BESCHWERDEKAMMERN DES EUROPÄISCHEN PATENTAMTS | BOARDS OF APPEAL OF THE EUROPEAN PATENT OFFICE | CHAMBRES DE RECOURS DE L'OFFICE EUROPEEN DES BREVETS

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File Number: T 123/90 - 3.5.1

Application No.: 82 850 076.9

Publication No.: 0 064 042

Title of invention: Programmable signal processing device

Classification: H04R 25/00

D E C I S I O N
of 25 April 1991

Proprietor of the patent: Mangold, Stephan, et al.

Opponent: N.V. Philips' Gloeilampenfabrieken

Headword:

EPC Article 56

Keyword: "Inventive step (denied)"

Headnote

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Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number : T 123/90 - 3.5.1

D E C I S I O N
of the Technical Board of Appeal 3.5.1
of 25 April 1991

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Decision under appeal : **Decision of the Opposition Division of the European Patent Office dated 13 December 1989 revoking European patent No. 0 064 042 pursuant to Article 102(1) EPC.**

Composition of the Board :

Chairman : van den Berg P.K.J.
Members : Oettinger W.B.
Benussi F

Summary of Facts and Submissions

I. The appeal is directed at the Opposition Division's decision, announced on 20 September 1989 and posted with reasons on 13 December 1989, to revoke the European patent 64 042, which had been granted for the programmable signal processing device of patent application 82 850 076.9 claiming a priority of 16 April 1981 and having a filing date of 7 April 1982.

II. In the patent, inter alia, the following documents had been acknowledged as prior art:

D0: US-A-3 989 904
D1: US-A-4 185 168
D2: US-A-4 187 413.

The decision to revoke the patent was taken following first and second admissible oppositions which had been based on Article 100(a) EPC citing D1, D2 and, in addition, the following prior art documents corresponding, in substance, to one another:

D3: US-A-4 025 721
D4: DE-A-2 719 973.

After expiry of the time limit for opposition, the parties cited, inter alia, the following prior art in addition:

D5: WO-A-80/01632
D6: J. Acoust. Soc. Am., Vol. 69, No. 2 (February 1981), pages 524 to 534
D7: Scan. Audiol. 8, 1979, pages 121 to 126
D11: US-A-3 571 529.

III. The reason given, in the decision under appeal, for the revocation was that the subject-matter of Claim 1 as amended on 20 September 1989 did not, in one of its expressly stated alternatives, involve an inventive step having regard to D11 and to the general knowledge.

For the other alternative, the Opposition Division drew the same conclusion on the basis of the same prior art in combination with either one of documents D1, D2 and D5.

IV. In contrast to the Opponent's Article 100(a) objection, the Opponent I's additional objection under Article 100(b) EPC was rejected by the Opposition Division as unfounded.

Furthermore, whereas the Opposition Division shared the Opponent II's objection under Article 123(2) and (3) EPC against the amendments made before the oral proceedings, it found that this objection had been overcome by additional amendments during the oral proceedings.

V. The appeal was lodged by the patentees, and the respective fee paid, on 8 February 1990 and it (implicitly) seeks relief from the Opposition Division's decision in its entirety, i.e. maintenance of the patent as amended.

In a statement of grounds, filed on 11 April 1990, the Appellants contested the Opposition Division's view on inventive step but replaced their former claims by three sets of amended claims constituting their main and first and second subsidiary requests.

In further support of their differing view, the Appellants' statement of grounds was accompanied by an affidavit of Professor Dr Daniel Graupe and an article by Professor Ward not forming prior art.

VI. The Respondent II filed a counterstatement to which the Appellants replied.

In response to a communication from the Board and to observations from Respondent I, the Appellants filed further replies.

The first of them, filed on 20 March 1991, was accompanied by a newly amended characterising portion of Claim 5 for the Appellant's main request and an amended set of claims for their first subsidiary request.

The independent claims on file read as follows:

Main request:

"1. A programmable wearable hearing aid intended for persons having hearing deficiencies and which includes an electronically controlled signal processor (4) with adequate functions for processing a complex input signal containing information such as speech or music from a sound environment/listening situation, and a control unit (5) with associated memory (6) for supplying pre-stored information/data for adjustment of said signal processor (4) via said control unit (5) to the sound environment/listening situation,
characterised in,
that said memory (6) is arranged to store information for at least two unique signal processes preprogrammed for different sound environments/listening situations and said control unit (5) upon manual activation or automatically, is arranged to transmit the prestored information/data

for one of the unique signal processes, from the memory (6) to the signal processor (4), to bring about one signal process at a time adjusted to a particular sound environment/listening situation."

First subsidiary request:

"1. A programmable wearable hearing aid intended for persons having hearing deficiencies and which includes an electronically controlled signal processor (4) with adequate functions for processing a complex input signal containing information such as speech or music from a sound environment/listening situation, and a control unit (5) with associated memory (6) for supplying prestored digital information/data for adjustment of said signal processor (4) via said control unit (5), the prestored digital information/data including parameters for defining the amplification of the signal processor as a function of frequency; characterised in that
said memory (6) is arranged to store at least two unique sets of said digital information/data each preprogrammed for a different sound environment/listening situation and said control unit (5) upon manual activation or automatically is arranged to transmit one of the sets of digital information/data from the memory (6) to the signal processor (4) to vary the amplification of the signal processor (4) as a function of frequency so that said function is adjusted to a particular one of the different sound environment/listening situations."

Second subsidiary request:

"1. A programmable wearable hearing aid intended for persons having hearing deficiencies and which includes an electronically controlled signal processor (4) with adequate functions for processing a complex input signal containing information such as speech or music from a sound environment/listening situation and programmed according to the hearing deficiency of a person, and a control unit (5) with associated memory (6) for supplying prestored information/data for adjustment of said signal processor (4) via said control unit (5) to the sound environment/listening situation,
characterised in that,
said memory (6) is arranged to store information for at least two unique signal processes preprogrammed according to the hearing deficiency of the person and for different sound environment/listening situations, and said control unit (5) upon manual activation or automatically, is arranged to transmit the prestored information/data for one of the unique signal processes, from the memory (6) to the signal processor (4), to bring about one signal process at a time adjusted to a particular sound environment/listening situation and the person's hearing deficiency."

Claims 2 to 5 in all three versions are dependent claims referring back to their respective superior claim.

VII. On 23 April 1991, the Respondent I cited (by telecopy):

D13: DE-A-2 321 765.

VIII. On 24 April 1991, the Respondent II withdrew (by telecopy) his opposition.

IX. In oral proceedings, requested auxiliarily by the Appellants and held on 25 April 1991, they requested that the decision under appeal be set aside and the patent maintained as amended on the basis of the following documents on file:

Description pages 1 to 7 filed on 11 April 1990 with clerical errors corrected;

Claims 1 to 4 and preamble of Claim 5 filed on 11 April 1990 with a minor correction in Claim 2 and characterising portion of Claim 5 filed on 20 March 1991 (main request), or

Claims 1 to 5 filed on 20 March 1991 (first auxiliary request), or

Claims 1 to 5 filed on 11 April 1990 (second auxiliary request);

Drawings (two sheets) as published.

X. The remaining Respondent (I) requested that the appeal be dismissed.

Reasons for the Decision

1. The appeal is admissible (Articles 106 to 108 and Rule 64 EPC).

2. The main issue to be decided is the question of patentability (Article 52(1) EPC), more particularly inventive step (Article 56 EPC).

However, the case involves a number of objections of another kind and these should be dealt with first, as far as the independent claims are concerned.

3. **Objection under Article 100(b) EPC**

The Respondent I, referring to a statement on what the device disclosed in D1 "is not aimed for" in the description of the patent as granted (column 2, line 16/17), submits that this passage is unclear and, in effect, it would follow from this lack of clarity of the prior art that it is not clear what the invention claimed in Claim 1 (main request) is aimed for.

The Board does not share this view. The claimed invention as it is described in the patent, for instance with reference to Figure 2 showing a preferred embodiment thereof, can clearly be carried out by a person skilled in the art, irrespective of whether the cited statement is incorrect, correct, or unclear.

4. **Further objection under Article 100(b) EPC**

The Respondent I, referring to the passage "and the person's hearing deficiency" introduced in Claim 1 of the second auxiliary request, submits that the Appellants made statements before the Opposition Division from which it would follow that "something special" is meant by that passage. But any particularity to this effect cannot be derived from the patent.

The Board does not share this view. The question of sufficiency can be decided independently of whether "something special" was submitted or not before the first instance department.

In any case, the claimed invention as it is described in the patent can, without any difficulty, be carried out including the feature that the signal process in the signal processor (4) is (somehow) also adjusted to the person's hearing deficiency.

5. **Objections under Articles 100(c) and 123 EPC**

5.1 The oppositions were not based on the ground that the subject-matter of the patent would extend beyond the content of the application as filed (Article 100(c) EPC) but such an objection was made by the Respondent I against the amendment of the second auxiliary request (Article 123(2) EPC).

This Article 123(2) objection was based on the absence of any disclosure, in the original application documents, for what the Respondent has assumed to be "something special" (cf. paragraph 4).

The Board does not share this view.

The passage introduced in Claim 1 of the second auxiliary request is clearly interpretable in the sense of what the description discloses, in the "background of the invention", as a general demand to be put on hearing aids, viz. their adjustment (somehow) to the patient's hearing deficiency.

The amendment does not, therefore, introduce any subject-matter extending beyond the content of the application as originally filed.

It is noted, in this context, that Claim 1 does not specify where or when and how the adjustment of the signal process to the user's hearing deficiency is made. Claim 1

is not to be construed as saying, for instance, that the memory and/or the control unit are involved in this adjustment to the hearing deficiency. Any such interpretation would not be supported by the patent description nor, indeed, by the original disclosure which both are silent about where, when or how the adjustment to the hearing deficiency is made.

In deciding the present case, the Board must, and will, therefore, stick to the first mentioned, more general, interpretation.

5.2 The former Respondent II raised an objection against a dependent claim then on file on the ground that it would extend the protection conferred (Article 123(3) EPC). But, irrespective of whether such an objection is possible at all, in any case neither that claim was maintained nor that objection.

5.3 In summary, as to the amendments made, the Board concludes as follows:

Claim 1 of the main request is, in substance, based on Claim 1 as granted and on Claim 1 as originally filed, differing from those claims, in essence, only by specifying the "signal processing device" as a "wearable hearing aid".

Claim 1 of the first auxiliary request differs from that of the main request, in substance, only by specifying the "signal process" as an "amplification as a function of frequency".

Claim 1 of the second auxiliary request differs from that of the main request, in essence, only by specifying the signal process, in addition to its being adjusted to the

sound environment/listening situation, as being adjusted also to the user's hearing deficiency.

For all these restrictions, support is found in the patent and in the original application documents as well.

With the other patent documents on file, an amendment problem is not seen or, as far as this may appear doubtful, is not relevant to the present case.

6. Proceeding, in these circumstances, to the issue of patentability to be decided, it is noted that a lack of novelty objection could, in any case, not validly be maintained without a somewhat artificial interpretation of the independent claims in the light of the prior art documents, particularly as regards the storage of process information in the memory.

The Board chooses, therefore, not to deal with this question in detail but to concentrate on the issue of inventive step.

7. Main request

7.1 There has been some discussion about the question what prior art document would come "nearest" to the claimed invention. The Appellants have chosen D2 as the one on which the formulation of the preamble of Claim 1 is based.

However, as far as the relevance of the cited prior art documents for the issue of inventive step is concerned, it is noted that Claim 1 (cf. paragraph VI) suggests (by the word "or") that it is intended to cover, in effect, two alternatives, and it would appear that D11 is particularly

relevant for one of them whereas a different document, specifically D1, would be particularly relevant for the other.

7.2 D11 discloses a hearing aid of the general kind as defined in the first four lines of the preamble of Claim 1, the "electronically controlled signal processor" being an amplifier chain (20 to 40). The pre-amplifier stage (20) is electronically controlled (via its input terminal A) by an automatic gain control loop (50). That AGC loop contains a frequency selective network having either a highpass, or an allpass, or a lowpass, or an allstop characteristic, any of which can be selected manually (S1, S2) (as described in four paragraphs starting column 3, line 55 and ending column 4, line 40). The three modes described in the first place are intended for users having different (low, flat or high frequency) hearing deficiencies and any user will select only the mode intended for him in order to protect him from sudden loud sounds.

The fourth mode, however, "enables the user", for instance the one having the high frequency hearing deficiency, "to operate the hearing aid without AGC" and "he desires such a provision when he uses the hearing aid in a very quiet environment which necessitates his using the maximum possible gain of the aid" (column 4, lines 29 to 32).

Thus, the signal processor (amplifier 20 to 40) of the D11 hearing aid can operate, upon manual selection by the user, according to either one of two unique signal processes (with and without automatic gain control respectively) adjusted to a particular one of two sound environments/listening situations (normal situation where loud sounds can occur, or a very quiet environment, respectively).

7.3 This hearing aid of D11 has the apparent disadvantage that the "direct" implementation of the two signal processes (amplification with and without AGC) with conventional means (switches in the capacitor network) has no versatility, i.e. cannot easily be changed according to possible other needs.

7.4 Claim 1 of the patent in suit is also concerned with adjustment of a signal process by which, inter alia, a frequency dependent AGC (Automatic Gain Control) function can be maintained (cf. present description, page 3, lines 31 to 33 and 37 to 39).

7.5 It differs, however, in one of its two alternatives (cf. paragraph 7.1) from the cited prior art (D11) by the fact that it suggests to have the two signal processes "stored" in form of "information" in a "memory", and the means for selecting one of the processes is implemented by a control unit which, upon (e.g. manual) activation, is arranged to transmit the prestored information for the memory to the signal processor (if it is accepted that the circuit elements of D11 are not a "memory" and "control unit" in this sense; cf. paragraph 6).

7.6 However, such a more versatile solution of the plural signal process problem is known from D2.

This document discloses a hearing aid whose signal processor can take different transmission functions (frequency response, input/output dynamics, and transient response), i.e. work according to different signal processes, by having a programmable coefficient memory and means for reading out the stored coefficients into the processor multiplier.

7.7 The skilled person recognising the advantage of greater versatility of the solution known from D2 will certainly be led to consider making use of it not only when it is his task to make a hearing aid adjustable to various hearing deficiencies (D2, or the first three operating modes described in D11) but also when it is to be made adjustable to various sound environments or listening situations (fourth operating mode in D11 as against one of the first three modes).

In the opinion of the Board, the hearing aid as claimed in Claim 1 in its first mentioned alternative ("upon manual activation") is, therefore, obvious from D11 having regard, in addition, to D2.

7.8 In these circumstances, Claim 1 would be unallowable already for the reason that it would cover an obvious implementation.

However, the Board has considered the alternative implementation and a possible combination of both as well.

7.9 A hearing aid of the general kind as defined in the first four lines of the preamble of Claim 1 is disclosed also in D1 (for instance in Figure 7), the "electronically controlled signal processor" being an amplifier (204) and a noise reduction circuit (210) controlled by a noise analysis circuit (208). The noise reduction is implemented by a filter bank (104) in Fig. 1 or a filter array (12) in Fig. 4, and its filters are electronically controlled in their individual gains by respective noise filters (130 or 13) in the analysis circuit (102 or similar circuit in Figure 4). By this arrangement, in each frequency band any noise is automatically minimised.

D1 is based on the consideration that it is particularly desirable to enhance the intelligibility of information such as speech or music contained in a signal by filtering out any near-stationary or relatively long duration noise such as vehicular or machinery noises.

In other words: The signal process (frequency response) in the signal processor (amplifier, filters) is automatically adjusted to a particular sound environment/listening situation (spectral properties of the environmental noise).

7.10 The noise analysis circuit of D1 contains a microprocessor (170) with a parameter identifier (108) and parameter to gain converter (109) or a parameter storage means (17).

Even though, therefore, in D1 a "memory" and a "control unit" can be identified, it may be accepted that in the hearing aid claimed in Claim 1 in its second alternative (cf. paragraph 7.1) their function differs from this prior art in that the control unit does not merely select, for any frequency band, the required gain value stored, but that it selects a particular one of a distinct number of signal processes characterising each, by a combination of parameters, a particular acoustical environment situation such as normal conversations at home, place of work with disturbing background noises, traffic environment, meetings, parties and so on (cf. description, page 2, third paragraph).

7.11 Nevertheless, this difference is not, in the opinion of the Board, based on an inventive consideration.

The idea of distinguishing different sound environments/listening situations is well recognisable from D1 even if it proposes a particular solution only for

near stationary, relatively long duration noise (cf. column 1, lines 21 to 36).

Moreover, as already pointed out before (paragraph 7.6), D2 discloses a memory and control unit in the sense of present Claim 1.

The hearing aid as claimed in Claim 1 in its second mentioned alternative ("automatically") is, therefore, obvious from D1 having regard, in addition, to D2.

7.12 The Board has, furthermore, considered that Claim 1 would allow an interpretation to the effect that the alternatives mentioned are implemented in one and the same hearing aid at the same time, as Figure 2 seems to suggest (push button 9 and detector 19).

However, this interpretation would not allow a different conclusion to be drawn from the ones drawn above (paragraphs 7.7 and 7.11).

It is clear from the description that the manual switch (9) serves to allow the user to change the signal process at will (column 5) and the averaging detector (19) serves the purpose of detecting automatically the entrance into a new acoustical environment (column 6), without any interaction between these two cases.

An incorporation of both the manual and the automatic facility in one hearing aid is, therefore, to be regarded, in the case of any need, as obvious from D11 and D1, also taking into account D2.

7.13 The Appellants' submissions and counter-arguments, including those contained in the affidavit or in the article not forming prior art (cf. paragraph V), have been

carefully reviewed for any arguments which might render the above conclusions doubtful, but in vain.

The Board does not deny that the claimed hearing aid is more versatile than that of D11 or that of D1 but, in its opinion, this is the result of the use of a memory as known, per se, from D2 and that result is obvious.

The Board agrees also that the claimed invention solves the need for a hearing aid which is generally adjustable to any important acoustical environment situation but this is as well an apparent result of that feature of using a memory.

It is the Board's belief that the skilled person would, without any hindsight from the patent, recognise that a memory such as suggested by D2 with a suitable control unit would render the hearing aid of D11 and/or that of D1 more versatile in their adjustability to different acoustical environmental situations.

7.14 A study of the patent description would also not lead to the conclusion that patentable subject-matter could be contained in Claim 1. On the contrary:

The "signal processor" (4) is, in fact, an amplifier and the various "signal processes" are, in fact, various frequency responses as a result of the control, by control unit (5), of attenuators (18c-h) in three frequency channels (filter 24) with no other parameters involved. Insofar the "signal processor" and its "signal processes" of the claimed invention fully correspond with those of the hearing aid of D1 (Figure 7 in combination with Figure 1 or 4).

7.15 Claim 1 (main request), in all three of its possible interpretations as regards the alternatives covered by it (paragraph 7.7, paragraph 7.11 and paragraph 7.12), is, therefore, unallowable for the reason of lack of inventive step.

8. **First subsidiary request**

8.1 Claim 1 of the first subsidiary request, as already stated (paragraph 5.3), specifies the "signal processes" of the "signal processor" of the main request as the frequency dependent amplification of a hearing aid amplifier.

The Board fully agrees with the Appellants' submission that with this more specific definition the "signal processes" of the claimed hearing aid can no longer be read on the dynamic control by AGC in the hearing aid of D11 which indeed does not change the frequency response (only the automatic gain control signal being made frequency dependent).

8.2 Apart from this fact, however, all the above made considerations are applicable to the first auxiliary request as well.

Primarily, this applies to the "automatic" alternative (paragraphs 7.9 to 7.11), having regard to D1 and D2.

8.3 No inventive idea can further be seen in reducing an automatic adjustment of the frequency response to the acoustical environment situation (noise) such as known from D1, to a manual adjustment of the same process according to the same criteria.

This "simplification" of the adjustment known from D1 appears the less inventive as it is known from D11 to provide the user with the possibility of manually

selecting the (kind or absence of) automatic gain control according to an acoustical environment situation as well as in accordance with the kind of his hearing deficiency. It is considered as obvious to make a frequency response selectable in the same way as the automatic gain control is selectable in D11, i.e. manually.

8.4 The same then applies to the possible implementation of both kinds of adjustment in one hearing aid (cf. paragraph 7.12).

8.5 Claim 1 (first subsidiary request) is, therefore, unallowable, in effect, for the same reason of lack of inventive step.

9. **Second subsidiary request**

9.1 As stated above (paragraphs 4, 5.1 and 5.3), the feature added to Claim 1 is not to be regarded as meaning "something special" but only the generally required adjustability of the signal process in, or transmission function of, a hearing device, for instance its frequency response, to the user's demand.

The added feature thus represents prior art and must be read into any document relating to a hearing device even if it does not mention that feature explicitly.

Its addition to Claim 1 does not, therefore, alter any of the conclusions drawn from the prior art for the main request (paragraphs 7.2 to 7.14).

9.2 Claim 1 of the second subsidiary request is, therefore, unallowable for the same reason of lack of inventive step as its main request version.

10. In these circumstances, it is not necessary to deal with any of the other documents referred to during the procedure (cf, paragraph II), for instance D3/D4, D5 or D7. None of them would support a different decision on the issue of inventive step.

Rather to the contrary, D7 would only seem to corroborate the obviousness argumentation based on the prior art (D2) relating to the use of a memory for storing, in a programmable hearing aid, the information for a particular signal process, e.g. frequency response.

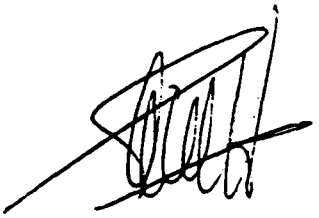
Furthermore, it is not necessary to deal with the question whether D13 (cf. paragraph VII) is relevant enough to justify its introduction into the procedure despite its late filing (Article 114(1) EPC). In any case, it would not change the outcome of this case and was, therefore, disregarded (Article 114(2) EPC).

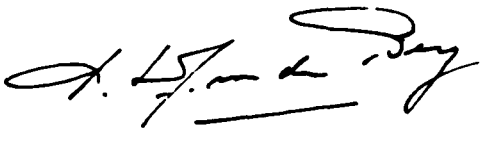
Order

For these reasons, it is decided that:

The appeal is dismissed.

The Registrar: **The Chairman:**





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