

THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 20

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte TOSHIYA SATO

Appeal No. 1998-1644
Application No. 08/494,516

ON BRIEF

Before KRASS, JERRY SMITH and BARRETT, Administrative Patent Judges.

KRASS, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal from the final rejection of claims 1 through 8, all of the claims pending in the application.

The invention is directed to the detection of a rotation angle of a crankshaft of an engine. More specifically, a magnetic sensor outputs a signal in accordance with the passing of teeth in only a specified range of the ring gear. That range is set so as not

to overlap a wear region of the ring gear teeth. Ring gear teeth in the wear region have been worn because of engagement with the starter pinion. By not permitting the sensor to output signals based on ring gear teeth which are in the wear region, detection precision of the rotation angle is said to be improved.

Representative independent claim 1 is reproduced as follows:

1. An apparatus for continuously detecting a rotation angle in a specific range of a crankshaft of an engine, said engine having a piston reciprocating between a top dead center and bottom dead center, comprising:

a ring gear having teeth and coupled with said crankshaft,

a starter motor for rotating said ring gear,

a starter pinion coupled with said motor, said pinion having teeth to be engaged with said ring gear teeth when starting up said engine,

a magnetic sensor for outputting a signal according to the passing of teeth in a specific range of said ring gear, said specific range being set so as not to overlap with a wear region of said ring gear teeth which is worn due to engagement with said pinion, and

means for detecting a rotation angle of said crankshaft based on said signal.

The examiner relies on the following references:

Lotterbach et al. (Lotterbach)	4,700,305	Oct. 13, 1987
Hmelovsky et al. (Hmelovsky)	4,707,791	Nov. 17, 1987

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Claims 1 through 8 stand rejected under 35 U.S.C. § 103 as unpatentable over Lotterbach in view of Hmelovsky.

Reference is made to the brief and answer for the respective positions of appellant and the examiner.

OPINION

With respect to the claimed engine comprising a ring gear having teeth and coupled with the crankshaft, a starter motor for rotating the ring gear and a starter pinion coupled with the motor and having teeth engaged with the ring gear teeth when starting the engine, the examiner contends that this is all very well known to artisans dealing with engines and appellant does not deny it. The examiner cites Lotterbach for the teaching of a magnetic sensor which outputs a signal in accordance with the passing of teeth of a toothed wheel for a particular region and for the teaching of detecting a rotation angle of the crankshaft.

The examiner admits that Lotterbach does not teach the specific range, or particular region, being set so as not to overlap with a wear region and the outputting of a signal during the specific range. However, it is the examiner's position that since Lotterbach teaches a "continuous measuring of a plurality of regions via the plurality of teeth on the toothed wheel wherein some of the regions do not coincide with a region

immediately before TDC” [answer-page 4], that Lotterbach “inherently” teaches a specific range being set so as not to overlap with the “wear region.” The examiner concludes that it would have been obvious to explicitly output a signal in a specific range which does not occur before immediate TDC (i.e., “wear region”).” The examiner cites Hmelovsky for the proposition that it is very common to output a signal at TDC.

While the examiner has also presented arguments relative to the obviousness of employing a ring gear as the toothed wheel in Lotterbach and the obviousness of the subject matter of the dependent claims, we need not reach these issues because, in our view, the examiner’s reasoning with regard to the claimed “specific range” is insufficient to sustain the rejection of the independent claims even assuming, arguendo, that the examiner is correct on everything else.

Lotterbach teaches nothing about a “wear region,” as claimed. The examiner has mistakenly attributed to appellant a definition which supposes that a “wear region” is a region occurring immediately prior to top dead center (TDC). In fact, a “wear region” is defined in the instant specification, at page 3, as “either a region to be engaged with the teeth of the pinion at a point where a rotating resistance of the engine becomes large when starting up the engine, or a region to be engaged with the teeth of the pinion when starting up the engine.”

In any event, independent claim 1 requires that the magnetic sensor output a signal in accordance with the passing of teeth “in a specific range” of the ring gear and that the specific range is “set so as not to overlap with a wear region of the ring gear teeth which is worn due to engagement with said pinion.” Independent claim 7 calls for a “specific angular range” of the ring gear and the sensor “displaced such that said specific angular range and said wear region do not overlap.” If we understand the examiner correctly, as outlined on page 8 of the answer, he has taken the position that because Lotterbach detects teeth all along a ring gear, then it detects teeth in both a wear region and in a non-wear region and, accordingly, detects teeth in at least a non-wear region, meeting the claim limitations. The examiner has explicitly said that there is “no limitation...stating that the signal which is outputted outside the wear region is the only signal to be outputted.” If, indeed, we read the examiner’s position correctly, it is clearly an untenable position in view of the language in both independent claims which explicitly excludes wear regions; i.e., the “specific range” and the “wear region” must not overlap. Thus, the sensor must not output a signal in the wear region of the ring gear in accordance with the claimed subject matter.

Since the examiner has provided us with no evidence that either of the applied references teaches or suggests that a magnetic sensor outputs a signal according to

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the passing of teeth in a specific range of the ring gear and wherein that specific range is set so as not to overlap with a wear region of the ring gear teeth, as claimed, we will not sustain the rejection of claims 1 through 8 under 35 U.S.C. § 103.

The examiner's decision is reversed.

REVERSED

ERROL A. KRASS)	
Administrative Patent Judge)	
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)	BOARD OF PATENT
JERRY SMITH)	APPEALS AND
Administrative Patent Judge)	INTERFERENCES
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LEE E. BARRETT)	
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