UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte AKIRA MASAOKA and ATSUSCHI SHIMOISHI

Appeal 2007-4221
Application 10/605,843
Technology Center 3700

Decided: May 21, 2008

Before WILLIAM F. PATE, III, LINDA E. HORNER, and
JOHN C. KERINS, *Administrative Patent Judges*.

HORNER, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Akira Masaoka and Atsuschi Shimoishi (Appellants) seek our review under 35 U.S.C. § 134 of the final rejection of claims 1-17. We have jurisdiction under 35 U.S.C. § 6(b) (2002).

SUMMARY OF DECISION

We AFFIRM-IN-PART.

THE INVENTION

The Appellants' claimed invention is to an ignition system for an internal combustion engine that includes an arrangement for precluding reverse rotation running, particularly during starting of the engine (Spec. 1:¶0001). Claim 1, reproduced below with paragraphing added, is representative of the subject matter on appeal.

> 1. A method of preventing reverse rotation in a spark ignited internal combustion engine having at least one spark plug fired by an ignition circuit and having an electrical generator driven by the engine and a starting device for cranking the engine for starting thereof, said method comprising the steps of
>
> permitting firing of the spark plug after the starting device is initially operated,
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> determining after the starting has been initiated if the speed of the engine has decreased from a previously sensed speed sufficiently that the engine may be starting to rotate in a direction opposite to that desired, and
>
> thereafter preventing firing of the spark plug.

THE REJECTIONS

The Examiner relies upon the following as evidence of unpatentability:

Ozawa	US 5,020,506	Jun. 4, 1991
Mingo	US 6,435,158 B1	Aug., 20, 2002

The following rejections are before us for review:

1. Claims 1 and 2 are rejected under 35 U.S.C. § 102(b) as anticipated by Mingo.
2. Claims 3-17 are rejected under 35 U.S.C. § 103(a) as unpatentable over Mingo and Ozawa.

ISSUES

The first issue before us is whether the Appellants have shown that the Examiner erred in rejecting claims 1 and 2 as anticipated by Mingo. This issue turns on whether Mingo has an electrical generator driven by the engine and whether Mingo discloses "determining after the starting has been initiated if the speed of the engine has decreased from a previously sensed speed sufficiently that the engine may be starting to rotate in a direction opposite to that desired," as recited in claim 1.

The second issue before us is whether the Appellants have shown that the Examiner erred in rejecting claims 3-17 as unpatentable over Mingo and Ozawa. This issue turns on whether the combined teachings of Mingo and Ozawa would have led one having ordinary skill in the art to the subject matter set forth in the claims.

FINDINGS OF FACT

We find that the following enumerated findings are supported by at least a preponderance of the evidence. *Ethicon, Inc. v. Quigg*, 849 F.2d 1422, 1427 (Fed. Cir. 1988) (explaining the general evidentiary standard for proceedings before the Office).

1. Mingo describes a step of inferring an imminent stall condition when the engine speed is less than or equal to a first engine speed threshold and the starter has been disengaged (Mingo, col. 5, l. 65 – col. 6, l. 5). The starter must necessarily be disengaged after the starter has been engaged. Thus, Mingo prevents firing of the spark plug after the starting has been initiated.
2. Mingo uses a predetermined engine speed threshold (FNSTARTRPM), along with disengagement of the starter, to infer "imminent stall" (Mingo, col. 5, l. 65 – col. 6, l. 1). The FNSTARTRPM threshold is chosen as a function of engine coolant temperature (Mingo, col. 6, ll. 30-32). In particular, "[t]he engine coolant temperature is measured or derived by the controller" and then "[u]sing measured engine speeds at engine reversal (REV_RPM) at various engine coolant temperatures, the values of FNSTARTRPM and FNKILLRPM are calibrated and selected so as to yield true 'imminent stall' and 'stall' conditions respectively" (Mingo, col. 6, ll. 32-39). As such, the engine speed threshold used in Mingo to infer the stall condition is based on a

"previously sensed speed." Mingo compares a current engine speed to this threshold speed to determine if the current engine speed has decreased, i.e., "is less than or equal to the threshold," to a point where stall is imminent (Mingo, col. 5, l. 64 – col. 6, l. 1).

3. Mingo's system includes a starter motor 150 coupled to a battery 130 via a starter relay 140 (Mingo, col. 2, ll. 52-53). Mingo describes that when the starter motor is engaged via an ignition key switch, the starter relay 140 is activated and electrical power is enabled from the battery 130 to the starter motor 150 for vehicle start-up (Mingo, col. 2, ll. 53-57). Mingo further discloses battery 130 provides electrical power to the ignition switch 120 (Mingo, Fig. 1). Although Mingo does not explicitly disclose a battery charging system driven by the engine, such a configuration can be inferred from Mingo's reference to a battery charge state (Mingo, col. 4, l. 20) and from the conventional configuration of a battery in a standard automobile, in which the battery is charged by the engine. As such, Mingo discloses an electrical generator driven by the engine.

4. Ozawa discloses a multi-pole permanent magnet generator (electrical generator) which is driven by the engine and has a coil 1 which generates alternating current in synchrony with engine rotation (Ozawa, col. 2, ll. 47-50). Ozawa discloses that the ignition timing control circuit 25 determines, based on the polarity

> in the output of the signal coil 1, the rotational direction of the engine, and then determines the rotational speed of the engine (Ozawa, col. 3, ll. 33-40). It is our understanding from Ozawa, that its ignition timing control circuit 25 uses the output of signal coil 1 of the electrical generator to determine the engine speed (see e.g., Ozawa, col. 4, ll. 16-46). As such, Ozawa discloses determination of the engine speed from the output of the electrical generator.

PRINCIPLES OF LAW

"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 Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631 (Fed. Cir. 1987).

"Section 103 forbids issuance of a patent when '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.'" *KSR Int'l Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 1734 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including (1) the scope and content of the prior art, (2) any differences between the claimed subject matter and the prior art, (3) the level of skill in the art, and (4) where in evidence, so-called

secondary considerations. *Graham v. John Deere Co.*, 383 U.S. 1, 17-18 (1966). *See also KSR*, 127 S.Ct. at 1734 ("While the sequence of these questions might be reordered in any particular case, the [*Graham*] factors continue to define the inquiry that controls.")

ANALYSIS

Rejection of claims 1 and 2 as anticipated by Mingo

The Appellants contend that Mingo does not anticipate claim 1 because Mingo does not prevent reverse running "<u>under all conditions</u> after starting has been <u>initiated</u>," but instead requires disengagement of the starter before reverse rotation protection is implemented (Br. 3) (emphasis in original). The Appellants' argument is not commensurate in scope with claim 1, which does not require the prevention of reverse running under all conditions after starting has been initiated. Rather, claim 1 recites "determining after the starting has been initiated if the speed of the engine has decreased from a previously sensed speed sufficiently that the engine may be starting to rotate in a direction opposite to that desired, and thereafter preventing firing of the spark plug." The broadest reasonable interpretation of this claim language requires only that the determination of engine speed and subsequent prevention of spark plug firing occur at any point in time after initiation of a start of the engine, but it does not limit these steps to a point in time during starting of the engine, i.e., prior to disengagement of the starter. Limitations not appearing in the claims cannot be relied upon for

patentability. *In re Self*, 671 F.2d 1344, 1348 (CCPA 1982). As such, even though Mingo does not prevent firing of the spark plug until after the starter has been disengaged, this preventing step is still occurring "after the starting has been initiated" (Fact 1).

The Appellants further contend that Mingo does not anticipate claim 1 because Mingo does not infer the stall condition from a decrease in speed from a previously measured speed. Rather, Mingo infers stall condition when the engine speed is less than or equal to the first engine speed threshold (Br. 3). As we found *supra*, Mingo discloses comparing the speed of the engine to a previously sensed speed, because Mingo's predetermined engine speed threshold (FNSTARTRPM) is based on a "previously sensed speed," and Mingo compares a current engine speed to this threshold speed to determine if the current engine speed has decreased to a point where stall is imminent (Fact 2).

The Appellants further contend that Mingo does not have "an electrical generator driven by the engine" as recited in claim 1 (Br. 3). The Appellants' Specification describes:

> Spark ignited internal combustion engines generally include engine driven electrical generators for providing the electrical power to fire the ignition system. This may be done directly from the generator, as in the case of magneto ignition, of [*sic*, or] from the battery charging system of battery carrying machines.

(Spec. 1: ¶0002.) As we found *supra*, although Mingo does not explicitly disclose a battery charging system driven by the engine, such a configuration can be inferred from Mingo's disclosure of a battery, its reference to a battery charge state, and from the conventional configuration of a battery in a standard automobile, in which the battery is charged by the engine (Fact 3). As such, Mingo discloses an electrical generator driven by the engine (*id.*). Accordingly, the Appellants' have not persuaded us of error in the Examiner's finding that Mingo anticipates claim 1. The Appellants have not presented any further arguments for the patentability of claim 2. As such, claim 2 falls with claim 1.

Rejection of claims 3-17 as unpatentable over Mingo and Ozawa

The Appellants argue that claim 12 parallels claim 1 and that Ozawa does not cure the deficiencies of Mingo as argued for claim 1. For the reasons provided *supra* for claim 1, we find no deficiencies in Mingo, and thus we sustain the rejection of claim 12.

The Appellants contend the Examiner failed to address the limitation in claim 7 that "ignition is not permitted until the pulser coil outputs a first signal" (Br. 4). We agree with the Appellants that the Examiner's explanation of the basis for the rejection of claim 7 is lacking. Although the Examiner cites to Mingo, column 1, line 19, for a disclosure of a timing mark, and presumably refers to the pulser coil (1) of Ozawa (Ans. 5, 9), the Examiner does not provide a reason or explanation as to how the combined

teachings would have led one to modify Mingo such that ignition is not permitted until the pulser coil outputs a first signal. As such, the Examiner has failed to set forth a prima facie case of obviousness of the subject matter of claim 7. For this reason, we do not sustain the rejection of claim 7, or claims 8-11, which depend therefrom.

The Appellants argue that claim 3 is patentable over the combination of Mingo and Ozawa, because Ozawa does not teach determination of the engine speed from the output of the electrical generator (Br. 4). As we found *supra*, Ozawa discloses an ignition timing control circuit 25, which uses the output of signal coil 1 of the electrical generator to determine the engine speed, and thus discloses determination of the engine speed from the output of the electrical generator (Fact 4). Thus, we sustain the rejection of claim 3.

The Appellants argue that claims 4 and 13 are patentable over the combination of Mingo and Ozawa because neither reference discloses deferring the firing of the spark plug after starting operation until the engine reaches a predetermined speed (Br. 4). We first treat claim 4.

Claim 4 recites that "the firing of the spark plug upon starting is not permitted until the speed of the engine reaches a predetermined first value." The Examiner cites to the disclosure of the FNSTARTRPM threshold in Mingo for disclosure of this claim limitation. While the FNSTARTRPM threshold of Mingo is a predetermined first value, Mingo does not appear to disclose preventing firing of the spark plug until the speed of the engine

reaches this threshold. Rather, Mingo discloses merely discontinuing firing of the spark plug once the speed of the engine drops below the threshold (Fact 2). As such, we do not sustain the rejection of claim 4, or claims 5 and 6, which depend therefrom.

Claim 13 depends from claim 12. Contrary to Appellants' assertion, claim 13 does not call for the firing of the spark plug to be deferred. Rather, claim 13 calls the engine to drive an electrical generator and the speed of the engine to be determined by the output of the electrical generator. We sustain the rejection of claim 13 for the same reasons provided *supra* for claim 3.

Claim 14, like claim 4, recites that "the ignition circuit is prevented from firing the spark plug by the ignition preventing circuit until the speed of the engine reaches a predetermined first value." We do not sustain the rejection of claim 14 for the same reasons provided *supra* for claim 4.

The Appellants contend the Examiner made no showing as to how the combination of Mingo and Ozawa supports the rejection of claims 15-17, and for that reason alone, the rejection must be reversed (Br. 4). The Examiner has cited to Ozawa, column 3, lines 4-23, in support of the rejection of claim 15. The Appellants have not rebutted the Examiner's finding that this portion of the disclosure of Ozawa meets the subject matter of claim 15. As such, we sustain the rejection of claim 15.

The Examiner has not, however, pointed to any portion of either prior art reference to support the rejection of claim 16, nor has he provided any reasoning as to why the subject matter of claim 16 would have been obvious

(Ans. 6-7). As such, the Examiner has failed to set forth a prima facie case of obviousness of the subject matter of claim 16. For this reason, we do not sustain the rejection of claim 16, or claim 17, which depends therefrom.

CONCLUSIONS

We conclude that the Appellants have failed to show that the Examiner erred in rejecting claims 1 and 2 under 35 U.S.C. § 102(b) as anticipated by Mingo and claims 3, 12, 13, and 15 under 35 U.S.C. § 103(a) as unpatentable over Mingo and Ozawa.

We conclude that the Appellants have shown, however, that the Examiner erred in rejecting claims 4-11, 14, 16, and 17 under 35 U.S.C. § 103(a) as unpatentable over Mingo and Ozawa.

DECISION

The decision of the Examiner to reject claims 1-3, 12, 13, and 15 is affirmed, and the decision of the Examiner to reject claims 4-11, 14, 16, and 17 is reversed. No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a). *See* 37 C.F.R. § 1.136(a)(1)(iv) (2007).

AFFIRMED-IN-PART

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