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**Datasheet for the decision  
of 22 May 2024**

**Case Number:** T 2482/22 - 3.2.04

**Application Number:** 17792830.6

**Publication Number:** 3437536

**IPC:** A47L9/28, G05D1/02, B25J11/00,  
B25J9/00, B25J9/16, B25J19/02,  
A47L9/30, A47L9/00

**Language of the proceedings:** EN

**Title of invention:**  
CLEANING ROBOT AND CONTROL METHOD THEREFOR

**Patent Proprietor:**  
Samsung Electronics Co., Ltd.

**Opponent:**  
Aurigium Leischner & Luthe Patentanwälte  
Partnerschaft mbB

**Headword:**

**Relevant legal provisions:**  
EPC Art. 56  
RPBA 2020 Art. 13(2)

**Keyword:**

Inventive step - (yes)

Amendment after summons - exceptional circumstances (no) -  
taken into account (no)

**Decisions cited:**

**Catchword:**

Reasons 3



**Beschwerdekammern**

**Boards of Appeal**

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Case Number: T 2482/22 - 3.2.04

**D E C I S I O N**  
**of Technical Board of Appeal 3.2.04**  
**of 22 May 2024**

**Appellant:** Aurigium Leischner & Luthe Patentanwälte  
(Opponent) Partnerschaft mbB  
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**Respondent:** Samsung Electronics Co., Ltd.  
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**Representative:** Walaski, Jan Filip  
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**Decision under appeal:** **Decision of the Opposition Division of the  
European Patent Office posted on 7 October 2022  
rejecting the opposition filed against European  
patent No. 3437536 pursuant to Article 101(2)  
EPC.**

**Composition of the Board:**

**Chairman** A. de Vries  
**Members:** C. Kujat  
M. Millet

## **Summary of Facts and Submissions**

- I. The appeal lies from the decision of the opposition division of the European Patent Office rejecting the opposition filed against European patent No. 3 437 536 pursuant to Article 101(2) EPC.
- II. The opposition division held that the patent and the invention to which it related met the requirements of the EPC, having regard inter alia to the following pieces of evidence:
- D1: EP 2 781 981 A2  
D2: US 2015 168 541 A1  
D3: WO 2008 / 008970 A2  
D4: US 2014 / 0111812 A1
- III. The appellant opponent requests that the decision under appeal be set aside and that the European patent No.3 437 536 be revoked.
- IV. The respondent proprietor requests that the decision under appeal be upheld and that the patent maintained as granted (as main request), or in an amended form on the basis of the first to fourth auxiliary requests filed with their reply to the statement setting out the grounds of appeal.
- V. In preparation for oral proceedings the Board issued a communication pursuant to Article 15(1) RPBA setting out its provisional opinion on the relevant issues. Oral proceedings were duly held on 22 May 2024.
- VI. Independent claims 1 and 12 according to the relevant main request (patent as granted) read as follows:

"1. A cleaning robot (100) comprising:  
a light emitter (141) configured to radiate light,  
characterised in that the cleaning robot (100)  
comprises further a plurality of light receivers (143)  
configured to receive a radiation of the light in a  
predetermined direction among radiations of the light  
reflected from an obstacle when the radiated light is  
reflected from the obstacle;  
a support plate (145) to which the light emitter ( 141)  
and the light receivers ( 143) are fixed and which is  
rotatably provided; and  
a controller (110) configured to detect the obstacle on  
the basis of output signals transmitted from the light  
emitter and the plurality of light receivers and  
rotation information of the support plate."

"12. A method of controlling a cleaning robot (100)  
including a light emitter (141) configured to radiate  
light,  
characterised in that a plurality of light receivers  
(143) configured to receive a radiation of the light in  
a predetermined direction among radiations of the light  
reflected from an obstacle when the radiated light is  
reflected from the obstacle, and  
a support plate (145) to which the light emitter and  
the light receiver are fixed and which is rotatably  
provided,  
the method comprising:  
collecting obstacle information from the light emitter  
and the plurality of light receivers;  
collecting rotation information of the support plate  
from a rotary drive unit (147); and  
detecting the obstacle on the basis of output signals  
transmitted from the light emitter and the plurality of  
light receivers and the rotation information of the  
support plate."

VII. The opponent as appellant argued as follows:

The objection of lack of novelty over D1 should be admitted. The subject-matter of claims 1 and 12 of the main request does not involve an inventive step over D1 or D2 in combination with D3.

VIII. The proprietor as respondent argued as follows:

The objection of lack of novelty over D1 should not be admitted. The subject-matter of claims 1 and 12 of the main request involves an inventive step over the cited prior art.

### **Reasons for the Decision**

1. The appeal is admissible.

2. *Background*

The invention concerns a cleaning robot and a method of controlling a cleaning robot. The cleaning robot comprises an optical sensor for identifying obstacles in its surroundings with a light emitter 141 and a plurality of light receivers 143. These light receivers are configured to receive a radiation of the light in a predetermined direction among radiations of the light reflected from an obstacle when the light is reflected from an obstacle. The light emitter and the light receivers are located on a rotatable support plate 145. A controller 110 detects the obstacles on the basis of the output signals transmitted from the light emitter and the light receivers, see figures 8, 11 and 12 of the patent in suit. The use of a plurality of light receivers is an improvement over conventional cleaning robots with a single receiver. Such a conventional

arrangement needs to be tilted mechanically in order to detect obstacles on different levels or to measure the height of obstacles. This is slow and leads to mechanical wear of the tilting mechanism, see paragraph 0004 of the patent.

3. *Admittance of the objection of lack of novelty over D1*

During oral proceedings before the Board, the appellant requested that an objection of lack of novelty over document D1 be admitted into the proceedings. This new line of attack constitutes an amendment to the appellant's case in the sense of Article 13 RPBA 2020 read in conjunction with Article 12(4) RPBA 2020.

3.1 Pursuant to Article 13(2) RPBA 2020, any amendment to a party's case made after notification of a summons to oral proceedings, in principle shall not be taken into account unless there are exceptional circumstances which need to be reasoned by the party concerned. The appellant's present representative justified the late submission by arguing that he took over the case from a colleague, who had overlooked the novelty objection when he drafted the grounds of appeal. The appellant also argued that it because this concerns a European patent it is of utmost importance that there be no doubts concerning validity.

3.2 None of these arguments convince the Board for the following reasons:

As regards the meaning of the term "exceptional circumstances" in Article 13(2) RPBA 2020, it is established jurisprudence of the boards that such circumstances concern new or unforeseen developments in the appeal proceedings, such as new objections raised

by the board or another party, see CLBA, 10th edition 2022, V.A.4.5.4.a) ff. In the present case, the appellant had already overlooked that objection when they drafted the notice of opposition, see page 8, last paragraph of the notice, where it is stated that "D1 does not disclose a plurality of light receivers". The notice of opposition is signed by the appellant's present representative. Thus, the fact that another representative of the appellant, the former representative who had signed the grounds of appeal, overlooked the novelty objection when drafting the grounds of appeal is not a development of the appeal proceedings, let alone a new or unforeseen one. The appellant alone must bear the responsibility for any such errors and mistakes.

The appellant's further argument puts emphasis on the patent being a European patent, implying, as the Board understands it, that the legitimacy of the European patent system depends on the strength of validity of patents issued by it, and that therefore any concerns of validity must trump any other considerations, e.g. those of procedural economy and transparency or the nature of appeal proceedings as a judicial review. As is evident from Art 12(2) of the Rules of Procedure of the Boards of Appeal 2020 as adopted by Decision of the Administrative Council of 26 June 2019, the legislator saw this quite differently. They see the appeal proceedings primarily as a judicial review of a decision and a party should direct their appeal case at the requests, facts, objections, arguments and evidence on which the decision under appeal is based. As a consequence the possibility of a party to change their case or add to it is very limited, increasingly so as the appeal procedure progresses, see document CA/3/19, points 47 and 48, explaining the convergent approach



underlying the provisions Articles 12 and 13, as well as the explanatory remarks to these articles in the table from that document reproduced in OJ EPO 2020, Supplementary publication 2. These articles lay out the criteria by which the Boards shall exercise their discretion when considering amendments to a party's appeal case, i.e. request, facts, objections, arguments and evidence that lie outside those on which the decision is based. Articles 12(4) and 13(1) do still include criteria that can be seen as reflecting on the merit or relevance of any such new material (e.g. suitability to address issues) albeit subject to justifying reasons. Indeed and following established case law (G7/95, OJ EPO 1996, 626), at an early appeal stage it might still be possible to consider novelty, even if not raised before, vis-a-vis a closest prior art already cited against inventive step, but then only in the context of assessing inventive step. However, such criteria are entirely absent from the wording Art 13(2), which was purposely chosen to express the much more stringent criterion applicable at this the most latest stage of the appeal proceedings. Thus, merit or relevance is not somehow subsumed in the sole criterion of "exceptional circumstances", which, as is clear from the examples, can only reflect on circumstances that arise from the way the proceedings have developed, i.e. the procedure itself and not its subject.

- 3.3 Thus, the Board sees no exceptional circumstances that justify the late filing of this objection. Therefore it found it appropriate not to admit the appellant's objection of lack of novelty over D1 into the proceedings, Article 13 (2) RPBA 2020.

4. *Inventive Step*

The opponent as appellant disputes the decision's finding that the subject-matter of granted claims 1 and 12 involves an inventive step over each of documents D1 or D2 in combination with D3. At the oral proceedings before the Board they indicated not to have any further inventive step attacks.

4.1 The Board concurs with the parties that documents D1 and D2 each constitute a suitable starting point for the assessment of inventive step. It is common ground that these documents relate to domestic cleaning robots, see the reference to a small vacuum cleaner for home use on page 8 of the grounds of appeal and the reference to a domestic cleaning robot in paragraph 2.2.2.1 of the impugned decision. D1 discloses a cleaning robot with a rotatable sensor unit 120 and a location calculation unit 140 for determining the distance from obstacles within 4 m to 5 m of the cleaning robot. The sensor unit includes a light emitting unit and a light receiving unit, and the location of an obstacle is determined by triangulation, see paragraphs 0036-0038, 0053 and 0064 and figure 1 of the document. Document D2 also discloses a cleaning robot with distance measuring device 300 comprising a light transmitter 310 and a light receiver 320 and also uses triangulation, see paragraphs 0044 and 0089, as well as figures 2 and 9 of the document.

4.2 In order to apply the problem-and-solution approach, the Board must now determine the distinguishing features over these domestic cleaning robots. In their statement of grounds the appellant acknowledged the finding of the decision under appeal, section 2.2.2.1, that documents D1/D2 do not disclose a plurality of

light receivers, see pages 9 and 11 of the grounds of appeal ("Thus, D2 discloses all part-features of feature F5 except a plurality of light receivers according to feature F3." and "D1 does not disclose a plurality of light receivers."). This view also underlies the further arguments submitted in their reply of 3 July 2023, which, concerning the combination of D1 or D2 with D3 or D4, focussed mainly on the combinability of these teachings. This view is the starting point for the discussion below.

4.3 Based on the effect that a sensor system with a plurality of light receivers senses more target points in an environment during a specific period, the objective problem as proposed by the appellant-opponent of providing a sensor system with improved obstacle detection capabilities may be formulated.

The Board must therefore now examine whether a skilled person would as a matter of obviousness modify the light receiver in D1/D2, considered to be a single light receiver, by changing its structure in order to arrive at a plurality of light receivers configured to receive a radiation of the light in a predetermined direction among radiations of the light reflected from an obstacle when the radiated light is reflected from the obstacle.

4.4 In accordance with established jurisprudence, the Boards of Appeal apply the "could-would approach". This means asking not whether the skilled person *could* have carried out the invention, but whether they *would* have done so in the hope of solving the underlying technical problem (CLBA, 10th edition 2022, I.D.5). The appellant-opponent argues that the skilled person could arrive at the claimed cleaning robot by adding additional light receivers to the sensor systems of D1/

D2 in order to improve its obstacle detection capabilities, and would be incited to do so by document D3. However, the board is not convinced that the skilled person would do so for the following reasons:

- 4.4.1 Document D3 is directed to an autonomous passenger vehicle such as a pick-up travelling outdoors on a road or highway and in harsh weather conditions such as fog and heavy rain. The vehicle comprises a LIDAR sensor, i.e. Laser Imaging Detection and Ranging, for mapping the terrain and detecting obstacles by determining time of flight (TOF) for distant points in its field of view, see paragraphs 0011 and 0031, as well as figure 14 of that document. This Lidar sensor, to which the appellant refers on page 10 of their grounds of appeal, comprises two assemblies of grouped pairs of laser emitters and corresponding photo detectors. These pairs, in which the Board considers the laser a light emitter and the photo detector a light receiver, are physically aligned in different angles, ranging from above horizontal to approximately  $-24^\circ$ ), see paragraph 0035 of the document.
- 4.4.2 While the board accepts that D1/D2 and D3 belong to neighbouring technical fields, there are simple geometric constraints which dissuade the skilled person from considering D3. The sensor arrangement disclosed in that document is part of a navigation system fitted onto the cabin of a pick-up truck, see paragraph 0044 and figure 7, and has inclination angles of its light detectors such that they are aligned at a longer distance of 500 feet, i.e. 152.4 m, and at a shorter distance of 20 feet, i.e. 6,096 m, in front of the vehicle, see paragraph 0035. In the Board's view, the longer distance is needed to provide enough reaction time when travelling at high speeds on a highway. While

paragraph 0011 of D3 indeed suggests the possibility of downscaling the sensor system, there is no indication in the document that the alignment points / inclination angles of the detectors may be changed, and this has not been argued by the appellant, see page 7 of their letter of 3 July 2023. Therefore, even if the skilled person would only extract the basic idea of D3, as argued by the appellant, they would maintain the corresponding inclination angles of the two assemblies of grouped pairs of laser emitters and corresponding photo detectors. In the Board's view, the cabin of a typical pick-up truck has a height of 1,8 m while a typical domestic cleaning robot has a height of 0,1 m. Therefore, if the sensor arrangement of D3 is mounted on such a cleaning robot, the inclination angle  $\alpha_{\text{LONG}}$  for the longer distance can be obtained by the following equation:

$$\tan \alpha_{\text{LONG}} = 1,8 \text{ m} / 152,4 \text{ m} == 0,1 \text{ m} / x$$

$$\rightarrow x = 0,1 / 1,8 * 152,4 \text{ m} = 8,4666 \text{ m}$$

This leads to an alignment point of the longer distance sensor which would be 8,4666 m in front of the cleaning robot.

- 4.4.3 The Board is not convinced that such a long distance is suitable for using the robotic cleaner in a domestic environment, since that is far beyond the distance at which a domestic vacuum cleaner detects obstacles. Instead, a further modification of the light receivers is needed in order to render the sensor according to the basic idea of D3 suitable for a domestic cleaning robot. Such a further modification requires a level of abstraction on the part of the skilled person of the teaching of D3 that in the Board's view goes beyond

their normal skill. The board is therefore not convinced that the skilled person would consider D3 for improving the obstacle detection of the vacuum cleaners known from D1/D2.

4.5 From the above it follows that a skilled person will not arrive at the subject-matter of claim 1 starting from each of D1 or D2 in combination with D3 in an obvious manner. Therefore, claim 1 of the main request involves an inventive step in the light of this prior art.

4.6 Independent method claim 12 is directed to a method of controlling a cleaning robot with a plurality of light receivers. As the obstacle is detected on the basis of the output signals transmitted from the plurality of light receivers, the above assessment of inventive step applies to claim 12 *mutatis mutandis*.

5. In conclusion the Board finds that the decision was right to hold that the subject matter of claims 1 and 12 of the main request, patent as granted, involves an inventive step, Articles 100(a) and 56 EPC.

The appeal thus fails.

**Order**

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

**The appeal is dismissed.**

The Registrar:

The Chairman:



G. Magouliotis

A. de Vries

Decision electronically authenticated