The opinion in support of the decision being entered today is *not* binding precedent of the Board.

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte JIN SUZUKI,
DAVID RANDAL HINTON,
JULIE A. GANNON, and
CONRAD GENE GREMBOWICZ

Appeal 2007-2682
Application 10/326,410[1]
Technology Center 2800

Decided: 10 July 2007

Before JAMESON LEE, RICHARD TORCZON, and SALLY C. MEDLEY, *Administrative Patent Judges*.

LEE, *Administrative Patent Judge*.

DECISION ON APPEAL

A. Statement of the Case

This is a decision on appeal by an applicant under 35 U.S.C. § 134(a) from a rejection of claims 24, 26, and 34-38 of Application 10/326,410. We have jurisdiction under 35 U.S.C. § 6(b).

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[1] The real party in interest is Caterpillar Inc.

Reference Relied on by the Examiner

Sarangapani U.S. Patent 6,442,511 Aug. 27, 2002

The Rejections on Appeal

The Examiner rejected claims 24, 26 and 34-38 under 35 U.S.C. § 102(e) as anticipated by Sarangapani.

B. Issue

Have the Applicants shown error in the rejection of claims 24, 26, and 34-38 as anticipated by Sarangapani under 35 U.S.C. § 102(e)?

C. Summary of the Decision

The Applicants have shown error in the anticipation rejection of all of claims 24, 26, and 34-38.

D Findings of Fact (Referenced as FF. ¶ No.)

1. The invention is directed to a machine life indicator method which monitors the effect of operating conditions on a component of a machine. (Specification 3:9-10).

2. Of all the claims on appeal, the only independent claims are claims 24 and 34. They are reproduced below:

> 24. A method of monitoring the effect of operating conditions on a component of a machine, the method comprising:
>
> sensing at least one property associated with the machine;
>
> maintaining a data structure in a memory element that determines a damage factor indicative of an instantaneous stress applied to the component based at least in part on the at least one property; and
>
> processing the data structure to determine the damage factor based on the at least one property;
>
> displaying the damage factor in a cab of the machine; and

> displaying at least one of: a time, a period, a location, and a damage level when the damage factor exceeds a designated level.
>
> 34. A method of monitoring the effect of operating conditions on a component of a machine, the method comprising:
> sensing at least one property associated with the machine;
> maintaining a data structure in a memory element that determines a damage factor indicative of an instantaneous stress applied to the component based at least in part on the at least one property; and
> processing the data structure to determine the damage factor based on the at least one property; and
> displaying at least one of: a time, a period, a location, and a damage level when the damage factor exceeds a designated level.

3. Sarangapani discloses a method for evaluating a machine parameter "trend" as it approaches an impending failure limit or point of unacceptable performance, and a method for determining a severity value for the trend. (Sarangapani, Col.1, ll. 7-13).

4. Sarangapani discloses using sensors to sense operational parameters of a machine and delivering sensor output signals to an electronic module which includes a microprocessor and a memory section 24. (Sarangapani, Col. 3, l. 52 to Col. 4, l. 5).

5. Sarangapani discloses that performance baselines are stored within the memory section of the electronic module, and the baselines are (1) used during performance checks of the machine to help verify machine component health, and (2) as reference points to determine **whether the machine is in an operating condition in**

which machine parameters are to be processed and stored. (Sarangapani, Col. 4, ll. 12-20).

6. In Sarangapani, each parameter is associated with a dependency definition that identifies the conditions under which data will be stored "for trending purposes" (Sarangapani, Col. 4, ll. 23-25), and trend data is gathered and stored as the dependency definition is met over a specified trend period. (Sarangapani, Col. 4, ll. 31-33).

7 In Sarangapani, for each trending period, a single trend point is generated for a parameter which represents either the average value, maximum value, or minimum value in the period, and the choice of which form is selected for the trend points is a system designer's decision based on what changes best indicate impending failure. (Sarangapani, Col. 4, ll. 37-50).

8. For projecting impending failure, Sarangapani discloses plotting the generated trend points based on actual conditions versus time. (Sarangapani, Col. 5, ll. 51-54 and 57-59; Fig. 5, curve 44). Also plotted on the same graph shown in Figure 5 is a separate curve 44 illustrating a "typical" theoretical trend line based on past actual or historical information.

9. Sarangapani discloses comparing the actual trend curve 44 with the theoretical trend curve 42 to arrive at a conclusion on whether the machine will last longer or shorter than a machine under typical conditions, and by how much. (Sarangapani, Col. 6, ll. 7-11).

E. Principles of law

To establish anticipation under 35 U.S.C. § 102, each and every element in a claim, arranged as is recited in the claim, must be found in a single prior art reference. *Karsten Manufacturing Corp. v. Cleveland Golf*

Co., 242 F.3d 1376, 1383, 58 USPQ2d 1286, 1291 (Fed. Cir. 2001). Anticipation can be found when a claim limitation is inherent or otherwise implicit in the relevant reference. *Standard Havens Products, Inc. v. Gencor Industries, Inc.*, 953 F.2d 1360, 1369, 21 USPQ2d 1321, 1328 (Fed. Cir. 1991). For establishing inherency, that which is missing in the express description must necessarily be present. *Continental Can Co. USA, Inc. v. Monsanto Co.*, 948 F.2d 1264, 1268, 20 USPQ2d 1746, 1749 (Fed. Cir. 1991). Once a prima facie case of anticipation by inherency has been established, however, the burden shifts to the applicants to prove that the subject matter shown in the prior art does not possess the characteristics relied on by the Examiner. *In re King*, 801 F.2d 1324, 1327, 231 USPQ 136, 138 (Fed. Cir. 1986). The Patent and Trademark Office is not equipped to prove any assertion by way of conducting experiments. *In re King*, 801 F.2d at 1327, 231 USPQ at 139.

F. Analysis

The two independent claims are claims 24 and 34. Claim 24 includes all of the recited features of claim 34, and adds a further step of "displaying the damage factor in a cab of the machine." The following four steps are recited in both claims 24 and 34:

> sensing at least one property associated with the machine;
>
> maintaining a data structure in a memory element that determines a damage factor indicative of an instantaneous stress applied to the component based at least in part on the at least one property; and
>
> processing the data structure to determine the damage factor based on the at least one property;

> displaying at least one of: a time, a period, a location, and a damage level when the damage factor exceeds a designated level.

At the heart of the dispute in this appeal is whether Sarangapani discloses a data structure in memory that determines a damage factor indicative of "an instantaneous stress" applied to the machine component. If it does not, then Sarangapani would not disclose the above-quoted maintaining step, the above-quoted processing step which processes that data structure to determine the damage factor, or the above-quoted displaying step which displays the damage factor resulting from that processing.

For the maintaining step, the Examiner initially cited to Col. 3, ll. 29-30, and Fig. 6-7 of Sarangapani, but nothing in the cited text indicates that data is stored which determines a damage factor indicative of a component's "instantaneous stress." Sarangapani, in Column 3, ll. 27-32, merely states:

> Employing a complement of on-board and off-board hardware and software, the machine prognostic system 10 monitors and derives machine component information and analyzes the resulting data to indicate and/or predict impending component or system failures or unacceptable performance levels.

The above-quoted text does not teach that impending failures are determined based on a damage factor indicative of a component's "instantaneous stress." The approach may be based on accumulated stress over time or something else. Figures 6 and 7 of Sarangapani are no better than the cited text. They do not reveal anything about determining a damage factor which is indicative of a component's "instantaneous stress." Indeed, the "severity" computations referred to in Figures 6 and 7 appear to be based on trends

over time rather than instantaneous stress values. See the severity equation illustrated in Sarangapani in Col. 6, ll. 41-43.

In the Answer, the Examiner asserts that any data capable of indicating or predicting impending component or system failure is indicative of an instantaneous stress. (Answer, 6:1-2). The argument is misplaced. To regard the general health of a component as instantaneous stress is not entirely unreasonable in a general sense. But in the context of claims 34 and 24 where the "instantaneous stress" has to be that "applied to the component based at least in part on the at least one property," the general health or impending failure of the component does not meet the requirement. The general well being of the component is much too removed from the instantaneous stress applied to the component at any specific instant as measured in a property sensing step. The Examiner has overly generalized. Note also that an impending failure, whether it is predicted or otherwise indicated, is nonetheless a general prediction of operability and system well being, and is not an actual measure of instantaneous stress applied to a machine component based on a measured property.

The Examiner further asserts (Answer 6:11-14) that any sensed property, e.g., temperature, provides an indication of instantaneous stress and cites to Figure 5 of Sarangapani as illustrating the plotting of sensed parameter versus time. There are two problems with the position taken.

First, curve 44 in Sarangapani's Figure 5 is only a trend line based on a collection of trend points. Each trend point is not an instantaneous machine component value but either the maximum, minimum, or average over a full trending period. (Sarangapani, Col. 4, ll. 30-50). The curves in

Sarangapani's Figure 5 do not show instantaneous stress applied to the component as is recited in the claims.

Secondly, the Examiner has read required features entirely out of the claims. Applicants' claims 24 and 34 do not simply recite a broad step of sensing a machine property which indicates instantaneous stress applied to the machine component based on the sensed property. Rather, there has to be data structure which determines a damage factor indicative of the instantaneous stress and a particular step for processing that data to determine the damage factor. In regarding sensed property as itself a damage factor indicative of instantaneous stress, the Examiner has failed to account for the processing step explicitly required by the claims. That processing step cannot be ignored or read out of the claims. In the context of the Applicants' claims, the sensed property, when stored as data, cannot also be the damage factor determined from stored data in a processing step.

Claim 26 depends from claim 24. Claims 35-38 each depend from claim 34. The dependent claims include all the limitations of the independent claim on which they depend.

For the foregoing reasons, the rejection of claims 24, 26, and 34-38 as anticipated by Sarangapani cannot be sustained.

CONCLUSION

The rejection of claims 24, 26 and 34-38 under 35 U.S.C. § 102(e) as anticipated by Sarangapani is **reversed.**

REVERSED

Elizabeth M. Burke
FINNEGAN, HENDERSON, FARABOW,
GARRETT & DUNNER, L.L.P.
901 NEW YORK AVENUE, N.W.
WASHINGTON, DC 20001-4413