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D E C I S I O N
of 16 May 2006

Case Number: T 0372/05 - 3.5.03

Application Number: 96942968.7

Publication Number: 0868807

IPC: H04M 1/74

Language of the proceedings: EN

Title of invention:

A telephone equipment protection circuit

Applicant:

THOMSON CONSUMER ELECTRONICS, INC.

Opponent:

-

Headword:

Telephone equipment protection circuit/THOMSON

Relevant legal provisions:

EPC Art. 56
EPC R. 86(4)

Keyword:

"Inventive step (no)"
"Objection based on Rule 86(4) EPC - not well-founded"

Decisions cited:

T 0141/04, T 0708/00

Catchword:

-



Case Number: T 0372/05 - 3.5.03

D E C I S I O N
of the Technical Board of Appeal 3.5.03
of 16 May 2006

Appellant: THOMSON CONSUMER ELECTRONICS, INC.
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Indianapolis, IN 46290-1024 (US)

Representative: Arnold, Klaus-Peter
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Decision under appeal: Decision of the examining division of the
European Patent Office posted 14 October 2004
refusing European application No. 96942968.7
pursuant to Article 97(1) EPC.

Composition of the Board:

Chairman: A. Clelland
Members: F. van der Voort
M.-B. Tardo-Dino

Summary of Facts and Submissions

I. This appeal is against the decision of the examining division to refuse European patent application 96 942 968.7, which was published as international application WO 97/23987 A pursuant to Article 158(1) EPC, and which claimed 22 December 1995 as the earliest priority date.

II. The following documents were referred to in the impugned decision:

D1: M. Williams et al, "Circuit Protection for Telephone Networks - Needs and Co-ordination", IEEE Wescon 95 conference record, "Microelectronics, Communications Technology, Producing Quality Products, Mobile and Portable Power, Emerging Technologies", San Francisco, 7 November 1995, pages 189 to 194;

D2: WO 92/06523 A;

D3: CH 0 661 397 A; and

D4: US 4 254 442 A.

III. The main reason for the refusal was that the subject-matter of claim 1 of a main request did not involve an inventive step (Article 56 EPC) having regard to the disclosure of D2 and the common general knowledge of the person skilled in the art as illustrated in, e.g., D3 or D4. Further, both auxiliary requests filed by the appellant were objected to under Rule 86(4) EPC. In any case, the examining division considered that the

subject-matter of claim 1 of each of these auxiliary requests lacked an inventive step (Article 56 EPC) having regard to the common general knowledge of the person skilled in the art.

IV. In the statement of grounds of appeal the appellant requests that the decision under appeal be set aside and a patent be granted on the basis of claims 1 to 7 of a main request, or claims 1 to 6 of a first auxiliary request, or claims 1 to 5 of a second auxiliary request, all claims as filed with the statement of grounds of appeal. Oral proceedings were conditionally requested. Arguments in support of inventive step of the claimed subject-matter were submitted. The appellant further argued that the auxiliary requests should not have been rejected under Rule 86(4) EPC and referred to decision T 708/00 in support.

V. The appellant was summoned by the board to oral proceedings. In a communication accompanying the summons, the board gave a preliminary opinion and introduced the following documents known to the board and cited in accordance with Article 114(1) EPC:

D5: US 4 113 340 A;

D6: Patent Abstracts of Japan & JP 08293647 A; and

D7: DE 35 02 421 A.

VI. In response to the board's communication, the appellant informed the board that the representative would not attend the oral proceedings and requested that a

decision be made in respect of the requests as filed with the statement of grounds of appeal.

VII. Oral proceedings were held on 16 May 2006 in the absence of the appellant. At the end of the oral proceedings, after deliberation, the board's decision was announced.

VIII. Claim 1 of the main request reads as follows:

"Circuit for protecting telephone equipment (30), coupled to a subscriber telephone line (10), from damage, comprising:

 a spark gap (20) coupled between the subscriber telephone line (10) and a source of reference potential, and

 an inductor (L1) coupled between the spark gap (20) and the telephone equipment (30), **characterized in that**

 a first resistor (R1) having a fixed resistance is coupled with one terminal to the subscriber telephone line (10) and with the other terminal to the spark gap (20) and to the inductor (L1) for providing current limiting on the current drawn from the subscriber telephone line (10), and

 a discharging circuit comprising a second resistor (R2) is coupled in parallel with the spark gap (20) for discharging a static charge from the subscriber telephone line to the source of reference potential, and

 the spark gap (20) is arranged as an air spark gap, which is configured to generate a spark when the voltage between the subscriber telephone line (10) and

the reference potential exceeds a predetermined trigger voltage."

Claim 1 of the first auxiliary request is identical to claim 1 of the main request, except for the last feature being replaced by:

"the spark gap (20) is arranged as an air spark gap, which is formed on a printed circuit board by a physical air-gap, with copper electrodes on either side of the gap, for generating a spark when the voltage between the subscriber telephone line (10) and the reference potential exceeds a predetermined trigger voltage."

Claim 1 of the second auxiliary request is identical to claim 1 of the first auxiliary request with the addition of the following wording:

", and the copper electrodes on either side of the air-gap having chip resistors bonded to them, the chip resistors being covered with solder."

Reasons for the Decision

1. *Inventive step - claim 1 of the main request*
- 1.1 Both the examining division and the appellant considered D2 to represent the closest prior art; the board agrees. D2 (see, in particular, Fig. 1 and the abstract) discloses a circuit for protecting telephone equipment from damage. The circuit includes a gas discharge tube (GDT) 5 which is coupled between a

subscriber telephone line 1 and a source of reference potential, i.e. ground 1'. An inductor 4 is coupled between the GDT 5 and the telephone equipment (Fig. 1: "TO LOAD"). The GDT 5 is configured to switch or fire when the voltage between the subscriber telephone line and the reference potential exceeds a predetermined trigger voltage (page 4, lines 14 to 18, page 6, lines 29 to 31). An overcurrent protection device is series connected in the current-carrying line (D2, claims 9 and 10) and, hence, provides current limiting on the current drawn from the subscriber telephone line. In the embodiment shown in Fig. 1 of D2, the overcurrent protection device is a PTC resistor 6 having a resistance of 6 Ohm (page 6, lines 8 to 13) which is connected between the GDT and the inductor. The GDT may be replaced by a spark gap (page 4, lines 9 to 12).

1.2 The subject-matter of claim 1 of the main request differs from the protection circuit known from D2 in that claim 1 includes the following features:

- i) the spark gap is an air spark gap;
- ii) the overcurrent protection/current limiting resistor has a fixed resistance and is coupled with one terminal to the subscriber telephone line and with the other terminal to the spark gap and the inductor; and
- iii) a discharging circuit is provided which comprises a second resistor coupled in parallel with the spark gap for discharging a static charge from the subscriber telephone line to the source of reference potential.

- 1.3 In the board's view, the claim thereby defines an aggregation or collocation of features, in which the technical problem underlying the claimed subject-matter when starting out from D2 consists of three separate partial problems; a first problem may be seen in providing a practical implementation of the spark gap (cf. feature i)), a second in providing a simpler, alternative implementation of the overcurrent protection device (cf. feature ii)) and a third problem in avoiding surges due to discharges via the telephone equipment which could occur, were a high voltage static charge to build up on the subscriber line (cf. feature iii); see also the application as filed, page 1, lines 16 to 20, and page 6, lines 1 to 10).
- 1.4 The formulation of each of these partial problems does not contribute to an inventive step for the following reasons. Implementing circuits and, in doing so, seeking for alternative components, whenever necessary, is considered to fall within the scope of the customary practice of a person skilled in the art of telecommunication electronics. Further, at the earliest priority date the skilled person was familiar with the desirability to protect telephone equipment against surges due to discharges of high voltage static charges built up on communication lines (see, e.g., D1, page 190, left-hand column, last two paragraphs).
- 1.5 Regarding feature i) the board notes that at the earliest priority date of the present application air spark gaps were well-known examples of spark gaps and used for the same purpose of overvoltage protection (see, e.g., D1, page 189, right-hand column, lines 1 to

- 4 ("*carbon blocks*") and page 192, left-hand column, last paragraph, first sentence, D4, col. 1, lines 1 to 20, and D7, page 3, lines 6 to 18 and page 4, lines 8 to 14). Using an air spark gap is therefore considered an obvious practical implementation.
- 1.6 Faced with the second partial problem, it would have been obvious to the skilled person to use a simple resistor for the overcurrent protection device, i.e. one having a fixed resistance, since, by definition, a resistor impedes the flow of an electric current. The board also notes that from the overall teaching of D2 it is clear that the overcurrent protection device need not be a PTC resistor connected as shown in Fig. 1. As follows from claim 9, it may be series connected anywhere in the subscriber line. Inserting it at a point before the spark gap would therefore have been an obvious alternative implementation of the overcurrent protection device of the protection circuit of D2 and, consequently, any additional advantageous effect thereby achieved, in particular an improved protection against high-energy lightning pulses as argued by the appellant in the statement of grounds, would merely have been a bonus effect.
- 1.7 Regarding the third distinguishing feature, the board notes that it was well-known to use a bleeder resistor connected between a subscriber line and ground in order to avoid surges damaging the telephone equipment (see, e.g., D5, col. 1, lines 5 to 7 and 15 to 20 and col. 2, lines 52 to 55). Since bleeder resistors are permanently and directly connected between the subscriber line and ground, a build-up of any static charge is thereby avoided.

1.8 A skilled person starting out from D2 and faced with the above partial problems would therefore have arrived at the subject-matter of claim 1 without the exercise of any inventive skill.

1.9 For these reasons, the subject-matter of claim 1 of the main request does not involve an inventive step (Articles 52(1) and 56 EPC).

2. *Admissibility of the first and second auxiliary requests*

2.1 The claims of the first and second auxiliary requests correspond to the auxiliary requests filed during the examination proceedings, in which the connection of the first resistor is clarified. The examining division held that claim 1 of the auxiliary requests did not comply with the requirements of Rule 86(4) EPC in that the additional features related to unsearched subject-matter and in that there was a lack of unity between the respective inventions claimed and the invention as defined by claim 1 of the main request.

2.2 In the board's view, however, these claims do not contravene Rule 86(4) EPC, since independent claim 1 of each of the auxiliary requests corresponds to claim 1 of the main request, in which the construction of the air spark gap has been further defined in an attempt to overcome the inventive step objection raised in respect of the subject-matter of claim 1 of the main request. The board concurs with the reasoning as given in T 0141/04 (see the reasons for the decision, point 5), in which it was held that Rule 86(4) EPC is not to be

applied in such cases where through the introduction of a feature from the description a claim is amended by giving more concrete expression of the invention in order to overcome an inventive step objection (see also T 708/00, reasons for the decision, point 17, OJ EPO 2004, 160). The first and second auxiliary requests are therefore admitted to the procedure.

3. *Inventive step - claim 1 of the first and second auxiliary requests*

3.1 In accordance with Article 111(1) EPC, the board exercises the power within the competence of the examining division and has examined whether or not the subject-matter of claim 1 of these requests involves an inventive step (Articles 52(1) and 56 EPC).

3.2 According to claim 1 of the first auxiliary request, the spark gap is formed on a printed circuit board by a physical air-gap, with copper electrodes on either side of the gap. The appellant argued that this provided for a particularly cheap manufacture of the protection circuit (see also the application as published, page 6, lines 25 and 26). The additional feature according to claim 1 of the second auxiliary request further specifies that the copper electrodes on either side of the air-gap have chip resistors bonded to them, which are covered with solder.

3.3 D7 is concerned with the implementation at low cost of a protection device including a spark gap (see D7, page 4, lines 20 to 33). A person skilled in the art when faced with the problem of implementing at low cost the protection circuit of D2 would therefore have

considered this document. More specifically, D7 (see Fig. 1 and page 7, line 17 to 23) discloses a protection device having an air spark gap with solder pads ("Lötfläche") 3, 5 at respective ends of chip resistor layers 7 mounted on a carrier substrate 10. The solder pads thus form electrodes on either side of the gap 9. The description does not specify what material the solder pads are made of. The board however considers that using copper would have been obvious to the skilled person, since at the earliest priority date of the present application it was well-known that copper pads provide reliable and cheap electrical conductive surfaces suitable for soldering, e.g. as in printed circuit boards having copper tracks connected with electrical components mounted on the printed circuit board.

- 3.4 Faced with the problem of implementing at low cost the spark gap of the protection circuit of D2, it would therefore have been obvious to the person skilled in the art to apply the teaching of D7 to the circuit of D2. He would thereby have arrived at an implementation of the spark gap as defined as part of the protection circuit of claim 1 of either one of the first and second auxiliary requests.
- 3.5 The additional features as defined in claim 1 of the first and second auxiliary requests do not therefore contribute to an inventive step.
- 3.6 In view of the above and the reasons as given in respect of claim 1 of the main request, the board concludes that the subject-matter of claim 1 of each

one of the first and second auxiliary requests does not involve an inventive step (Articles 52(1) and 56 EPC).

4. It follows that none of the requests on file can be allowed.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:

D. Magliano

A. S. Clelland