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

**Case Number:** T 1485/14 - 3.4.01

**Application Number:** 06009611.2

**Publication Number:** 1698905

**IPC:** G01R1/073, G01R3/00

**Language of the proceedings:** EN

**Title of invention:**

Nano-drive for high resolution positioning and for positioning  
of a multi-point probe

**Patent Proprietor:**

Capres A/S

**Opponent:**

SmartTip BV

**Headword:**

Multi-point probe / Capres

**Relevant legal provisions:**

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

**Keyword:**

Grounds for opposition - fresh ground for opposition - not  
admitted

Inventive step (no)

**Decisions cited:**

G 0010/91



**Beschwerdekammern**  
**Boards of Appeal**  
**Chambres de recours**

Boards of Appeal of the  
European Patent Office  
Richard-Reitzner-Allee 8  
85540 Haar  
GERMANY  
Tel. +49 (0)89 2399-0  
Fax +49 (0)89 2399-4465

Case Number: T 1485/14 - 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  
(Opponent) Drienerlolaan 5  
7522 NB Enschede (NL)

**Representative:** Altenburg, Bernardus Stephanus Franciscus  
DOGIO Patents BV  
PO Box 2350  
1200 CJ Hilversum (NL)

**Respondent:** Capres A/S  
(Patent Proprietor) DTU Bygn. 373  
2800 Lyngby (DK)

**Representative:** Budde Schou A/S  
Hausergade 3  
1128 Copenhagen K (DK)

**Decision under appeal:** **Decision of the Opposition Division of the  
European Patent Office posted on 6 May 2014  
rejecting the opposition filed against European  
patent No. 1698905 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 claims 1 and 11 of the contested patent did not involve an inventive step and that the invention of claim 1 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, during which two new versions of the main (sole) request were filed. The Board indicated that it would consider only the second.
- V. The final requests of the parties were formulated as follows:

The opponent requested that the decision under appeal be set aside and that the patent be revoked.

The proprietor requested that the patent be maintained on the basis of amended claims 1-12, filed during oral proceedings before the Board.

VI. Claim 1 reads as follows:

*A multi-point testing apparatus (100) for testing electric properties on a specific location of a test sample (110), comprising: means (104) for receiving and supporting said test sample; electric properties testing means (106) including electric generator means for generating a test signal and electric measuring means for detecting a measuring signal; a multi-point probe (102), comprising: a supporting body (12) originating from a wafer body of a semiconducting material; a first multitude of conductive probe arms (14a, 18a; 14b, 18b; 14c, 18c; 14d, 18d) positioned in co-planar relationship with a surface (16) of said supporting body, and freely extending from said supporting body (12), giving individually flexible motion of said first multitude of conductive probe arms (14a, 18a; 14b, 18b; 14c, 18c; 14d, 18d); and said conducting probe arms (14a, 18a; 14b, 18b; 14c, 18c; 14d, 18d) originating from a process of producing said multi-point probe (102) including producing said conductive probe arms (14a, 18a; 14b, 18b; 14c, 18c; 14d, 18d) on said wafer body in facial contact with said wafer body and removal of*

*a part of said wafer body providing said supporting body and providing said conductive probe arms (14a, 18a; 14b, 18b; 14c, 18c; 14d, 18d) freely extending from said supporting body (12); said multi-point probe (102) communicating (114) with said electric properties testing means (106); and nano driving means (1701, 1703, 1705, 1707) configured for reciprocating said multi-point probe (102) relative said test sample (110) so as to cause said conductive probe arms (14a, 18a; 14b, 18b; 14c, 18c; 14d, 18d) to be contacted with said specific location of said test sample (110) for performing said testing of electric properties thereof.*

VII. In the present decision, reference is made to the following document:

D1: JP-A-8015318.

An English translation of D1 was filed with the notice of opposition. References to the text of D1 are taken from that translation.

VIII. 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. During the appeal proceedings, the opponent submitted that the claimed invention was insufficiently disclosed with respect to the process of producing the conductive probe arms in facial contact with the semiconductor wafer body. Moreover, the claimed facial contact between the conductive arms and the semiconductor wafer meant that the device would not work, since the arms would no longer be insulated from each other.
2. The only ground of opposition addressed in the notice of opposition was that of a lack of inventive step (Article 100(a) EPC). A lack of sufficient disclosure (Article 100(b) EPC) was not mentioned. The objection raised by the appellant under Article 100(b) EPC, therefore, is a fresh ground for opposition.
3. Claim 1 was amended during the oral proceedings before the Board to specify that the wafer body is in fact a *semiconductor* wafer body. However, since the "wafer body" of the granted claims encompasses a semiconductor wafer body, any objections with regard to this feature could have been raised with the notice of opposition.
4. In accordance with G 10/91 *Examination of opposition/appeals* OJ EPO 1993, 420, a fresh ground can only be introduced into the appeal proceedings with the consent of the patentee. Such consent has not been given.

*Article 100(a) EPC - inventive step*

5. It is not contested that D1 represents the best starting point for discussing inventive step.
  
6. D1 discloses a multi-point probe which is used to perform unspecified testing of liquid crystal panels. The probe is made up of an insulating base plate and a multitude of probe arms provided on a surface of the base plate. The arms extend from the base plate parallel to the surface on which they are provided. The probe is produced by depositing the arms on the base plate and then removing part of the base plate to leave the probe tips freely extending from the base plate. In use, the base plate is mounted on an inclined surface such that the probe tips point diagonally downwards. The resilience of the arms means that when the distal ends of the probes are pressed into contact with the electrode layer, all tips make contact with the LCD. The proximal ends of the probes are connected to an IC. The presence of this IC implies that the probe of D1 also comprises an electric measuring means for detecting a measuring signal. It is self-evident that some form of drive means must be provided, to bring the probe tips into contact with the electrodes of the LC panel. D1 indicates that the probe unit is "*pressured and placed in contact ... with the electrode layer*" (paragraph [0066]). This implies that it is the probe unit which is driven into contact with the LC panel, as opposed to the LC panel being moved in order to contact the probe. It was not contested that the probe of D1 is capable of reciprocal movement towards and away from the LC panel so as to cause the conductive probe arms to come into contact with a



specific location of the test sample for performing testing of the electric properties thereof.

7. It is not contested that the subject-matter of claim 1 is distinguished from the disclosure of D1 by the following features:

(i) electric generator means for generating a test signal;

(ii) the driving means configured for reciprocating the multi-point probe relative to the test sample is a nano driving means; and

(iii) the supporting body of the multi-point wafer is formed of a semiconductor material.

In addition, the proprietor was of the opinion that the subject-matter of claim 1 was further distinguished from the disclosure of D1 in that

(iv) the conducting probe arms originate from a process in which they are produced on the semiconductor wafer body *in facial contact with said wafer body*.

8. With regard to feature (iv), the proprietor notes that, in D1, the probe arms 3 were formed on a bonding layer 3' positioned between the probe arms and the base plate. There was, therefore, no facial contact between the base plate and the probe arms. The whole idea behind the facial contact provided by the invention was to improve the alignment of the probe tips: better tip alignment improved the electrical contact at the individual tips and reduced the wear and tear of the

probe. In contrast, the probe arms of D1 were embedded in the metallised conductive layer 3' and this compromised the alignment of the probe tips.

9. The Board cannot follow this argument. In D1, there is indeed an intermediate layer 3' between the "conductive leads" 3 and the surface of the base plate 2. However, the intermediate layer 3' is an elongated conductive layer disposed in a striped pattern with the same pitch as the conductive leads 3. Each lead 3 is electroplated on top of its respective elongated conductive layer. The leads are not "embedded" in the conductive layer, but are grown on top of it. In the embodiment of Figure 17 of D1, the leads extend along the whole length of the conductive stripes 3'. The probe arms can therefore be considered to be made up of not only the top conductive layer 3 but also the conductive layer 3'. On this interpretation, the probe arms (the integral structures made up of 3 and 3') are disposed in facial contact with the base plate 2. Feature (iv) is, therefore, known from D1.
  
10. Regarding feature (i), the proprietor admits that it was likely that the probe of D1 was made for active electrical measurements. The proprietor concedes that no inventive step was involved in providing an electric generator means for generating a test signal. This feature is, therefore, not considered further in the following analysis.
  
11. The proprietor further submits that the distinguishing features (ii) and (iii) were functionally interdependent since the use of a semiconductor wafer

as the base plate of the probe meant that the probe could be fabricated with tips which were more precisely aligned than those of D1. Whereas the precision of a nano-driving means would be wasted on a probe with misaligned tips, the improvement afforded by the semiconductor base plate would mean that a nano-driving means would in fact make sense in the present case.

12. The Board does not agree. As will be shown below, the probe tip alignment is by no means an inevitable consequence of the use of a semiconductor base plate. The alleged synergy therefore does not exist. As a result, features (ii) and (iii) may be treated separately when considering inventive step.
  
13. With regard to feature (iii), the proprietor also emphasises that the base plate of D1 was an insulating plate made of, e.g., glass, synthetic resin or ceramic. The use of a semiconductor wafer as the base plate in the claimed multi-point probe improved the planarity of the body on which the arms were to be disposed. This increase in planarity improved the alignment of the probe tips which, in turn, gave rise to improved electrical contact at the individual tips and reduced wear and tear of the probe. In addition, the provision of a semiconductor wafer as the base plate implied the use of etching techniques in the fabrication of the probe. This not only contributed to better tip alignment, but also permitted the production of a nano-scale probe. The claimed device could therefore be used for testing integrated circuits, whereas the ceramic probe of D1 was a larger scale and was only suitable for larger devices such as the LCDs discussed in D1. Moreover, etching techniques resulted in a simpler

manufacturing process to that used in D1. The technical effect of feature (iii) was therefore the straightforward production of a nano-scale probe with improved tip alignment.

14. The Board does not agree. The alleged advantages and the resulting technical effect do not inevitably derive from the use of a semiconducting base plate. In particular, claim 1 does not define that the production process used for fabricating the arms is an etching process. Any advantages associated with etching techniques must therefore be disregarded. Moreover, claim 1 contains no indication of the dimensions of the probe, so a smaller size cannot be cited as an advantage. The planarity of the base plate is not an inevitable consequence of using a semiconducting wafer: a rough-cut wafer would not exhibit the evenness and the resulting tip alignment which the respondent is suggesting. In addition, as pointed out by the opponent, the probe structure comprises resilient arms which can flex independently of each other. It is therefore not important whether the probe tips are accurately aligned. It is the resilience of the probe arms which enables reliable contact with the test sample, without undue pressure being applied to any one feature of the test sample. This advantage stems from the flexibility of the probe arms and will be achieved even if the surface of the test sample is uneven or the probe tips are misaligned. Therefore, potential planarity of the semiconductor wafer cannot be seen to be an advantage in the context of claim 1.
15. The assessment of inventive step can only be based on those elements of the invention in respect of which a

technical effect can be established. Alleged advantages which do not derive from the features of the claim, cannot be taken into consideration in determining the problem underlying the invention and therefore in assessing inventive step.

16. In the present case, the provision of a semiconductor wafer as the base plate in the probe of D1 would not necessarily solve the problems of simplifying the fabrication process, providing an improved tip alignment, or achieving nano-scale dimensions. The only technical effect that can be recognised in this feature is the provision of an alternative material for the base plate. On the basis of this technical effect, however, the selection of a semiconductor material represents just an arbitrary choice from a host of possible solutions. Since the proprietor has failed to identify any technical effects which would distinguish the semiconductor wafer from the other possible solutions, no inventive step can be recognised in this selection.
  
17. Regarding feature (ii), it is not clear what is meant by the term *nano-driving means* (emphasis added). This term does not define a precise resolution of the driving means and contains no precise indication of the exact distances over which the driving means can move the probe. The only indications in the contested patent with regard to the dimensional capability of the nano-driving means are in claim 10, which indicates that the nano-driving means has a resolution in the range of 1nm up to 100nm, and in paragraph [0057], which indicates that the probe holder can be moved with a resolution of 100nm or better. So the term *nano-driving means* does

not necessarily have to be interpreted to mean a driving means capable of moving the probe with a resolution as low as 1nm.

18. The proprietor submits that the probe of D1 was for testing LCDs. The dimensions involved were much larger than nano-scale. Although D1 contained no discussion of the driving means, the context in which it was used meant that it would certainly not have a nano-scale resolution. Moreover, the expense of a nano-driving means could not be justified if the probe tips were misaligned, as they would be in D1. The technical effect of the nano-driving means was the ability to position the probe tips very precisely. This was clearly an advantage on uneven sample surfaces as it prevented the tips crashing into the surface. This precision would ultimately reduce wear and tear and destruction of the tips.
19. The Board cannot follow this argument.
20. Firstly, it is not the nano-driving means which is responsible for mitigating any unevenness in the sample surface. This problem is addressed by the flex afforded by the cantilever structure of the probe arms. Any surface irregularities are accommodated by the flex. This is the *raison d'être* of such cantilever-type probe arms.
21. Secondly, although D1 mentions the testing of LCDs, the probe unit itself is by no means restricted to LCD testing. D1 discloses a probe which can be brought into

contact with any device under test (DUT). The driving means is provided to establish contact at the surface of the DUT. If this is to be performed without damaging the probe tips when approaching the sample surface, a driving means must be selected in order to be able to move the probe towards the surface with the appropriate resolution. If the DUT had components with height dimensions in the nano-metre range (say, up to 100nm), it would have been obvious to use a driving means capable of moving the probe tip with a similar resolution. No inventive step can therefore be seen in the provision of a nano-driving means.

22. In conclusion, the subject-matter of claim 1 is not patentable.

**Order**

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

The decision under appeal is set aside.

The patent is revoked.

The Registrar:

The Chairman:



D. Hampe

P. Scriven

Decision electronically authenticated