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D E C I S I O N
of 22 December 2004

Case Number: T 0603/00 - 3.4.1

Application Number: 90104717.5

Publication Number: 0387781

IPC: G01R 33/06

Language of the proceedings: EN

Title of invention:
Ferrous object sensor assembly

Patentee:
American Electronic Components, Inc.

Opponent:
Koninklijke Philips Electronics N.V.

Headword:
-

Relevant legal provisions:
EPC Art. 100(a), 54,

Keyword:
"Patentability - (no)"
"Novelty - (no)"

Decisions cited:
-

Catchword:
-

Case Number: T 0603/00 - 3.4.1

D E C I S I O N
of the Technical Board of Appeal 3.4.1
of 22 December 2004

Appellant: (Opponent)
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Decision under appeal: **Interlocutory decision of the Opposition Division of the European Patent Office posted 6 April 2000 concerning maintenance of European patent No. 0387781 in amended form.**

Composition of the Board:

Chairman: G. Davies
Members: G. Assi
R. Q. Bekkering

Summary of Facts and Submissions

I. The appellant (opponent) lodged an appeal, received on 2 June 2000, against the interlocutory decision of the opposition division, dispatched on 6 April 2000, concerning the maintenance of the European patent No. 0 387 781 (application number 90104717.5) in amended form. The appeal fee was paid on 2 June 2000. The statement setting out the grounds of appeal was received on 4 August 2000.

II. The opposition had been filed against the patent as a whole and was based, *inter alia*, on the ground pursuant to Article 100(a) EPC that the subject-matter of the patent was not patentable within the terms of Articles 52(1), 54, 56 EPC.

In the decision under appeal, the opposition division held that the grounds for opposition did not prejudice the maintenance of the patent in amended form, having regard to, *inter alia*, the following document:

(E1) Valvo, Anwendungen der Magnetfeldsensoren KMZ 10, 5 November 1986, pages 1 to 18.

The maintenance of the patent as amended was based on the following documents:

Claims:
- No. 1 filed with a letter of 23 October 1998,
- No. 2 to 11 of the patent as granted,

Description:

- Pages 2 to 8 of the patent as granted,
- Insert filed with the letter of 23 October 1998,

Drawings:

- Sheets 1/3 to 3/3 of the patent as granted.

III. By a letter of 28 April 2004, the parties were summoned to oral proceedings due to take place on 5 October 2004. By a notification dated 3 June 2004, the oral proceedings were postponed until 26 October 2004. The respondent (patent proprietor), by a letter of 24 September 2004, announced that it would not attend the scheduled oral proceedings. The appellant, by a letter of 28 September 2004, withdrew its request for oral proceedings and requested a decision according to the state of the file. By a notification of 14 October 2004, the oral proceedings were cancelled.

IV. The appellant requested that the interlocutory decision be set aside and the patent be revoked in its entirety.

V. The respondent requested that the appeal be rejected.

VI. Claim 1 of the patent as amended reads as follows:

"*A ferrous object sensor assembly (50) comprising:*

- *a magnetic flux sensor (30; 100; 114; 116; 118) having at least one sensing plane (32) and producing an output signal dependent on the magnetic flux density existing in said sensing plane*

and

- a single permanent magnet (34) providing a magnetic flux in said sensing plane (32) and having a magnetic axis (55) substantially perpendicularly connecting substantially planar opposing pole faces (P’, P’’), characterized in that said magnetic flux sensor (30; 100; 114; 116; 118) is attached to a lateral surface of said permanent magnet (34) intermediate said opposing pole faces (P’, P’’) in a manner that it is responsive to radial magnetic flux components of said permanent magnet (34)."

Reasons for the Decision

1. The appeal is admissible.

2. In the decision under appeal, the opposition division considered that document E1 represented the closest state of the art disclosing all the features according to the preamble of claim 1 of the patent as maintained. The appellant did not dispute this view. A controversial question rather concerns whether the features of the characterising portion of the claim would also be disclosed by document E1, having regard, in particular, to Figure 6.

3. Document E1 (No. 2.1) teaches that magnetic flux responsive sensors made of permalloy films exhibit an internal axis of magnetisation ("*Vorzugsrichtung der Magnetisierung*"), which is obtained during fabrication. In particular, the sensor has two stable states corresponding to opposite directions of the magnetisation. It may happen that the magnetisation switches from a state to the other under the influence of an external field, this fact causing a change in the output characteristics of the sensor. In order to ensure a stable operation, the sensor is thus biased

with an external magnetic field ("*magnetisches Vorspannfeld*") along the axis of magnetisation.

4. Figure 6 shows a sensor assembly comprising a magnetic flux responsive sensor KMZ10 (No. 1) and a single permanent magnet made of FERROXDURE or RES (No. 2.2). The magnetic flux responsive sensor has a sensing plane and produces an output signal dependent on the magnetic flux density existing in the sensing plane (Figures 3 and 4). The permanent magnet provides a magnetic flux in the sensing plane and has a magnetic axis perpendicularly connecting planar opposing pole faces N and S. Moreover, the magnetic flux responsive sensor is attached to a lateral surface of the permanent magnet intermediate the opposing pole faces N and S, so that it is responsive to radial magnetic flux components of the permanent magnet.

5. In the sensor assembly of Figure 6, the permanent magnet generates a biasing field (No. 2.2.1). This fact was not disputed by the respondent which indeed acknowledged that the known sensor assembly provided a biasing field eliminating the component of an external field along the magnetisation axis, thus preventing the magnetisation of the sensor from flipping. The respondent, however, considered the known sensor assembly to be different from that of claim 1 under consideration. In its view, the claimed assembly comprised a sensor responsive to radial magnetic flux components of a permanent magnet generating a measuring field, whereas the permanent magnet shown in Figure 6 of E1 was a mere auxiliary magnet. Thus, the known sensor assembly could not operate without an additional permanent magnet forming the main magnet within the

meaning of claim 1 (letter of 27 April 2001, paragraph "*Ad 1)*").

This view is not convincing because it does not take due account of the wording of claim 1, which does not make any distinction between biasing and measuring fields. In particular, the claim covers the case of a single permanent magnet, which generates a both biasing and measuring field. Such a case is disclosed by document E1, having regard, for example, to Figures 32 and 33. Here, ferrous object sensor assemblies are shown, which comprise a magnetic flux sensor attached to a permanent magnet generating a both biasing and measuring field. Moreover, the magnetic axis of the permanent magnet is so arranged that the sensor is responsive to radial magnetic flux components of the permanent magnet. It is noted that the assemblies according to Figures 32 and 33 do not essentially differ from that of Figure 6 with the provision of a suitable permanent magnet.

6. The respondent identified a further difference between the subject-matter of claim 1 and the disclosure of E1 in that the claimed sensor assembly provided an output which was relatively stable over a wide temperature range, whereas, according to E1 (Figures 15 and 16), the output signal of the sensor significantly changed with temperature.

This argument is, however, not conclusive for the issue of novelty. According to the patent in suit (page 5, line 56 to page 6, line 4), the claimed sensor assembly provides an output signal relatively unaffected by temperature changes, because it substantially relies on radial components of the magnetic field emanating from the permanent magnet. The same applies for the known sensor assembly, the sensor of which is also positioned in the radial magnetic field. Moreover, the fact that E1 (No. 3) discloses additional means for compensating for temperature dependence of the sensor is irrelevant to the issue of novelty.

7. In conclusion, the subject-matter of claim 1 of the patent as maintained lacks novelty, having regard to document E1.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The patent is revoked.

The Registrar: The Chairman:

A. Vottner G. Davies