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**Datasheet for the decision
of 19 October 2011**

Case Number: T 1070/09 - 3.2.04
Application Number: 98925883.5
Publication Number: 0939598
IPC: A47L 9/00, A47L 9/04, A47L 9/28
Language of the proceedings: EN

Title of invention:

Electrical surface treatment device with an acoustic surface
type detector

Patent Proprietors:

Koninklijke Philips Electronics N.V.
PHILIPS AB

Opponent:

Miele & Cie. KG

Headword:

-

Relevant legal provisions:

EPC Art. 56

Relevant legal provisions (EPC 1973):

-

Keyword:

"Inventive step (yes)"

Decisions cited:

G 0009/91

Catchword:

-



Case Number: T 1070/09 - 3.2.04

DECISION
of the Technical Board of Appeal 3.2.04
of 19 October 2011

Appellant: Miele & Cie. KG
(Opponent) Schutzrechte/Verträge
Carl-Miele-Strasse 29
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Respondents: Koninklijke Philips Electronics N.V.
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Representative: Wolfs, Marc Johannes Maria
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Intellectual Property & Standards
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Decision under appeal: Interlocutory decision of the Opposition
Division of the European Patent Office posted
31 March 2009 concerning maintenance of
European patent No. 0939598 in amended form.

Composition of the Board:

Chairman: M. Ceyte
Members: A. de Vries
T. Bokor

Summary of Facts and Submissions

- I. The Appellant (Opponent) lodged an appeal, received 14 May 2009, against the decision of the Opposition Division posted 31 March 2009 to reject the opposition, and simultaneously paid the appeal fee. The statement setting out the grounds was received 31 July 2009.

Opposition was filed against the patent as a whole and based inter alia on Article 100 (a) together with Articles 52(1) and 56 EPC 1973, for lack of inventive step.

The Opposition Division held that the grounds for opposition under Article 100 EPC 1973 did not prejudice the maintenance of the patent as granted having regard to the following documents among others:

D1: DE-T2-691 20 176

D10: DE-A1-43 33 645

- II. During the proceedings the Board considered the following further document filed with the statement of the grounds of appeal:

D12: DE-A1-30 05 851

- III. The Appellant (Opponent) requests that the decision under appeal be set aside and the patent be revoked in its entirety.

The Respondents (Proprietors) request that the appeal be dismissed and the patent maintained as granted.

IV. Oral proceedings in appeal were duly held before this Board and in the absence of the duly summoned Respondents on 19 October 2011.

V. The wording of the relevant independent claims in the amended form held allowable by the opposition division is as follows:

1. "An electrical surface treatment device provided with a surface-type detector (29; 51; 59; 69; 81; 95) for detecting a type of surface to be treated, which surface-type detector comprises a vibration generator (37; 97) and a vibration detector (39; 97) for detecting air vibrations reflected by the surface to be treated and for measuring a value of a physical quantity of said air vibrations, said detector delivering an output signal which is determined by the value of said physical quantity and which is characteristic of the type of the surface to be treated, characterized in that the vibration generator generates air vibrations having a frequency which varies within a predetermined range during operation, said predetermined range having a lower boundary of at least 15000 Hz."

11. "An attachment (9) suitable for use in an electrical surface treatment device as claimed in any of the preceding claims, characterized in that the surface type detector (29;51;59;69;81;95) is a surface type detector as defined in any of the preceding claims and is accommodated in a suction nozzle (11) of the attachment."

A further independent claim 3 plays no role in the present appeal, see the reasons.

VI. The Appellant argued as follows :

With respect to D1 as agreed closest prior art, the sole difference is the feature of the frequency varying over a predetermined range above 15000 Hz. The patent associates the feature with various factors that effect detection accuracy, among these the temperature of detector and generator. The actual problem is the fact that the ultrasonic detector and generator must operate at resonance which can vary, e.g. due to temperature. D10 and D12 address this problem and offer the same solution. The skilled person, a specialist in ultrasonic sensing, the main area of interest of the claimed invention, will be familiar with their teachings.

D1 (and the patent) may not mention resonance but it is self evident to the skilled person that its ultrasonic sensor and receiver operate at resonance. Even if D1 in first instance measures time intervals, it also uses a threshold amplitude measurement, where resonance is important.

VII. The Respondents argued as follows :

The fields of application of D10 and D12 are unrelated to that of the patent and D1, which is the detection of floor surfaces. Moreover the detection geometries are fundamentally different, with D10 and D12 using a transmission arrangement, the patent and D1 being based on reflection. Nor does resonant frequency play any

role in either patent or D1, where it is not mentioned at all. The skilled person would therefore not consider D10 or D12.

Reasons for the Decision

1. The appeal is admissible.
2. *Extent of Scrutiny*

The Appellant contests patentability only of independent claims 1 and 11 in the form held allowable in the decision, but does not dispute further independent claim 3, directed at substantially different subject-matter. As the purpose of appeal proceedings inter partes is to give the losing party the possibility of challenging a decision of the Opposition Division and bearing in mind their judicial character (see G 9/91 OJ EPO 1993, 408, reasons 18) the Board shall review the decision only to the extent it is challenged. It shall therefore only examine the case made against patentability of independent claims 1 and 11, and their dependent claims.

3. *New document*

D12 is filed with the statement of the grounds of appeal. Its subject-matter is not complex and its relevance seems easy to assess, and has indeed been discussed in detail by the Respondent. Its admission is therefore unlikely to seriously compromise procedural delay. The Board consequently exercises its discretion under Article 12(4) of the Rules of Procedure of the

Boards of Appeal to admit this document into the procedure.

4. *Background*

The patent relates to the detection of surface type in an electrical surface treatment device, such as a vacuum cleaner, using an acoustic reflective sensing arrangement. Acoustic signals from a generator are reflected off a floor surface and sensed by a detector, with its output signal characteristic of the type of floor surface. Claim 1 as granted specified a frequency above 15000 Hz. Examples cited in the patent specification paragraphs [0025] and [0026] - 36 to 40 kHz - are indeed well within the ultrasonic range.

The main idea of claim 1 (to the device) and claim 11 (to an attachment with detector as in claim 1) as held allowable by the opposition division is to vary frequency over a set range during operation. According to paragraph [0009] of the patent specification this limits dependence of the output signal on factors other than floor surface type, such as the temperature of the generator and detector, the distance between the two or the properties of the detection space.

5. *Inventive Step*

5.1 The sole contention is that the subject-matter of claims 1 and 11 lacks inventive step in view of an obvious combination of D1 with D10 or D12. Both parties agree that D1 discloses the closest prior art. D1, see claim 1 and figures 1A and B, describes an electrical surface treatment device ("Reinigungs-roboter") with a

vibration generator ("Sendeeinrichtung (11) von Ultraschallwellensignalen") and a vibration detector ("Empfangsverstärkereinrichtung (121) [um] ein Ultraschallwellensignal zu empfangen"). The signals are ultrasonic, at a frequency of 25 kHz, page 10, line 10. The generator and detector are arranged in reflection geometry so that the sensor receives signals generated by the generator after reflection off the floor, page 10, lines 13 to 17. As follows from claim 1 of D1 in conjunction with figure 6 the nature of the floor is inferred from the distance to the floor, determined on the basis of the measured time interval from transmission to receipt of a signal pulse. This measured time interval is the characteristic physical quantity in the sense of claim 1 as upheld.

- 5.2 D1 does not disclose varying the frequency within a predetermined range during operation and this feature thus represents the sole difference of claim 1 as claimed over this prior art. As noted above specification paragraph [0009] associates this difference with the limited effect of factors such as generator and sensor temperature and distance as well as properties of the detection space on the measurement.

The Board notes that the patent does not explain why these factors influence measurement or how exactly varying frequency reduces their effect. In the Board's view the explanation can only lie in the arrangement's frequency response and how this changes due to the factors mentioned. Ultrasonic sensors indeed normally operate at a resonant frequency, where they are most responsive, and it is, in the Board's view, reasonable to assume that this is the case here also. It is also

reasonable to assume that resonant frequency is susceptible to the factors mentioned, in particular generator and sensor temperature. A drift away from resonance due to temperature changes can have a profound effect on measurement, if, as is the case in all embodiments of the patent, cf. specification paragraph [0026], signal amplitude (intensity) is measured. Varying frequency across a range then ensures that the device always "captures" a resonance.

Whatever the underlying mechanism, the object technical problem to be solved can be formulated as how to limit the effects of the above factors on floor surface type measurement in a device as in D1.

- 5.3 The claimed solution of varying frequency across a set range is known per se in ultrasonic sensing, see prior art citations D10 and D12. In both instances the frequency of the signal generator or transmitter is "wobbled" or repeatedly swept across a set range to ensure that the sensing arrangement captures signals at resonance in spite of fluctuations of the resonant frequency due to temperature and other factors, see D10, column 1, lines 49 to 63, and D12, page 3, first paragraph.
- 5.4 The specific field of application of the present patent may be surface treatment devices, nevertheless its main thrust is in the field of ultrasonic sensing. The skilled person will therefore not simply be an engineer confined to the field of surface treatment devices but rather someone at least working in close cooperation with an engineer in the field of ultrasonic sensing, if not that engineer himself. This reflects development as

it is most likely to take place, with a company manufacturing surface treatment devices acquiring ultrasonic sensing technology from a firm specializing in the area. The Board is therefore in no doubt that the skilled person will be aware of the teaching of D10 and D12 which both concern ultrasonic sensing, though applied in different fields.

- 5.5 Decisive for the question of inventive step is then whether or not the skilled person who is aware of D10 and D12 would consider applying their teaching to a device as in D1.

As noted previously D1 measures *time intervals* between transmission and receipt. D10 and D12 on the other hand measure the *amplitude* of a detected signal (as does the present patent): in D10, see column 2, lines 25 to 29, amplitude is averaged over many resonances, while D12, see claims 2 and 3, measures either a (rectified) average or a maximum of the detector output. Signal amplitude changes dramatically away from resonance, whereas the time interval from generation of a signal to its receipt does not vary significantly as long as the signal is detected. It is true that signal detection may involve some form of level discrimination : thus in the D1 scheme the detected output amplitude is compared (in an opamp OP52, see page 10, lines 17 to 27) with a reference signal. However - and assuming that D1 also operates near or at resonant frequency (which as noted is reasonable where an ultrasonic sensor is involved) - with a judicious choice of threshold the detection of a signal will not noticeably change even if the frequency moves away from resonance. For example, D1 uses a very low threshold

(cf. page 13, lines 1 to 3 : "wenn das Ultraschallwellensignal kaum empfangen wird..."), which allows for considerable variation in signal level before a signal is not detected.

In view of the relative insensitivity of time interval measurement to varying resonant frequency the Board considers it unlikely that the skilled person would consider applying the teaching of D10 or D12 specific to amplitude measurement which *is* sensitive to changes in resonant frequency to a device as in D1 based on time interval measurement.

- 5.6 The Board concludes that even if the skilled persons *could* apply the teaching of D10 or D12 to a device as in D1, he *would* not do so as a matter of obviousness. The combination of D1 with D10 or D12 does therefore not prejudice inventive step of claim 1 as held allowable by the opposition division in its decision. The same conclusion holds for claim 11 directed to the attachment integrating a detector as in claim 1 in the form upheld in the decision under appeal.
6. As the appeal's sole contention against the findings of the decision under appeal is found to be not well-founded, the appeal must fail.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar

The Chairman

G. Magouliotis

M. Ceyte