The opinion in support of the decision being entered today was **not** written for publication in a law journal and is **not** binding precedent of the Board.

Paper No. 23

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte KIYOHIKO USHIYAMA and ISAO USHIKOSHI

Appeal No. 1998-1078
Application No. 08/442,532

HEARD: October 12, 2000

Before HAIRSTON, BARRY, and LEVY, Administrative Patent Judges.
BARRY, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal under 35 U.S.C. § 134 from the rejection of claims 1-4. We reverse.

BACKGROUND

The invention at issue in this appeal relates to brushless motors. A brushless motor comprises a stator and a rotor. The stator includes a frequency generating (FG) pattern and drive coils wound on a stator core. The rotor includes a rotor magnet having magnetized poles that oppose

the drive coils and an FG magnetized portion that opposes the FG pattern.

The rotational speed and position of a conventional brushless motor are controlled as follows. The FG pattern outputs the sinusoidal FG signal shown in Fig. 7(b) of the appellants' specification. The sinusoidal FG signal is converted into the pulse-like FG signal shown in Fig. 7(c) of the specification. The pulse-like FG signal's leading edge point "a" or point "b" shown in Fig. 7(c) can serve as a trigger point for rotational control. Alternatively, the sinusoidal FG signal's zero-crossing point "a" or zero-crossing point "b" shown in Fig. 7(b) can be used as the trigger point.

The torque ripple of the motor is shown in Fig. 7(a). When the period of the ripple equals the period of the FG signal, or an even number multiple thereof, the minimum point "c" of the motor torque due to the torque ripple coincides with the leading edge "a" or the trailing edge "b" of the pulse-like FG signal, and therefore also coincides with

the zero-crossing points "a" and "b" of the sinusoidal FG signal. Such coincidence delays the change of the speed of the motor in response to an input of a speed control signal, i.e., the speed control reaction is delayed. When the brushless motor is used to drive a video tape recorder, for example, the delay causes undesirable phenomena such as color slippage and disturbance in the displayed image.

The appellants' invention aims to prevent the reaction delay of a brushless motor by setting the relative positions of the stator core, the magnetized poles of the rotor magnet, the FG magnetized portion, and the FG pattern in a circumferential direction so that the minimum point "c" of the torque ripple shown in Fig. 3(a) of the appellants' specification occurs at a different time than a point of an output signal from the FG pattern that functions as a trigger for rotation control. In other words, points "a" and "b" shown in Figs. 3(b) and (c), which are used as trigger points for rotational control, occur at a different time from the minimum point "c" of the motor torque ripple. Preferably, the relative positions are set so that the maximum point of torque

ripple, i.e., point "d" shown in Fig. 3(a), occurs simultaneously with the output signal, i.e., points "a" and "b," from the FG pattern.

Claim 1, which is representative for our purposes, follows:

> 1. A rotation detecting device for a brushless motor, comprising:
>
> a stator core on which a coil is wound;
>
> a driving magnetic pole portion opposing said stator core, the driving magnetic pole portion including a plurality of magnetic poles, and being rotated;
>
> an FG magnetized portion rotated together with said driving magnetic pole portion, the FG magnetized portion including a plurality of magnetic poles; and
>
> an FG pattern opposing said FG magnetized portion, wherein
>
> relative positions of said stator core, said driving magnet pole portion, said FG magnetized portion, and said FG pattern in a circumferential direction are set so that a minimum point of a torque ripple of said brushless motor always occurs

> at a different time than a point of an output signal from said FG pattern, said point of said output signal functioning as a trigger for rotation control.

Besides the appellants' admitted prior art (AAPA), the reference relied on in rejecting the claims follows:

Imai et al. (Imai) 5,408,153 Apr. 18, 1995
effectively filed July 1, 1992.

Claims 1-4 stand rejected under 35 U.S.C. § 103 as obvious over AAPA in view of Imai. Rather than repeat the arguments of the appellants or examiner in toto, we refer the reader to the brief and answer for the respective details thereof.

OPINION

In deciding this appeal, we considered the subject matter on appeal and the rejection advanced by the examiner. Furthermore, we duly considered the arguments and evidence of the appellants and examiner. After considering the totality of the record, we are persuaded that the examiner erred in rejecting claims 1-4. Accordingly, we reverse.

We begin by noting the following principles from In re Rijckaert, 9 F.3d 1531, 1532, 28 USPQ2d 1955, 1956 (Fed. Cir. 1993).

> In rejecting claims under 35 U.S.C. Section 103, the examiner bears the initial burden of presenting a prima facie case of obviousness. In re Oetiker, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992).... "A prima facie case of obviousness is established when the teachings from the prior art itself would appear to have suggested the claimed subject matter to a person of ordinary skill in the art." In re Bell, 991 F.2d 781, 782, 26 USPQ2d 1529, 1531 (Fed. Cir. 1993) (quoting In re Rinehart, 531 F.2d 1048, 1051, 189 USPQ 143, 147 (CCPA 1976)). If the examiner fails to establish a prima facie case, the rejection is improper and will be overturned. In re Fine, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988).

With these principles in mind, we consider the examiner's rejection and the appellants' argument.

Admitting that AAPA does not shift a frequency generating magnetized portion to produce the claimed timing relationship between the torque ripple and the output signal of the frequency generating magnets, the examiner asserts, "Imai et al. disclose many specific examples of frequency generating magnets being shifted in a number of ways, depending upon the

desired output of the motor." (Examiner's Answer at 4.) He then alleges, "it would have been obvious ... to have shifted the frequency generating magnets of the admitted prior art to obtain a desired torque ripple/output signal timing relationship to optimize the motor characteristics for a specific application." (Id.) The appellants argue, "there is no recognition whatsoever in the prior art of a relationship between a trigger point for rotation control and torque ripple of the motor. Imai et al. are completely silent with respect to torque ripple of the motor." (Appeal Br. at 6.)

Claims 1 and 3 specify in pertinent part the following limitations: "relative positions of said stator core, said driving magnet pole portion, said FG magnetized portion, and said FG pattern in a circumferential direction are set so that a minimum point of a torque ripple of said brushless motor always occurs at a different time than a point of an output signal from said FG pattern, said point of said output signal functioning as a trigger for rotation control." Similarly, claims 2 and 4 specify in pertinent part the following limitations: "relative positions of said stator core, said

driving magnet pole portion, said FG magnetized portion, and said FG pattern in a circumferential direction are set so that a maximum point of a torque ripple of said brushless motor always occurs at the same time as, a point of an output signal from said FG pattern, said point of said output signal functioning as a trigger for rotation control."

The U.S. Court of Customs and Patent Appeals (CCPA) established the rule that “where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.” In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955)(citing In re Swain, 156 F.2d 239, 70 USPQ 412 (CCPA 1946); Minnesota Mining and Mfg. Co. v. Coe, 99 F.2d 986, 38 USPQ 213 (D.C. Cir. 1938); Allen v. Coe, 135 F.2d 11, 57 USPQ 136 (D.C. Cir. 1943)). As with many rules, however, there are exceptions to the CCPA’s rule. One exception is the case where a "parameter optimized was not recognized to be a result-effective variable ...." In re Antonie, 559 F.2d 618, 621, 195 USPQ 6, 8 (CCPA 1977). More specifically, "[i]n determining whether the invention as a whole would have been

obvious under 35 USC 103, we must first delineate the invention as a whole. In delineating the invention as a whole, we look not only to the subject matter which is literally recited in the claim in question ... but also to those properties of the subject matter which are inherent in the subject matter and are disclosed in the specification." Id. at 619, 195 USPQ at 8 (citing In re Davies, 475 F.2d 667, 177 USPQ 381 (CCPA 1973)).

Here, the invention as a whole is "a rotation detecting device for a brushless motor in which the reaction delay of the motor can be prevented from occurring," (Spec. at 4), and its disclosed property. The property is that the reaction delay of the motor can be prevented by adjusting a relationship between torque ripple of the motor and a trigger point of an output signal from an FG pattern of the motor. (Id. at 4-5.)

Accordingly, the controlling question is whether the differences between the prior art and the appellants' invention as a whole, viz., the relationship between the

torque ripple of a brushless motor and the motor's trigger point, are such that the invention would have been obvious. The answer is no. The examiner fails to show that the prior art as a whole recognized the relationship let alone its effect on the reaction delay of the motor.

Although the examiner is correct in asserting that "Imai et al. ... discloses (col. 10, lines 39-40) the driving magnets being offset from the frequency generating magnetss [sic] by 22.5 degrees to prevent faulty operation of a D latch," (Paper No. 13 at 2), the reference does not refer to an offset torque ripple of a brushless motor let alone its relationship to the motor's trigger point. Recognition of the relationship is essential to the obviousness of conducting experiments to decide the relative positions of the stator core, the driving magnet pole portion, the FG magnetized portion, and the FG pattern in a circumferential direction that will prevent the reaction delay of the motor. The examiner offers no basis for the obviousness of the necessary experiments apart from the appellants' disclosure.

Because the examiner fails to show a relationship between the torque ripple of a brushless motor and the motor's trigger point, we are not persuaded that the prior art would have suggested that "relative positions of said stator core, said driving magnet pole portion, said FG magnetized portion, and said FG pattern in a circumferential direction are set so that a minimum point of a torque ripple of said brushless motor always occurs at a different time than a point of an output signal from said FG pattern, said point of said output signal functioning as a trigger for rotation control" or that the "relative positions ... are set so that a maximum point of a torque ripple of said brushless motor always occurs at the same time as, a point of an output signal from said FG pattern, said point of said output signal functioning as a trigger for rotation control." Therefore, we reverse the rejection of claims 1-4 as obvious over AAPA in view of Imai.

CONCLUSION

In summary, the rejection of claims 1-4 under 35 U.S.C. § 103 as obvious over AAPA in view of Imai is reversed.

REVERSED

KENNETH W. HAIRSTON Administrative Patent Judge	)	
LANCE LEONARD BARRY Administrative Patent Judge	)	BOARD OF PATENT APPEALS AND INTERFERENCES
STUART S. LEVY Administrative Patent Judge	)	

LB/RWK

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