserts that claims 8, 9, and 16-18 could not have been obvious to a person of ordinary skill in the art at the time the invention was made considering Phillips in view of Hurst at least because Phillips and Hurst, alone or in combination, do not teach or suggest each and every element as recited in independent claims 1 or 16, as currently amended.

For example, Phillips and Hurst, alone or in combination, do not teach or suggest “*magnetometer* to be coupled to the at least one component of the downhole pumping system and to *measure axial movement* of the at least one component of the downhole pumping system based on variations in a magnet field detected by the magnetometer” as recited in claim 1, or “an axial motion sensor subsystem comprising a *magnetometer to measure axial movement* of at least one component of the downhole pumping system and to *determine a change in axial direction* of the at least one component of the downhole pumping system,” as recited in claim 16.

Phillips teaches a sensing device that includes a magnetometer and that “[t]he magnetometer is effectively a compass that identifies a *radial orientation* of the sensor relative to a fixed external location such as true north.” *Phillips*, ¶ [0022] (emphasis added). Phillips does not appear to teach or suggest, however, that the magnetometer is used to “*measure axial movement*” as recited in claims 1 and 16, or to “*determine a change in axial direction*” as recited in claim 16.

Hurst appears to be relied upon for teachings with regard to a tubing rotator. *Office Action*, page 8. Hurst, however, does not appear to teach or suggest a magnetometer is used to “*measure axial movement*” as recited in claims 1 and 16, or to “*determine a change in axial direction*” as recited in claim 16.

Thus, claims 1 and 16, and claims 8, 9, 17, and 18 depending therefrom, are believed to be in condition for allowance.

**Claims 12, 19, and 20** are rejected under 35 U.S.C. 103 as being unpatentable over **Phillips** in view of **Fyfe et al.** (US 11319794B2) (hereinafter “Fyfe”).

Claim 12

Applicant respectfully asserts that claim 12 is allowable at least because Fyfe does not cure the deficiencies of Phillips with regard to claim 2, from which claim 12 depends.

Additionally, claim 12 could not have been obvious to a person of ordinary skill in the art at the time the invention was made considering Phillips in view of Fyfe at least because Phillips and Fyfe, alone or in combination, do not teach or suggest each and every element as recited in claim 12, as currently amended.

For example, Phillips and Fyfe, alone or in combination, do not teach or suggest “a vibration sensor subsystem for monitoring vibration of the at least one component of the downhole pumping system *in three axes* over a vibrational baseline,” as recited in claim 12.

As recognized in the Office Action, Phillips fails to teach a vibration sensor subsystem. *Office Action*, page 11.

Fyfe teaches “a polished-rod dynamometer has at least one accelerometer adapted to measure acceleration and vibration of the polished rod.” Fyfe, col. 2, ll. 13-15. Fyfe does not appear to teach or suggest, however, “a vibration sensor subsystem for monitoring vibration of the at least one component of the downhole pumping system *in three axes* over a vibrational baseline,” as recited in claim 12.

Thus, claim 12 is believed to be in condition for allowance.

Claims 19 and 20

Applicant respectfully asserts that claims 19 and 20 could not have been obvious to a person of ordinary skill in the art at the time the invention was made considering Phillips in view of Fyfe at least because Phillips and Fyfe, alone or in combination, do not teach or suggest each and every element as recited in independent claim 19, as currently amended.

For example, Phillips and Fyfe, alone or in combination, do not teach or suggest “*determining a change in axial direction* of at least one component of the downhole pumping system *based on magnetic variations*” as recited in claim 19.

Phillips teaches a sensing device that includes a magnetometer and that “[t]he magnetometer is effectively a compass that identifies a *radial orientation* of the sensor relative to a fixed external location such as true north.” *Phillips*, ¶ [0022] (emphasis added). Phillips does

not appear to teach or suggest, however, “*determining a change in axial direction* of at least one component of the downhole pumping system *based on magnetic variations*” as recited in claim 19.

Fyfe teaches “a polished-rod dynamometer has at least one accelerometer adapted to measure acceleration and vibration of the polished rod.” Fyfe, col. 2, ll. 13-15. Fyfe does not appear to teach or suggest, however, “*determining a change in axial direction* of at least one component of the downhole pumping system *based on magnetic variations*” as recited in claim 19.

Thus, claim 19, and claim 20 depending therefrom, are believed to be in condition for allowance.

### **Conclusion**

In view of the foregoing, Applicant believes all claims now pending in this application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please contact the undersigned at (801) 870-4092.

Respectfully submitted,

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