

Internal distribution code:

- (A) Publication in OJ
(B) To Chairmen and Members
(C) To Chairmen
(D) No distribution

D E C I S I O N
of 10 May 2006

Case Number: T 0528/04 - 3.5.02

Application Number: 94108580.5

Publication Number: 0629045

IPC: H03J 5/02

Language of the proceedings: EN

Title of invention:

Tuning device for a receiver of radioelectric signals with
coils obtained by printing

Patentee:

EDICO S.r.l.

Opponent:

Interessengemeinschaft für Rundfunkschutzrechte GmbH
Schutzrechtsverwertung & Co. KG

Headword:

-

Relevant legal provisions:

EPC Art. 56

Keyword:

"Inventive step (yes) "

Decisions cited:

G 0006/88

Catchword:

-



Case Number: T 0528/04 - 3.5.02

D E C I S I O N
of the Technical Board of Appeal 3.5.02
of 10 May 2006

Appellant:
(Patent Proprietor)

EDICO S.r.l.
Via Flaminia, 366
I-00196 Roma (IT)

Representative:

Eisenführ, Speiser & Partner
Patentanwälte Rechtsanwälte
Postfach 10 60 78
D-28060 Bremen (DE)

Respondent:
(Opponent)

Interessengemeinschaft
für Rundfunkschutzrechte GmbH
Schutzrechtsverwertung & Co. KG
Bahnstrasse 62
D-40210 Düsseldorf (DE)

Representative:

Eichstädt, Alfred
Maryniok & Eichstädt
Kuhbergstrasse 23
D-96317 Kronach (DE)

Decision under appeal:

Interlocutory decision of the Opposition
Division of the European Patent Office posted
19 January 2004 concerning maintenance of
European patent No. 0629045 in amended form.

Composition of the Board:

Chairman: W. J. L. Wheeler
Members: J.-M. Cannard
C. Holtz

Summary of Facts and Submissions

I. The proprietor appealed against the decision of the opposition division concerning the maintenance of European patent No. 0 629 045 in amended form in accordance with the proprietor's auxiliary request filed on 18 November 2003 during oral proceedings before the opposition division.

II. The following documents:

D1: EP-B-0 147 518,

D2: EP-A-0 492 653,

D3: Funkschau 1996, Heft 10, pages 305 to 307,
E. Stäbler, Gedruckte Spulen und Kondensatoren,
and

D4: Taschenbuch Elektrotechnik, Bd. 3, Bauelemente und
Bausteine der Informationstechnik, 3. Auflage,
pages 274 to 277, Verlag Technik, Berlin 1989,

considered during the proceedings before the opposition division remain relevant to the present appeal.

III. The independent claims 1 and 11 filed on 10 May 2006 during the oral proceedings before the Board of appeal read as follows:

Claim 1:

"Method of calibrating a tuner of a receiver of radioelectric signals, in particular for a television receiver, with a plurality of tuning circuits, one of

them being part of a local oscillator, and each tuning circuit including a varactor diode and coils, according to which:

- the calibration is performed only on one channel every N channels by varying the tuning voltages supplied to the varactor diodes and without adjusting said coils, but only searching the best values of calibration voltages of said varied tuning voltages;
- appropriate information concerning the values of the calibration voltages are stored in a storage device which is associated with the tuner;
- the calibration is not provided for the tuning voltage to be applied to the varactor diode of the local oscillator circuit of the tuner,
- said stored information comprises differential values of the varied tuning voltages of the tuning circuits in respect of the values of the tuning voltage of the local oscillator circuit of the tuner,

characterized in that

N is a number greater than three, in particular five,

wherein said method is applied to a tuner in which said coils are obtained by way of a printing procedure, and all of said printed coils are comprised in the same printed circuit."

Claim 11:

"Television signal receiver including an electronic tuner with a plurality of tuning circuits, one of them being part of a local oscillator, and each tuning circuit including a varactor diode and coils, wherein:

- the calibration is performed only on one channel every N channels by varying the tuning voltages supplied to the varactor diodes and without adjusting said coils, but only searching the best values of calibration voltages of said varied tuning voltages;
- appropriate information concerning the values of the calibration voltages are stored in a storage device which is associated with the tuner;
- the calibration is not provided for the tuning voltage to be applied to the varactor diode of the local oscillator circuit of the tuner,
- said stored information comprises differential values of the varied tuning voltages of the tuning circuits in respect of the values of the tuning voltage of the local oscillator circuit of the tuner,

characterized in that

said coils are obtained by way of a printing procedure,

all of said printed coils are comprised in the same printed circuit, and

N is a number greater than three, in particular five."

Claims 2 to 10 are dependent on claim 1 and claim 12 is dependent on claim 11.

IV. The arguments of the appellant proprietor can be summarized as follows:

Document D1 did not explicitly mention coils, even if there was implicitly at least one inductance in the local oscillator of the tuner of D1. Three features of the calibrating method according to claim 1 were not disclosed in D1: the use of printed coils, a printing procedure in which all printed coils were comprised in the same circuit, and a calibration performed only on one channel every N channels, with N being greater than three. Starting from D1, the skilled person would not have considered introducing the combination of these three features. The teaching of D1 was to determine the number of calibrated channels in dependence on the non-linearity of the characteristic of the varactors used in the tuner. D1 in fact suggested using only the linear region of the varactor characteristic, but it was, in practice, unavoidable to use the whole characteristic of the diodes. None of the documents D2, D3 or D4 disclosed a printing procedure in which all the coils of a tuner were printed in the same circuit. Since the coils of the invention were printed in the same printed circuit they could be printed at the same time and by the same machine, so that they were produced with the same shift of manufacturing tolerance. This was not the case with traditional wired coils. This new technical effect allowed an increase of the calibration interval of the channels and had the

advantage of reducing the number of calibrated channels without impairing the quality of the tuning.

The subject-matter of claim 11 involved an inventive step for the same reasons as the calibration method of claim 1 because this method was used for manufacturing the tuner of the television receiver recited in claim 11. The differential values of the tuning voltage of the varactors obtained by calibration were stored in a memory of the tuner. The differential values of the tuning voltages for the intermediate channels where no calibration was made were calculated by interpolating the differential values obtained for the calibrated channels and could be stored in the memory. Since there was a mathematical link between the stored interpolated values and no such mathematical link between the stored calibrated values, it was possible to ascertain that the number N was greater than three from the values stored in the memory of a television receiver calibrated by the method of the invention.

V. The arguments of the respondent opponent can be summarized as follows:

In the calibration method disclosed in document D1, it was not necessary to adjust the values of the coils, but the tuning of the resonant circuits was performed only by adjusting the capacitors. Any kind of coils could be used in the method of D1, and in particular printed coils, which were known long before the filing date of the patent in suit as could be seen from D2, D3 or D4. Tuners comprising coils printed on the same printed circuit were known from D2 (Figure 2 and column 1, lines 2 to 20) and D3 (page 305, left and

middle columns). A calibration which was performed only on one channel every N channels, with N being greater than three, was also known from D1 (column 3, lines 3 and 4). The method of calibration according to claim 1 differed from that disclosed in D1 only in that the calibration interval was greater than three in the non-linear portion of the characteristic of the varactor. The selection of a number N greater than three in this non-linear portion was a mere matter of choice which only depended on the level of precision required for the tuning. Since printed coils had smaller manufacturing tolerances than wired coils, their use in a tuner for reducing in an expected way the number of channels to be calibrated was not inventive.

The subject-matter of claim 11 did not involve an inventive step for the same reasons as the method of claim 1 because the tuner of the television receiver of claim 11 differed from the tuner disclosed in D1 only by having been calibrated by the method of claim 1. Moreover, the use of this method for calibrating a television receiver did not result in any physical feature of the receiver.

VI. The appellant (patentee) requested that the decision under appeal be set aside and that the patent be maintained in amended form with claims 1 to 12 and description, columns 1 to 5, as submitted in the oral proceedings and sheets 1 and 2 of the patent specification.

VII. The respondent (opponent) requested that the appeal be dismissed.

Reasons for the Decision

1. The appeal is admissible.

Admissibility of the amendments

2. The Board is satisfied that the amendments made to the claims and the description satisfy the requirements of Article 84 EPC and do not contravene Article 123(2) and (3) EPC.

- 2.1 More specifically, present claim 1 differs in substance from granted claim 1 in that it specifies that all the printed coils are comprised in the same printed circuit, as is shown for instance in Figure 2A of the application as originally filed which shows the coils of the tuner of the invention obtained by printing on a printed circuit board, and in that it comprises the features of claim 19 of the application as originally filed.

Inventive step of Claim 1

3. The novelty of the subject-matter of claim 1 which relates to a method of calibrating a tuner was not in dispute. Nor was it disputed that the features recited in the preamble of claim 1 are disclosed in document D1 which represents the closest prior art.

- 3.1 D1 (figure; column 2, line 50 to column 4, line 57) discloses a method of calibrating a tuner having a plurality of tuning circuits, one of them being part of

a local oscillator, each tuning circuit including a reactance adjusted by varying the voltage applied to a diode for tuning the tuner. D1 does not explicitly mention coils, although coils are implicitly included in the tuner. A calibration is performed only on one channel every N channels. The differential values of the varied tuning voltages of the tuning circuits in respect of the values of the tuning voltage of the local oscillator are stored in a memory included in the tuner.

4. According to the characterising part of claim 1, the number N is greater than three and the method is applied to a tuner in which the coils are obtained by way of a printing procedure and all of the printed coils are comprised in the same printed circuit.
- 4.1 In D1, the number N is usually greater than one, and according to the described preferred embodiment of calibration, equal to 2 or 3 in the non-linear portion of the characteristic of the diodes and greater than 3 in the linear portion. The method of claim 1, in which the number N is greater than 3 irrespective of the non-linearity of the varactor characteristics, thus differs in this respect from the method described in D1.
- 4.2 The printed coils being comprised in the same printed circuit also distinguishes the method of claim 1 over the method described in D1.
- 4.2.1 According to the description of the contested patent (see paragraph [0034]), the use in the tuner of printed coils, all comprised in the same printed circuit, results in the production tolerances of the printed

circuits having little effect on the differential values of the tuning voltages for the calibrated channels, because the deviations of the inductances of the printed coils from their desired values are all in the same direction. Because of this, it is possible to increase the spacing between the calibrated channels ($N > 3$). This effect should be construed as a feature of the claimed invention, following the decision G 6/88 of the Enlarged Board of appeal (OJ 1990, 114, points 7 and 9 of the reasons), which stated that the proper interpretation of a claim whose wording clearly defines a new use of a known compound for a particular purpose, will normally be such that the attaining of a new technical effect described in the patent which underlies the new use is a technical feature of the claimed invention.

- 4.2.2 Even if the use of printed coils in a tuner was known at the filing date of the contested patent, it is not in dispute that the effect resulting from a printing procedure in which all the coils, including those of the local oscillator, are comprised in the same printed circuit (as described in paragraph [0034] of the contested patent) is not disclosed in any of the prior art documents cited.
5. Starting from D1 and having regard to the technical effect achieved by the invention, the technical problem addressed by the invention can be seen as providing a calibration method which is simpler and less expensive than those known from the prior art without impairing the quality of the tuning of the tuner. This problem is solved by the features which distinguish the method of claim 1 over D1 and provide a reduction of the number

of channels in which a calibration has to be performed, without impairing the quality of the tuning.

6. There is no hint in the prior art of the solution provided by the invention and more specifically no suggestion of a printing procedure in which all the coils are printed in the same printed circuit combined with increasing the calibration interval, irrespective of any non-linearity of the varactor diode characteristic, without impairing the performance of the tuner.
- 6.1 Even if it could have been obvious at the priority date of the patent in suit to print all the coils on the same circuit board, the cited prior art documents did not suggest the technical effect achieved by such a printing procedure because none of them even disclosed such a procedure. Starting from D1, the skilled man wishing to reduce the costs of the calibration process of a tuner could have increased the calibration interval of a tuner in the non-linear portion of the characteristic of the diodes. However, he would not have done that because, according to the teaching of D1, this would be detrimental to the performance of the tuner.
- 6.2 It is the merit of the invention to take advantage of the technical effect (shifting in parallel tolerance deviations) provided by printing all the coils on the same printed circuit to increase the calibration interval in the non-linear portion of the varactor characteristic to reduce the number of calibration steps of a tuner without impairing its performance. The combination of the new technical features according to

the invention provides a combinative effect which goes beyond the sum of the individual effects provided by each of these features. According to the established case law of the Board of appeal, an inventive step is involved when such a synergy effect occurs.

- 6.3 Moreover, it is observed that printed coils had been known and used in a tuner for a long period of time (about twenty years according to D3) before the present invention was made. This in itself indicates that there was no obvious connection in the mind of the skilled person between the use of printed coils in a same printed circuit and the calibration interval of a tuner comprising coils.

Inventive step of Claim 11

7. Claim 11 relates to a television signal receiver including an electronic tuner in which all the coils are obtained by way of a printing procedure and are comprised in the same printed circuit and a calibration comprising all the steps of the calibration method according to claim 1 is performed. These features cause the television receiver recited in claim 11 to include in its tuner technical features which differ from those of a prior art tuner calibrated by the method described in D1. The claim may be regarded as a product-by-process claim in which the process (calibration method) leaves its mark on the final product (calibrated television receiver). Accordingly the subject-matter of claim 11 is not obvious to a person skilled in the art for the same reasons as given above for the subject-matter of claim 1.

7.1 More specifically, the differential values obtained by the calibration steps specified in claim 11 are necessarily stored in a memory of the television receiver because they need to be re-read for tuning the calibrated channels. Such a memory could also contain differential values derived from those provided by the calibration steps for tuning the intermediate channels for which no calibration was performed. The appellant stated in the course of the oral proceedings of 10 May 2006 that there must be a mathematical link between the differential values for the intermediate channels because they are derived from the differential values obtained by calibration by a mathematical process. The differential values for the intermediate channels could thus be clearly distinguished in the memory from the values obtained by calibration which do not show such a mathematical link. The opponent did not convincingly rebut these statements from the appellant. The Board judges that the number N representative of the calibration interval can be ascertained from the values stored in the memory of the television receiver which contains the differential values used for tuning the tuner and thus is a specific physical feature of the television receiver obtained by the calibration steps identified in claim 11. Since the opponent, who bears the burden of proof for this counterargument, has not demonstrated that the appellant is incorrect in this respect, the Board concludes that the calibrating method features recited in claim 11 result in the tuner specified there having different features from the prior art tuner, namely fewer stored calibration values, possibly with different intermediate interpolated values.

8. The Board concludes therefore that the appellant has shown that the subject-matter of the claims involve an inventive step within the meaning of Article 56 EPC. The grounds for opposition mentioned in Article 100 EPC do not prejudice the maintenance of the patent in the presently amended form.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the first instance with the order to maintain the patent in amended form in the following version:

Claims: claims 1 to 12, and

Description: columns 1 to 5,

all submitted in the oral proceedings on 10 May 2006,
and

Drawings: sheets 1 and 2 of the patent
specification.

The Registrar:

The Chairman:

U. Bultmann

W. J. L. Wheeler