

REMARKS

This is a full and timely response to the final Office action mailed September 18, 2009. Reexamination and reconsideration in view of the foregoing amendments and following remarks is respectfully solicited.

Claims 1, 5-9, and 13-20 are pending in this application, with Claims 1, 9, 14, and 20 being the independent claims. Claims 1, 9, 14, and 20 have been amended, and Claims 2-4 and 10-12 have been canceled. No new matter is believed to have been added.

Rejections Under 35 U.S.C. § 103

Claims 1, 4-7, 9, and 13 were rejected under 35 U.S.C. § 103 as allegedly being unpatentable over U.S. Patent Nos. 6,325,331 (McKeown), 3,984,711 (Kordik), and 5,043,618 (Stephenson); Claim 8 was rejected under 35 U.S.C. § 103 as allegedly being unpatentable over McKeown, Kordik, Stephenson, and U.S. Patent Publication No. 2005/0247529 (Gaines); and Claims 14-20 were rejected under 35 U.S.C. § 103 as allegedly being unpatentable over McKeown and Kordik. These rejections are respectfully traversed.

Independent Claim 1 relates to an actuator assembly that includes a power drive unit, an actuator, a latch rotor, one or more permanent magnets spaced apart from and at least partially surrounding the latch rotor, and an electromagnet. Independent Claim 1 has been amended herein to recite, *inter alia*: that (1) the electromagnet is configured, upon receipt of a flow of electrical current, to generate a magnetic field that simultaneously opposes all of the permanent magnetic fields supplied from the permanent magnet pole pairs or simultaneously aids all of the permanent magnetic fields supplied from the permanent magnet pole pairs and (2) the latch windings are wound on the latch stator such that, upon receipt of the flow of electrical current, the latch windings simultaneously generate the same number of magnetic pole pairs as there are permanent magnet pole pairs. Independent Claim 9 relates to an actuator drive unit that includes the same recited elements as independent Claim 1, except for the actuator.

Independent Claims 14 and 20 relate to an actuation control system. Independent Claim 14 now recites, *inter alia*, that the latch electromagnet is configured, when the

latch control signals are supplied, to generate a magnetic field that (i) simultaneously opposes the permanent magnetic fields supplied from all of the permanent magnets or simultaneously aids the permanent magnetic fields supplied from all of the permanent magnets and (ii) does not induce a torque in the latch rotor. Independent Claim 20 now recites, *inter alia*, that the electromagnet is coupled to receive the latch control signals that are selectively supplied from the control circuit and is configured to: (i) generate a magnetic field force that opposes rotation of the latch rotor and has a magnitude sufficient to prevent rotation of the power drive unit when the latch control signals are supplied, and (ii) not generate the magnetic field when the latch control signals are not supplied.

McKeown relates to actuators that may be used in aircraft flight control systems and discloses two rather distinct actuator embodiments. In one embodiment, which is depicted in FIG. 1, the actuator (11) includes an electric motor (13), a brake (15), a gear train (17), a clutch (19), an output damper (21), and another gear train (23). The brake (15) is a spring-loaded device that engages the motor (13) to lock the actuator (col. 4, ll. 14-15). In the second embodiment, which is depicted in FIG. 2, McKeown discloses an actuator (27) that includes a stepper motor (29), a gear train (31), an output member (33), and an optional damping member (35). McKeown further espouses the fact that this second embodiment “provides all of the same functionality of typical prior-art mechanisms illustrated in FIG. 1, using only stepper motor (29), gear train member (31), and output member (33)” (col. 4, ll. 41-44). This is due, in part, to the fact that the stepper motor (29) may be “made to function as a braked, or locked device by exciting one or more phases in a fixed pattern, that is, without a time sequence” (col. 5, ll. 6-8).

Kordik relates to a variable reluctance stepper motor that includes permanent magnets interposed within the circumferential spaces of the stator pole pieces. The permanent magnets are provided to increase the dynamic and holding torque characteristics of the stepper motor while providing detent torque and dampening overshoot. The structure disclosed in Kordik, as with all stepper motors, is wholly disparate from the structure that is now more explicitly recited in independent Claims 1 and 9. Specifically, the structure of Kordick does not disclose a rotor having N-number of lobes, (N/2)-number of permanent magnet pole pairs, and an electromagnet that is

configured, upon receipt of a flow of electrical current, to generate a magnetic field that simultaneously opposes all of the permanent magnetic fields supplied from the permanent magnet pole pairs or simultaneously aids all of the permanent magnetic fields supplied from the permanent magnet pole pairs and that comprises latch windings that, upon receipt of a flow of electrical current, simultaneously generate the same number of magnetic pole pairs as there are permanent magnet pole pairs.

Stephenson was cited for allegedly disclosing a rotor having N-number of lobes, and (N/2)-number of permanent magnet pole pairs. However, as with Kordick, Stephenson fails to disclose, or even remotely suggest, an electromagnet that is configured, upon receipt of a flow of electrical current, to generate a magnetic field that simultaneously opposes all of the permanent magnetic fields supplied from the permanent magnet pole pairs or simultaneously aids all of the permanent magnetic fields supplied from the permanent magnet pole pairs and that comprises latch windings that, upon receipt of a flow of electrical current, simultaneously generate the same number of magnetic pole pairs as there are permanent magnet pole pairs.

There is simply no suggestion whatsoever in McKeown to replace the spring-loaded brake disclosed therein with a stepper motor, such as the ones disclosed in the Kordick and Stephenson. This is because, as noted above, McKeown explicitly teaches that a stepper motor may function as the lock device.

Moreover, there is reason whatsoever that a skilled artisan would be led to modify the stepper motors disclosed either Kordick or Stephenson so that an electromagnet is configured, upon receipt of a flow of electrical current, to generate a magnetic field that simultaneously opposes all of the permanent magnetic fields supplied from the permanent magnet pole pairs or simultaneously aids all of the permanent magnetic fields supplied from the permanent magnet pole pairs and that comprises latch windings that, upon receipt of a flow of electrical current, simultaneously generate the same number of magnetic pole pairs as there are permanent magnet pole pairs. If such a modification were made, the motors would not operate according to the intended purpose, which is clear evidence of non-obviousness. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984) (If the proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or

motivation to make the proposed modification).

As to independent Claim 14, Kordick (and all of the other cited references for that matter) also fails to even remotely suggest a latch electromagnet that is configured, when latch control signals are supplied thereto, to generate a magnetic field that selectively opposes or aids the permanent magnetic fields supplied from all of the permanent magnets. Again, this would run wholly contrary to the disclosed and intended operation of the stepper motor disclosed in Kordick. If the stepper motor disclosed in Kordick were energized in this manner, it would not operate, as it was intended, as a stepper motor. A complete change in the principle of operation of the elements disclosed in an applied reference is also evidence of non-obviousness. *In re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA 1959) (If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious).

Kordick also fails to disclose the above recited features of independent Claim 20, and for the same reason as discussed above for independent Claim 14, does not render independent Claim 20 obvious.

For at least the foregoing reasons, Applicants submit that a skilled artisan, upon reading both McKeown, Kordick, and Stephenson would not be led to the invention defined by at least independent Claims 1, 9, 14, or 20.

With respect to dependent Claim 8, while not conceding that Gaines discloses or suggests what is alleged in the Office action, Applicants nonetheless submit that Gaines fails to make up for the deficiencies of the McKeown/Kordik/Stephenson combination that were delineated above.

In view of the foregoing, reconsideration and withdrawal of the § 103 rejections is requested.

Response to Specific Items of Note

In addition to the above arguments, Applicants take this opportunity to address some specific items of note that were delineated in the Office action. In particular, the Office action, on pages 3, 5, 6, and 7, separately refers to the recitation of an element that

is “adapted to perform a function,” and that such a recitation is not patentable. However, it is respectfully pointed out that none of the claim elements are recited as being “adapted to perform a function.” Certainly, some claim elements are recited as being adapted to receive power or electrical current. Yet, these same claim elements are also explicitly expressed as being “configured,” in response to receiving the power or current, to implement a function. Something that is physically configured to implement a particular function in response to a particular stimulus is wholly disparate from something that is adapted to perform a function, and the functional recitation cannot be interpreted as a mere statement of intended use.

Conclusion

Based on the above, independent Claims 1, 9, 14, and 20 are patentable over the citations of record. The dependent claims are also deemed patentable for the reasons given above with respect to the independent claims and because each recite features which are patentable in its own right. Individual consideration of the dependent claims is respectfully solicited.

The other art of record is also not understood to disclose or suggest the inventive concept of the present invention as defined by the claims.

Hence, Applicant submits that the present application is in condition for allowance. Favorable reconsideration and withdrawal of the objections and rejections set forth in the above-noted Office action, and an early Notice of Allowance are requested.

If the Examiner has any comments or suggestions that could place this application in even better form, the Examiner is requested to telephone the undersigned attorney at the below-listed number.

If for some reason Applicant has not paid a sufficient fee for this response, please consider this as authorization to charge Ingrassia, Fisher & Lorenz, Deposit Account No. 50-2091 for any fee which may be due.

Respectfully submitted,

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