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**Datasheet for the decision  
of 24 July 2019**

**Case Number:** T 1484/14 - 3.4.01

**Application Number:** 03704319.7

**Publication Number:** 1466182

**IPC:** G01R1/073

**Language of the proceedings:** EN

**Title of invention:**

ELECTRICAL FEEDBACK DETECTION SYSTEM FOR MULTI-POINT PROBES

**Patent Proprietor:**

Capres A/S

**Opponent:**

SmartTip BV

**Headword:**

Multi-point probes / Capres

**Relevant legal provisions:**

EPC Art. 100(a), 100(b)

RPBA Art. 13(1)

**Keyword:**

Grounds for opposition - fresh ground for opposition - not admitted

Inventive step (yes) - neighbouring field (no)

**Decisions cited:**

G 0010/91, T 0176/84, T 0195/84, T 0025/13



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Case Number: T 1484/14 - 3.4.01

**D E C I S I O N**  
**of Technical Board of Appeal 3.4.01**  
**of 24 July 2019**

**Appellant:** SmartTip BV  
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**Decision under appeal:** **Decision of the Opposition Division of the  
European Patent Office posted on 2 May 2014  
rejecting the opposition filed against European  
patent No. 1466182 pursuant to Article 101(2)  
EPC.**

**Composition of the Board:**

**Chairman** P. Scriven  
**Members:** F. Neumann  
R. Winkelhofer

## **Summary of Facts and Submissions**

- I. The opponent (appellant) filed an appeal against the decision of the Opposition Division to reject the opposition.
  
- II. The opponent submitted that claim 1 of the contested patent did not involve an inventive step and that the invention of claim 5 was not sufficiently disclosed.
  
- III. The proprietor (respondent) provided arguments in support of inventive step. No submissions were made with respect to sufficiency of disclosure. Instead, it was requested that the case be remitted to the Opposition Division, should this objection be admitted into the appeal proceedings.
  
- IV. Oral proceedings were held before the Board.
  
- V. The final requests of the parties were formulated as follows:  
  
The opponent requests that the decision under appeal be set aside and the patent be revoked.  
  
The proprietor requests that the appeal be dismissed.
  
- VI. Claim 1 reads as follows:

*An electrical feedback detection system (110, 700) for detecting electrical contact of a multi-point probe (102, 702) to a material test sample (104, 704) surface comprising:*

*a. Electric generator means connected to a pair [sic] of electrodes (702a, 702b) of said multi-point probe (102, 702);*

*b. A switched impedance detection element connecting said pair [sic] of electrodes (702a, 702b) of said multi-point probe (102, 702); and*

*c. Electrical detector means for detecting a measuring signal from an electrical signal across said switched impedance detection element, characterized by*

*the electric generator means being a differential voltage to current converter comprising:*

*d. A precision amplifier providing two differential inputs, one output, and one reference input;*

*e. A precision resistive element providing an internal and external port, said internal port connected to said output of said precision amplifier, and; [sic]*

*f. A voltage follower providing an input and an output, said input connected to said external port of said precision resistive*

*element, and said output connected to said reference input of said precision amplifier.*

VII. The wording of claim 5 is not relevant to the present decision and so is not reproduced here.

VIII. In the present decision, reference is made to the following documents:

D1: EP-B-1 095 282;

D2: EP-A-0 111 815;

D6: Horowitz and Hill: "Art of Electronics", 2nd edition, 1989; pages 1-17;

D7: KEITHLEY: "Low Level Measurements Handbook"; 5th edition, 1998.

IX. The arguments of the parties, insofar as they are pertinent, are set out below in the reasons for the decision.

## **Reasons for the Decision**

### *Article 100(b) EPC - insufficient disclosure*

1. In the notice of opposition, the grounds for opposition were given as Article 100(a) EPC (lack of inventive step) and Article 100(b) EPC. However, only the ground of lack of inventive step was substantiated.

2. In G 10/91 *Examination of opposition/appeals* OJ 1993, 420, the Enlarged Board of Appeal held that, in principle, the Opposition Division shall examine only such grounds for opposition which have been properly submitted and substantiated. In the present case, therefore, the Opposition Division rightly restricted its examination to the ground of lack of inventive step.
3. During appeal proceedings, the opponent remarked - for the first time - that the multi-point testing apparatus of claim 5 was insufficiently disclosed.
4. Since the ground of Article 100(b) EPC was not substantiated in the notice of opposition, the objection raised by the appellant concerning insufficient disclosure is a fresh ground for opposition.
5. In accordance with G 10/91, a fresh ground can only be introduced into the appeal proceedings with the consent of the patentee. Such consent has not been given.

*Admissibility of D6 and D7*

6. With the submissions of 24 May 2019, the opponent introduced two new documents, D6 and D7. Brief reference was made to these citations during the subsequent written and oral proceedings.

7. In view of the filing of D6 and D7 after the opponent's statement of grounds, and since neither document influenced the arguments already on file, the Board, in exercise of its discretion under Article 13(1) RPBA, does not consider them.

*Article 100(a) EPC - inventive step*

8. It is uncontested that D1 represents the best starting point for discussing inventive step.
9. D1 discloses a multi-point probe for testing electric properties on a specific location of a test sample. Four probe tips are arranged in an in-line configuration and are designed to be brought into physical contact with the test sample. Current is applied across the two outer probe tips and a voltage is measured across the two inner probe tips (D1 paragraph [0055]; Figure 10). This allows the resistivity of the sample to be determined. Before measurements can be made using the apparatus of D1, the multi-point probe is moved towards the test sample until all four probe tips contact the surface of the test sample. The contact event is detected by monitoring resistances between the probe tips (D1 paragraph [0056]).
10. It is, moreover, uncontested that claim 1 is distinguished from D1 by the following three features:
  - b) a switched impedance detection element connecting the pair of electrodes of the multi-point probe which are connected to the electric generator means;



c) electrical detector means for detecting a measuring signal from an electrical signal across the switched impedance detection element; and

e) the resistive element of the differential voltage to current converter is a precision resistive element.

11. Since the proprietor concedes that the provision of a precision resistive element (feature e)) would not contribute to inventive step, this feature is not considered further in the following analysis.
  
12. The proprietor submits that, when employing the system of D1, it was difficult to detect contact with low conductivity surfaces with any degree of certainty. Without a clear indication that contact had been established, the user would continue to move the probe towards the surface, resulting in damage or destruction of the probe tips. As set out in paragraph [0018] of the contested patent, the technical effect of features b) and c) was that the probe could detect contact with different test samples over a wide range of conductivity. In addition, the fact that the impedance element was defined as a "switched impedance detection element" meant that the detection element could be switched in for the contact detection, but switched out when the measurements were being performed to avoid any influence on the measurement signal.
  
13. The proprietor considers that the problem to be solved by features b) and c) was, therefore, to modify the multi-point testing apparatus of D1 to obtain an electrical feedback detection system which provided a

detection mode in which a clear indication of contact, irrespective of the conductivity of the surface, could be achieved. The same probe should be able to register contact over a range of high and low conductivity surfaces.

14. Following a first line of argument, the opponent submits that, for detecting contact with a test surface, the skilled person would look in the field of resistance detection, and in particular in the field of electrical feedback detection systems. Local resistance (multi-probe) detectors, which measure the conductivity between two spaced pins, would have been an obvious place to look for a solution to the above problem. However, citing T 176/84 *Stiftspitzer* OJ 1986, 50 and T 195/84 *General technical knowledge* OJ 1986, 121, the opponent submits that the skilled person would also look for suggestions beyond the specific field of local resistance detectors. The skilled person was an electrical engineer and would be familiar with various types and applications of resistance sensors. She would, therefore, be aware of the fact that leakage sensors employed the same detection principle as D1, namely conductivity measurement using two electrodes to detect when a conducting path is established between the electrodes. They also provided a yes/no feedback indicating the presence/absence of a leak. More significantly, since the conductivity of liquids could vary over a large range, the same problems as experienced in D1 would also arise with leak detectors monitoring leakage of low-conductivity fluids. The skilled person would, therefore, consult leak detectors insofar as they were based on conductivity measurements.

15. The opponent further considers that this would lead the skilled person to D2, which disclosed a leak detector comprising two separated electrical contacts which may be electrically bridged by a conducting liquid. Page 2, lines 4-8, of D2 mentioned the problem of low conductivity measurements. The circuitry of D2 enabled even small changes in the voltage across the detector contacts to be detected. This effect was achieved by connecting a resistor 4 in parallel across the contacts. The resistor provided a stable, defined potential for the inverting input of the comparator 11 in the no-leak condition. A threshold potential was provided as the non-inverting input of the comparator 11. When a conducting liquid connected the electrodes, the potential at the inverting input would decrease below that of the non-inverting input and give rise to an alarm signal. The sensitivity of the detector could be adjusted by appropriate selection of resistance values. Although D2 did not disclose the use of a discrete switch for connecting the resistor across the electrodes, the resistor would effectively be switched out of the circuit when a connection was established between the two electrodes 2 and 3.
16. The opponent concludes that, in order to reliably detect contact with a low conductivity surface in D1, the skilled person would learn from D2 to connect a resistor between the two probes and to monitor any change in voltage across this resistor.
17. The Board cannot follow this line of argument.

18. In accordance with T 25/13 (reasons 2.3), the choice of starting point for the assessment of inventive step has implications for the technical knowledge of the skilled person. In the present case, D1 has been identified by all sides as the best starting point. This means that the skilled person has knowledge of multi-point probe systems for testing electrical properties at a specific location of a test sample. In accordance with T 176/84 (reasons 5.3.1) and T 195/84 (headnote), the skilled person would, as well as considering the state of the art in this specific technical field, look for suggestions in neighbouring fields or in a broader general technical field (see also Case law of the Boards of Appeal of the European Patent Office, 9th edition 2019, I.D.8.2). A neighbouring field is defined in T 176/84 as a field which is so closely related to the field of the contested patent that the person skilled in the art, seeking a solution to a given problem, would take developments in the neighbouring field into account.
  
19. Thus, the question to be answered is whether D2 belongs to a neighbouring field or a broader general technical field to that of the contested patent.
  
20. D2 concerns leakage in, for example, dishwashers and washing machines. The Board acknowledges that the leak detector of D2 employs the same principle as that of the probe of D1. Specifically, both D1 and D2 detect when a conductive path is established between two electrode tips.

21. However, the similarity between D1 and D2 ends there. In particular, the contexts in which this measurement principle is applied are totally different. D1 is a multi-point probe for testing electrical properties at a specific location of a test sample and is used, specifically, for analysing semiconductor integrated circuits. Measurements are made using the well-known four-point probe technique. In order to ensure that all four probe tips are positioned on the semiconductor wafer surface, the resistances between the probe tips are monitored as the tips advance towards the surface. In view of the configuration of the probe of D1, it is likely that the field of probe testers, in particular multimeters and four-point or two-point resistance measurement meters, would be a field which the skilled person would consult to find out how to provide a clear contact indication even when low-conductivity samples are used. The leak detector of D2 does not test electric properties of a surface in the sense of D1. The electrodes are not designed to be positioned at a specific location on the surface of a test sample. The leak detector of D2 therefore does not encounter the same problems as the device of D1 with respect to probe damage and destruction as a result of unreliable indications of a contact event. Whilst it could be argued that the leak detector of D2 might be suitable for measuring the resistance between two points on a surface, this is not the intended implementation of D2. The skilled person would only interpret D2 in this manner with the benefit of hindsight. D2, therefore, does not belong to a neighbouring field in the sense of a field in which the same or similar problems arise.
22. Nor does D2 belong to a general technical field which is broader than the specific field of D1. The leak

detector of D2 is a specific application of resistance detection and therefore does not represent a generalisation of the specific technology used in the field of multi-point probes for testing electrical properties of a test sample.

23. Consequently, the Board does not agree that, starting from the multi-point probe of D1, the skilled person would consult D2 in search of a solution to the problem of reliable detection of contact with low-conductivity surfaces. In particular, the Board does not consider that D2 belongs to a neighbouring field of, or to a more general field than, that of D1.
  
24. Following a second line of argument, the opponent submits that the objective technical problem had nothing to do with increasing the range of surface conductivities over which the probe could detect contact with. The open-circuit probe tips of D1 had an infinite resistance between them. This was the best condition for detecting a change in conductivity between the tips. Even a poorly conducting surface would give rise to a clear contact indication using this arrangement. The objective technical problem formulated by the proprietor was, therefore, erroneous.
  
25. Instead, the opponent submits that running the multi-point probe of D1 in open circuit would mean that the current source would be in compliance until the circuit was closed. As a result of this, when contact was made with the surface, a current spike would appear which could potentially damage the electronic circuitry, the probe tips or the sample under test. The technical

effect of the switched impedance element was, therefore, to limit the current source to its operating range and to prevent it going into compliance.

26. The opponent, finally, submits that the skilled person would never intentionally leave the output of a current source open and that, in order to limit the current source to its operating range, the skilled person would know to insert a shunt resistor between the electrodes to close the circuit. The basic principle of providing a shunt resistor in such a situation was common general knowledge and standard practice.
  
27. The Board agrees that the skilled person would place a shunt resistor across the open-circuit electrodes of D1 to prevent the current source going into compliance. It would, therefore, have been obvious to connect a shunt resistor across the top and bottom (outer) electrodes of Figure 10. The measurement circuit of Figure 10 is, however, connected across the two middle electrodes. Therefore, even if a shunt resistor were to be provided across the outer electrodes, this would not result in the features of claim 1 because an electrical detector means for detecting a measuring signal from an electric signal across the shunt resistor (feature c)) would not be present.
  
28. D2 is the only document cited by the appellant which could conceivably prompt the skilled person to provide such detection means. However, as shown above, it is only with the benefit of hindsight that the skilled person would look to D2. The skilled person would, therefore, not be aware of any teaching which would

suggest monitoring the voltage across the shunt resistor to provide an indication of a contact event.

29. Thus, although it would have been obvious to provide a shunt resistor across the pair of electrodes connected to the current source of D1, it would not have been obvious to provide an electrical detector means across such a shunt resistor.
  
30. Consequently, both lines of argument fail to show that the subject-matter of claim 1 derives in an obvious manner from the cited prior art and common general knowledge. The electrical feedback detection system of claim 1, therefore, involves an inventive step.



**Order**

**For these reasons it is decided that:**

The appeal is dismissed.

The Registrar:

The Chairman:



D. Hampe

P. Scriven

Decision electronically authenticated