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Aktenzeichen / Case Number / N° du recours : T 259/87 - 3.5.1

Anmeldenummer / Filing No / N° de la demande : 80 304 604.4

Veröffentlichungs-Nr. / Publication No / N° de la publication : 31 685

Bezeichnung der Erfindung: Surface acoustic wave device

Title of invention:

Titre de l'invention :

Klassifikation / Classification / Classement : H03H 9/145, H03H 9/64

ENTSCHEIDUNG / DECISION

vom / of / du 13 April 1989

Anmelder / Applicant / Demandeur :

Patentinhaber / Proprietor of the patent /
Titulaire du brevet :

FUJITSU LIMITED

Einsprechender / Opponent / Opposant :

N.V. Philips Gloeilampenfabrieken

Stichwort / Headword / Référence :

EPO / EPC / CBE Article 56

Kennwort / Keyword / Mot clé : Inventive step (yes)

Leitsatz / Headnote / Sommaire

Case Number : T 259 /87 - 3.5.1



D E C I S I O N
of the Technical Board of Appeal 3.5.1
of 13 April 1989

Appellant :
(Opponent)

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(Proprietor of the patent)

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Decision under appeal :

Interlocutory decision of the Opposition Division of
the European Patent Office dated 10 June 1987
concerning maintenance of European Patent No. 31 685
in amended form.

Composition of the Board :

Chairman : E. Persson

Members : W.J.L. Wheeler

W. Riewald

Summary of Facts and Submissions

- I. The grant of European patent No. 31 685 on European patent application No. 80 304 604.4, filed on 18 December 1980, claiming priority of 27 December 1979 from a previous application in Japan (JP 160190/79), was published on 29 February 1984.

- II. An opposition was filed by the Appellant on 22 November 1984, requesting revocation of the patent on the ground that its subject-matter was not patentable having regard to the prior art known from:
 - (1) US-A-4 096 455
 - (2) DE-A-2 839 851
 - (3) JP-Kokai No. 54-19635
 - (4) DE-A-2 820 046
 - (5) US-A-4 139 791
 - (6) EP-A-0 026 114.

- III. During subsequent written proceedings, the Appellant filed the following document:
 - (7) Electronics Letters, Vol. 8, No. 12, Pages 311-312.

- IV. In oral proceedings on 21 October 1986, the Opposition Division announced its intention to maintain the patent in amended form. A communication pursuant to Rule 58(4) EPC was dispatched on 25 November 1986. An interlocutory decision within the meaning of Article 106(3) EPC was dispatched on 10 June 1987.

- V. The text in which it was intended to maintain the patent has four claims of which Claim 1, the only independent claim, reads as follows:

" A surface acoustic wave device comprising a piezo-electric substrate (11), input and output transducers (12, 13), formed on said substrate and arranged diagonally opposite each other, said input and output transducers each being composed of a pair of comb-like electrodes, a multistrip coupler (14) formed on said substrate and interposed between said input and output transducers and including a plurality of filamentary conductors, the multistrip coupler coupling substantially all of a surface wave generated by the input transducer to the output transducer, and dummy transducers (15, 16; 20, 21; 35, 36) formed on said substrate and arranged to extend from the outer ends of said input and output transducers towards the ends of said substrate, the dummy transducers (15, 16; 20, 21; 35, 36) each including a plurality of electrodes spaced at substantially the same pitch as the electrode pitch in the respective input and output transducers, characterised in that dummy electrode structures (17, 18; 22, 23; 37, 38) are formed on the substrate and arranged to extend from the opposite ends of said multistrip coupler towards the ends of said substrate, the said dummy electrode structures (17, 18; 22, 23; 37, 38) each including a plurality of electrodes spaced at substantially the same pitch as the conductor pitch of said multistrip coupler."

VI. On 22 July 1987 the Appellant filed a reasoned appeal against that decision and paid the fee for appeal.

VII. Oral proceedings were held on 13 April 1989, at which the Appellant filed a further document:

(8) Electronics Letters, Vol. 7, No. 16, Pages 463-464.

VIII. The parties agreed that the multistrip coupler mentioned in Claim 1 was of known type having a sufficient number of filamentary conductors disposed in accordance with known principles to couple theoretically 100% of the surface

acoustic wave energy from the input transducer to the output transducer. In practice such multistrip couplers are very nearly, but not exactly, 100% efficient.

- IX. The Appellant argued in effect that a person skilled in the art would experiment with the conventional arrangement shown in Figure 2 of the opposed patent and known from document (2), to see if it behaved in the intended manner. In particular, he would check whether the energy received by the output transducer was equal to the energy input at the input transducer. He would also check whether any surface acoustic wave energy travelled straight through the coupler. Such an experiment was described in document (8), which showed that the amplitude of the signal coupled to the output transducer was 18dB larger than the amplitude of the straight through signal. Document (1) taught that end effects caused by differences in surface metallisation caused reflections. The skilled person would therefore expect some reflection to occur as the straight through component crossed the end of the coupler. Document (1) taught that these reflections could be suppressed by continuing the same pattern (dummy pattern). This led to the subject-matter of Claim 1 of the opposed patent.
- X. The Respondent argued that the average person skilled in the art would rely on the experimental results published in documents (7) and (8) and not repeat the experiments himself. From (7) he would know that in the case of a 3dB (i.e. 50% efficient) multistrip coupler, spurious signals caused by reflections from the edges of the coupler were of the order of 40dB smaller than the single transit signal. He would therefore expect any spurious signals caused by reflections from the end of a theoretically 100% efficient multistrip coupler to be negligible, even if because of imperfections the coupler were only 95% efficient. Even if a person skilled in the art did do the experiment and obtained the oscillogram shown in Figure 7 of the opposed

patent, he would not think the relatively large spurious signal 26 could be caused by reflections from the end of the multistrip coupler.

XI. The Appellant requests revocation of the opposed patent.

The Respondent requests dismissal of the appeal.

Reasons for the Decision

1. The appeal complies with Articles 106 to 108 and Rule 64 EPC and is, therefore, admissible.
2. No amendment has been made to the opposed patent during the proceedings before the Board of Appeal. The only point to be decided is whether or not the subject-matter of the claims of the opposed patent involves an inventive step having regard to documents (1), (2), (7) and (8) and common general knowledge in the art.
3. The prior art portion of Claim 1 is based on a combination of the teaching of documents (1) and (2).
4. Document (2) discloses a surface acoustic wave device comprising a piezoelectric substrate, input and output transducers formed on said substrate and arranged diagonally opposite each other, said transducers each being composed of a pair of comb-like electrodes, and a multistrip coupler including a plurality of filamentary conductors formed on said substrate and interposed between said input and output transducers. The multistrip coupler appears to couple substantially all of a surface wave generated by the input transducer to the output transducer.

Document (1) discloses that in surface acoustic wave devices, reflections caused by differences in substrate surface metallisation, and hence in surface wave velocity, between the transducer pattern and the non-pattern bearing substrate may be suppressed by a dummy transducer formed on the substrate and arranged to extend from the outer end of the transducer towards the end of the substrate, the dummy transducer including a plurality of electrodes spaced at substantially the same pitch as the electrode pitch in the transducer.

5. In the opinion of the Board it would be obvious to apply the teaching of document (1) to suppress reflections from the outer ends of the transducers in the device known from document (2) and thereby arrive at a device in accordance with the prior art portion of Claim 1 of the opposed patent.

6. However, the Appellant has indicated nothing in the cited prior art which would point towards the desirability of suppressing reflections from the ends of the multistrip coupler. On the contrary, it appears from documents (7) and (8) that these reflections may be considered to be negligibly small. Documents (3), (4) and (5) are not concerned with multistrip couplers. Document (6) was published after the priority date to which Claim 1 is entitled and therefore cannot be considered in deciding whether there has been an inventive step.

7. In view of this, the Board is not persuaded that it would be obvious to a person skilled in the art that a worthwhile improvement in the performance of the device, such as the suppression of the relatively large spurious signal 26 shown in Figure 7 of the opposed patent, could be obtained by suppressing the relatively small reflections from the ends of the multistrip coupler.

8. For the above reasons, the subject-matter of Claim 1 is considered as involving an inventive step within the meaning of Article 56 EPC.
9. As Claims 2 to 4 are properly dependent on Claim 1, their subject-matter is likewise considered as involving an inventive step within the meaning of Article 56 EPC.
10. For the reasons set out above, the Board concurs with the decision of the Opposition Division that the patent be maintained in the amended form set out in the communication pursuant to Rule 58(4) EPC, dispatched on 25 November 1986.

Order

For these reasons, it is decided that :

The appeal is dismissed.

The Registrar

The Chairman

S. Fabiani

S. Fabiani

E. Persson

E. Persson

lgw.
21.4.89

Per
21.4.89