Opinion Number

OPINION UNDER SECTION 74A

Patent	EP3030943B
Proprietor(s)	Papst Licensing GmbH & Co. KG (previously Robart GmbH)
Exclusive Licensee	
Requester	Elkiner IP Ltd
Observer(s)	Marks & Clerk LLP
Date Opinion issued	01 May 2025

The request

1. The comptroller has been requested by Elkiner IP Ltd ("the requester") to issue an opinion on the validity of Patent EP3030943B ("the Patent") in the name of Papst Licensing GmbH & Co. KG (previously Robart GmbH). In particular, the requester has argued that the Patent is not novel or inventive based on the following prior art references:

"Reference 1": US2012/0109376A1 - LEE SEONGSU [KR] et al, published 3 May 2012 (referred to as D6 during pre-grant).

"Reference 2": "User-centered Approach to Path Planning of Cleaning Robots: Analyzing User's Cleaning Behavior", Hyunjin Kim et al. XP040057714", published in 2007 (referred to as D1 during pre-gant).

"Reference 3": US6,667,592B2 – Intellibot LLC, published 23 December 2003.

"Reference 4": KR10-0730311B1 – Acerobot Co Ltd., published 19 June 2007 (referred to as D3 during pre-grant).

2. The requester also considers the Patent to be invalid as the claims relate to excluded subject matter, and also as the invention is not sufficiently disclosed.

Observations

- 3. Observations were received from Marks & Clerk LLP ("the observer"). The observations included arguments as to why the request should not be considered and why Patent was valid.
- 4. Observations in reply were subsequently received from the requester.

Preliminary Matters

- 5. During the pre-grant process at the European Patent Office the examiner specifically considered References 1,2&4 (referred to a D6,D1&D3 respectively during the pre-grant process).
- 6. The requester has asked that I reconsider Reference 1 for novelty in light of their "rebuttals" to the applicant's arguments that should have been raised during the pregrant process. It is not entirely clear whether the requester wishes me to consider Reference 4 with regard to novelty – but I shall assess such a request nonetheless.
- 7. Whilst it is somewhat unclear as to the extent of the request (particular with regard to various 'combinations' of the References), the requester is also seeking an opinion with regard to inventive step and References 1 to 4.
- 8. Whilst the requester has correctly noted that pre-grant considerations do not constitute relevant proceedings under rule 94(1)(b), Section 74A(3) of the Patents Act 1977 states:

The comptroller shall issue an opinion if requested to do so under subsection (1) above, but shall not do so -

...

(b) if for any reason he considers it inappropriate in all the circumstances to do so.

- 9. This is the grounds upon which it may be inappropriate to issue an opinion where a question has already been considered pre-grant. The established practice of the Office¹ is that an opinion request must raise something new, rather than merely seeking to cover old ground. In particular, the opinion request should raise a new question. It is not appropriate to revisit in an opinion any question that has clearly been considered during examination. I note that in decision BL O/370/07, the hearing officer concluded that a request for an opinion on validity which argues on the basis of prior art that was cited as category "X" or "Y" in the search report, or as part of a substantive objection at any other time in the examination procedure, is, other than in exceptional circumstances, unlikely to clear the hurdle of raising a new question or argument.
- 10. I believe that the requester is merely seeking to cover old ground with regards to the issue of novelty and References 1&4. This has clearly been considered in the examination reports dated 14 August 2019 and 20 December 2018 (respectively) and does not raise a new question. Furthermore, I do not see how the examiner's decision was 'clearly perverse'². <u>Therefore, my opinion will not consider the issue of novelty with regard to References 1&4</u>.
- 11. The requester has also asked that I consider the issue of novelty with respect to Reference 3. This document was referred to in the description of the application as

¹ See decisions BL O/370/07, BL O/289/07 and BL O/298/07

² See paragraphs 32-35 of BL O/370/07

filed (and in the published Patent). The observer considers that Reference 3 has already been implicitly considered by the Examining Division and therefore this part of the request should also not be considered. However, Reference 3 was not cited in the search report or cited by the examiner during the examination procedure and so would prima facie appear to raise a new question. <u>My opinion shall therefore consider Reference 3 with regard to novelty.</u>

- 12. The requester has further asked that I consider References 1 to 4 with regard to inventive step. They have argued that the claims are not inventive in light of either Reference 1 or 3 and common general knowledge ("CGK") and have also argued that *all* cited References 1 to 4 should be considered alongside one another and in combination with CGK. They have also provided 'rebuttals' to the applicant's arguments made during pre-grant processing regarding Reference 2 and inventive step.
- Firstly, as discussed above with regard to the issue of novelty, the examiner did not raise an objection based on Reference 3 – <u>therefore my opinion shall consider</u> <u>Reference 3 with regard to inventive step</u>.
- 14. It is clear that the issue of Reference 2 and inventive step has been considered during examination following the Written Opinion of the International Searching Authority dated 24 April 2014– and merely 'rebutting' the comments made during examination does not raise a new question. Nor was the examiner's decision 'clearly perverse'.
- 15. Reference 1 has also been considered for inventive step by the examiner in particular as Reference 1 was the basis of a novelty objection in the report dated 14 August 2019 and arguments were submitted in the applicant's response dated 21 February as to why the claims were inventive in light of Reference 1. Similarly, Reference 4 was the basis of a novelty objection in the report dated 20 December 2018 and arguments were submitted in the applicant's response dated 21 June 2019 as to why the claims were inventive in light of Reference 4.
- 16. The use of a 'combination' of References 1 to 4 is more nuanced as to whether a 'new question' is being asked. Whilst Reference 3 (which was not cited during pre-grant processing) is offered, at least in part, as evidence of the common general knowledge of the skilled person, it does not seem to me that this identification of CGK raises a genuinely new question with regard to any of References 1,2&4 as the question of inventive step for these References was considered before grant³.
- 17. <u>Therefore, my opinion will not consider the issue of inventive step with regard to</u> <u>each of References 1,2&4 respectively</u>.
- 18. The requester has also argued that the References can be 'combined' or 'mosaicked' to indicate a lack of inventive step. In their initial letter, the requester suggests that "in order to establish whether the claims are obvious, <u>all</u> cited References 1 to 4 should be considered alongside one another and in combination with the acknowledged CGK of the notional skilled person". This is somewhat unclear as to what is being requested with regards to inventive step and what 'new

³ I note the examiner in opinion 28/24 reached a similar conclusion at paragraph 30

question' is being raised. In their observations in reply, the requester expands on this somewhat by stating "the Patent lacks an inventive step in view of Reference 1 and Reference 2 in combination with the CGK and Reference 2 and Reference 3 in combination with the CGK"

- 19. As <u>all</u> of the References 1,2&4 have been considered for inventive step by the examiner, I do not think a request that I consider various 'combinations' of these references (such as a lack of inventive step in view of Reference 1 and Reference 2 in combination with the CGK as discussed generally in the observations in reply) raises a new question. <u>Therefore, my opinion will not consider the issue of inventive step with regard to any of References 1,2&4 in combination</u>.
- 20. However, the combining or mosaicking of <u>all</u> of References 1 to 4, or mosaicking Reference 2 and Reference 3 in combination with the CGK would not appear, prima facie, to have been considered by the examiner pre-grant and therefore arguably raises a new question. <u>My opinion will therefore consider whether all of References 1 to 4</u>, or <u>Reference 2</u>, <u>Reference 3 and CGK can be combined to indicate the claims of the Patent are obvious</u>.

The Patent

- 21. The Patent was filed on 6 August 2013 as an international PCT patent application designating Europe (GB). On entry into the European regional phase, the application was allocated the European application number EP13747828.5. The Patent was granted as EP3030943B on 7th October 2020. I would note that there is no English translation of the description available for EP3030943B (which is in German), and none has been provided for me by the requester.
- 22. The Patent relates to a floor cleaning device 10 which is self-propelled and self-steering, i.e. a cleaning robot. The device 10 has a storage unit 32, a control unit 20 and a sensor unit 42 see Figure 2 reproduced below. Maps of rooms can be stored in the memory unit 32 as well as at least one cleaning plan having a cleaning task(s). Figure 3 shows, by way of example, three maps of rooms 52, 54, 56, which can be stored in the memory unit 32 in the floor cleaning device 10. Features contained in the maps of the rooms 52, 54, 56 can be used by the floor cleaning device 10 to determine in which room 52, 54, 56 the floor cleaning device is located. In particular, the floor cleaning device 10 can examine a room in which it is located via the sensor unit 42, and signals from the sensors of the sensor unit 42 can be examined by the control unit 20 so as to check for presence of the features of the maps stored in the memory unit 32.
- 23. Accordingly, the user can specify a cleaning plan with at least one cleaning task for the floor cleaning device 10. For example, the cleaning plan could contain the cleaning task to first clean room 54 and then a cleaning task for room 52, with no cleaning task for room 56. When the device 10 is positioned in room 52 (which is separated from room 54 by physical boundaries e.g. on different floors), the device 10 can undertake an investigation of the room, by way of the sensor unit 42, and features are checked for their presence in the maps stored in the storage unit 32. Using the features stored in the maps, the device 10 can determine that it is in the room 52. As the cleaning plan provides for the cleaning task for room 54 to be carried out first, the step of determining that the floor cleaning device 10 is located in

room 54 gives a negative result. The execution of the cleaning task assigned to room 54 is not carried out, interrupted, or terminated by the floor cleaning device 10.





24. The Patent has two independent claims 1&10. Independent method claim 1 has been broken down into integers (a) to (g) by the requester and observer, and reads as follows:

(a) A method for operating a self-propelling and self-steering floor-cleaning device,

(b) wherein at least one map of at least one room (52, 54, 56) to be cleaned is stored in a storage unit (32) of the floor-cleaning device (10),

(c) as is a user-predeterminable cleaning plan having one or more cleaning tasks, wherein at least one cleaning task is associated with a particular room (52, 54, 56) that is identifiable from the at least one map, and the floor-cleaning device (10) is placed in a room (52, 54, 56), characterized in that the method comprises

(d) - when the cleaning plan is executed, examining, by means of a control unit (20) of the floor-cleaning device (10), at least one sensor signal of the sensor unit (42) of the floor-cleaning device (10) for features indicative of the room (52, 54, 56) in which the floor-cleaning device (10) is located;

(e) - checking whether the features are present in the map stored in the at least one storage unit (32)

(f) - determining, before or during the performance of the cleaning task, whether the room (52, 54, 56) in which the floor-cleaning device (10) is placed is the particular room (52, 54, 56);

(g) and, if the result of this determination is negative:- not carrying out, interrupting or ending the performance of the cleaning task associated with the particular room (52, 54, 56)

25. Independent claim 10 is of substantially similar scope, and reads:

A self-propelling and self-steering floor-cleaning device for performing the method in accordance with one of the preceding claims, comprising:

- a travelling gear (12) for moving the floor-cleaning device (10) on a floor surface;

- a cleaning unit (22) for cleaning the floor surface
- a control unit (20) coupled to the travelling gear (12) and the cleaning unit (22)
- a control unit (20) coupled to the sensor unit (42); and

- a storage unit (32) that is coupled to the control unit (20), in which at least one map of at least one room (52, 54, 56) to be cleaned is stored, as is a userpredeterminable cleaning plan having one or more cleaning tasks, wherein at least one cleaning task is associated with a particular room (52, 54, 56) that is identifiable from the at least one map,

characterized in that the control unit (20)

- when the cleaning plan is executed, examines at least one sensor signal of the sensor unit (42) for features indicative of the room (52, 54, 56) in which the floor-cleaning device (10) is located;

- checks for presence of the features in the at least one map stored in the storage unit (32);

- determines before or during the performance of the cleaning task whether the room (52, 54, 56) in which the floor-cleaning device (10) is placed is the particular room (52, 54, 56); and in that, if the result of this determination is negative, performance of the cleaning task associated with the particular room (52, 54, 56) is not carried out, is interrupted or is ended.

Claim Construction

- 26. Before considering the References identified in the request, I need to construe claims 1&10 of the Patent, that is to say I must interpret the claims in the light of the description and drawings as instructed by Section 125(1). In doing so I must interpret the claims in context through the eyes of the person skilled in the art. Ultimately the question is what the person skilled in the art would have understood the patentee to be using the language of the claims to mean. This approach has been confirmed in the recent decisions of the High Court in *Mylan v Yeda*⁴ and the Court of Appeal in *Actavis v ICOS*⁵.
- 27. The requester has identified the notional person skilled in the art as a programmer engaged in the design and operation of autonomous cleaning machines. The observer does not appear to disagree with such an identification, and I consider this to be a suitable assessment of the skilled person.
- 28. Neither the requester nor the observer have identified any difficulties in construing the claims, and I agree that, in general, there are no particular issues with claim construction.
- 29. I would note that "performance of a cleaning task....is not carrying out, is interrupted or is ended" would be construed broadly by the skilled person. In particular the description (at paragraph 55) refers to "cleaning tasks" as including "passing over the room in accordance with a predetermined cleaning route or cleaning pattern", "cleaning particular regions of the room more intensively than other regions", omitting region of a room from cleaning, cleaning the room "in different ways" e.g. cleaned in a random manner, in a partly planned manner or in an entirely planned manner, or particular parts of the room are only swept, only vacuum cleaned or both vacuum cleaned and swept.
- 30. Regarding "not carrying out, interrupting ending" a cleaning task, it is my opinion that, given the broad nature of the possible cleaning tasks, "interrupting" would encompass changing/altering/adapting a cleaning task as well as 'pausing' the task. In particular, I note the example in paragraph 73 where a cleaning plan is 'changed' as a result of a negative determination.

The Prior art

Reference 1 - US2012/0109376A1

31. US2012/0109376A1 relates to a robot cleaner, with a detection unit to detect structures within a cleaning region, a storage unit to store information regarding the detected structures, such as a map, and a control unit to compare detected structure information before a stopped cleaning operation with detected structure information following a restart, and to initiate a cleaning operation with respect to the cleaning region by recognizing an absolute position of the robot cleaner based on the comparison. A position recognition module can compare detected image information,

⁴ Generics UK Ltd (t/a Mylan) v Yeda Research and Development Co. Ltd & Anor [2017] EWHC 2629 (Pat)

⁵ Actavis Group & Ors v ICOS Corp & Eli Lilly & Co. [2017] EWCA Civ 1671

with stored image information. Then, a position recognition module recognizes an absolute position of the robot cleaner based on a result of the comparison, where the absolute position can indicate a cleaning region among a plurality of cleaning regions or a room among a plurality of rooms.

32. FIG. 8 reproduced below refers to method for controlling a robot cleaner which involves (S310) detecting image information within a cleaning region. (S320) storing the detected image information detected, a second step (S360) of detecting image information within the cleaning region after re-starting a cleaning operation, an feature point extraction step (S370) of extracting one or more feature points from the image information detected in the second detection step and the image information stored in the storage step, a similarity feature point calculation step (S380), a similarity comparison step (S390) of comparing the similarities with each other, a position recognition step (S400) of recognizing an absolute position of the robot cleaner based on a comparison result in the comparison step, a region determination step (S410) of determining whether the cleaning region has been already cleaned based on a comparison result in the comparison step, and a cleaning execution step (S420) of executing a cleaning operation with respect to the cleaning region. If the similarity is less than a predetermined value as a result of the comparison or if the recognized position has been already cleaned, the robot cleaner moves to another cleaning region to execute the operations after the second detection step again (S430).



Reference 2 - User-centered Approach to Path Planning of Cleaning Robots:

Analyzing User's Cleaning Behavior

- 33. "User-centered Approach to Path Planning..." is a paper from the International Conference on Human-Robot Interaction (HRI) which considers a human's cleaning path – in particular that the human cleaning path is not optimal regarding time but optimal to the cleaning purpose. The paper analyses the cleaning behaviours in home environments and attempts to understand the user's path planning behaviours through usage tests of various vacuuming robots. The paper argues that the actual user cleans with methods unique to specific areas of the house rather than following an optimal cleaning path. A path planning method for the vacuuming robot is suggested by using a layered map, and also a cleaning area designating method reflecting each area's characteristics. Based on these, a vacuuming robot's actions have been designed.
- 34. The paper discusses that a home service robot is expected to recognize the given environment in order to perform the tasks as intelligently and autonomously as possible. By using space information, the robot is able to calculate its position, define the map and plan the moving path. Using sensors the robot can measure accurately its movement and thus estimates the map and its location. However, because there are many unexpected variables such as encountering an obstacle on the move, it is not actually accurate. And because the robot often does not have global map and does not know the exact location of itself, it is difficult to design an efficient path. The present robot with such type of navigation technology cannot recognize its location and cleans by drawing a random path or cleans after drawing a general map according to the walls.
- 35. The paper proposes to build a cleaning map divided by areas according to the cleaning characteristics; reflecting the structure of house such as room, door, etc. The paper goes on the discuss a map building method which recognizes furniture, floor material and 'difference of rooms', and proposes a layered cleaning map method (i.e. with one map covering the entire house along with other maps of small area groups defined to clean differently according to each map). Figures 13&14 reproduced below show the different paths based on a conventional path and a path with the layered map.



Figure 13. Path with conventional path design



Figure 14. Path with layered map

Reference 3 - US 6667592B2

- 36. US 6667592B2 relates to a method and robot device for performing a service function, such as cleaning, in an area. The method includes the steps of commanding the robot system to perform a function in an area with a layout including at least one area segment. The robot system can access a stored map of the area layout, the stored map having at least one function task associated with the at least one area segment. A first position of the robot system is localized in the area, a function path is then determined from the first position of the robot system for navigation of the area and completion of the at least one function task. Whilst navigating the robot system along the function path a current position of the robot system can repeatedly continuously localized. The at least one function task that is associated with the current position of the robot system on the stored map of the area is completed.
- 37. A localizer portion 430 within the motion subsystem portion 400 of processor portion 100 is responsible for gathering a variety of sensor information. For example, the sensor information may include laser data, sonar data, odometry data, gyroscope data, global position system (GPS) data, pre-stored maps data, and x-y position system, i.e. grid data. The localizer portion 430 accesses a stored map of the area layout in which the robot system has been commanded to perform a function. The localizer portion 430 then localizes the robot system's position in the area and associates that current position with an actual position on the stored map. Utilizing the current position and the actual position on the stored map, the path planner portion 410 may determine a function path for the robot system to complete its assigned function and tasks. I note that this document discusses that an operator may change the nature of mapped boundaries in the area layout, i.e. increase the size of a room.
- Figure 9, reproduced below, shows a flowchart for utilizing a robot to perform a 38. function (with a task(s)) with in an area (with a layout having a segment(s)). In Step S20 the robot is commanded to perform a function in an area and then the robot system accesses a stored map of the area layout in step S40. The area layout has at least one function task associated with its at least one area segment. In step S60, the robot system localizes a first position in the area. Once the first position is determined, in step S80, the robot system determines a function path, from the first position, for navigation of the area and completion of the at least one function task. Then, in step S100, the robot system navigates the area and completes the at least one function task associated with the position of the robot system in the area, while continuously localizing the robot system position in the area. In addition, while the robot system is navigating the area and completing the at least one function task, the robot system is continuously monitoring for obstacles, and determining if an obstacle is in the function path in step S120. If an obstacle is detected in the function path, the process returns to step S60, where the robot system will once again localize a position (in step S60) and recalculate a new function path that avoids the obstacle in the current function path (in step S80). Alternatively, if the robot system does not detect an obstacle in the function path (in step S120), the process passes to step S140, wherein the robot system determines if it has completed the at least one function task in the area.



Reference 4 - KR10-0730311B1

39. KR10-0730311B1 discloses a method for making a robot cleaner autonomously recognize respective rooms in a house and clean by a simple setting without a user's continuous monitoring. The robot cleaner includes a receiver unit, a path searching unit, and a restoring unit. The receiver unit receives a signal of recognized respective cleaning areas when entering a communication region for dividing at least one cleaning area. The communication region can be distinguished by an infrared signal transmitted from an indicator or a charger. The path searching unit determines, based on the signal received by the receiver unit, whether a current position of the robot cleaner is within a preset cleaning area among predetermined cleaning areas and performs the cleaning after the determination. When the search of the cleaning area based on the searched cleaning area and performs the cleaning area based on the searched cleaning area and performs the cleaning by setting a cleaning time corresponding to the estimated area.

Validity - Novelty

- 40. In order for a claim to lack novelty, a prior art disclosure must clearly and unambiguously disclose all of the features of the claim.
- 41. The requester has argued that Reference 3 discloses each integer (a)-(g) of method claim 1, and thus also all of the features of corresponding device claim 10. The observer has argued that Reference 3 does not disclose determining whether the room in which the robot is placed is the particular room to which the current cleaning task is associated, and the step of not carrying out the cleaning task if the result of the determination is negative (features (f) and (g) of claim 1).
- 42. In particular the observer has argued that, at no time does the robot of Reference 3 check whether it is placed in the area in which it is required to perform the function. Instead, the robot assumes that it is already placed in the relevant area and plans a corresponding path.
- 43. The requester has argued that there is no basis for such an assertion and identifies column 7 lines 49 to 54 of the Patent which states:

"Accordingly, in one embodiment, the localizer portion 430 accesses a stored map of the area layout in which the robot system has been commanded to perform a function. The localizer portion 430 then localizes the robot system's position in the area and associates that current position with an actual position on the stored map."

44. The requester also highlights column 2 lines 3 to 8, column 7 lines 55-58 and column 8 lines 62-65 as disclosing the features (f) and (g) of claim 1:

"Lastly the method includes repeatedly and continuously localizing a current position of the robot system while navigating the robot system along the function path, and completing the at least one function task that is associated with the current position of the robot system on the stored map of the area, for example."

"Utilizing the current position and the actual position on the stored map, the path planner portion 410 may determine a function path for the robot system to complete its assigned function and tasks."

"The function task memory 616 may contain data and/or files relating to functions, function commands, function tasks, and associations between this information and data on areas, area layouts and area segments."

- 45. The requester argues that the description indicates that a function task is carried out if the robot system successfully localises itself within an area segment. Otherwise, in one example (as per figure 9), the robot system continues to localise itself (i.e. does not proceed with performing a task).
- 46. Whilst Reference 3 discusses that the robot may access a stored map of a room/area layout, upon receiving a command to perform a function in an room/area, and localise the robot's position in the area/room (including associating this position

on the map) and determine a function path for a task – it is my opinion that there is no disclosure of actually determining that the area/room in which the robot is placed is a particular area/room (which has been stored in association with a task(s)). Therefore, Reference 3 does not disclose integer (f) of claim 1.

- 47. Furthermore, whilst the robot may continuously localise itself in an area/room (e.g. if there is an obstacle in the way) and 'interrupt' a cleaning task (i.e. a new function path can be determined) this interruption is not as a result of a determination that the robot is in a particular room. Therefore, Reference 3 does not disclose integer (g) of claim 1.
- 48. Therefore, it is my opinion that claim 1 is novel in light of Reference 3. Furthermore, corresponding claim 10 is also novel.

Validity - Inventive Step

Whether claims 1&10 are inventive in light of Reference 3

49. To determine whether or not the claimed invention is inventive over prior art, I will rely on the four step test established in *Pozzoli*⁶ which reformulated the well-known *Windsurfing*⁷ test. The Pozzoli steps are as follows:

(1)(a) Identify the notional "person skilled in the art";

(1)(b) Identify the relevant common general knowledge of that person;

(2) Identify the inventive concept of the claim in question or if that cannot readily be done, construe it;

(3) Identify what, if any, differences exist between the matter cited as forming part of the "state of the art" and the inventive concept of the claim or the claim as construed;

(4) Viewed without any knowledge of the alleged invention as claimed, determine whether those differences constitute steps which would have been obvious to the person skilled in the art.

- 50. As discussed above I consider the person skilled in the art to be a programmer engaged in the design and operation of autonomous cleaning machines.
- 51. The requester has submitted that thirteen 'facts' (i-xiii) form part of the CGK of the skilled person:

(i) Many industrial processes that, in the past, required a human worker to staff are now being performed by robots controlled by computers (see for example, Reference 3, Background of the Invention, column 1, lines 15-17).

(ii) Reliance on computers and robots to perform simple functions, like cleaning or manufacturing, increases every day. As a result, there is a continuous need

⁶ Pozzoli SPA v BDMO SA [2007] EWCA Civ 588

⁷ Windsurfing International Inc. v Tabur Marine (Great Britain) Ltd, [1985] RPC 59

to make controlling these systems easier and more efficient. (see for example Reference 3, Background of the Invention, column 1, lines 19-22).

(iii) Computers and/or robots can be made autonomous so that they operate efficiently and effectively with as little human direction as possible (see for example Reference 3, Background of the Invention, column 1, lines 19-22).

(iv) The need for efficient and effective mechanisms for controlling computer and robot systems is evident in several industries. The industrial cleaning industry provides one example. (see for example Reference 3, Background of the Invention, column 1, lines 25-28).

(v) Throughout the world, numerous janitors and cleaning personnel enter buildings to clean these indoor spaces. Many of the cleaning functions provided by these personnel can also be achieved by an autonomous robot system. There is a requirement for efficient and effective methods of controlling such a system. It is clear that many corporations, businesses, retailers and individuals could save costs if a robot system could perform the same function as cleaning personnel. (see for example Reference 3, Background of the Invention, column 1, lines 28-36).

(vi) It is desirable to have a robot system that can operate for extended periods of time autonomously, without the need for human supervision. In this respect, a robot system could perform a series of tasks that free the robot system operator to perform other duties. This need can, once again, be seen in the industrial cleaning industry. (see for example Reference 3, Background of the Invention, column 1, lines 37-43).

(vii) An example of the home robot is a robot cleaner, a kind of home electronic appliance capable of performing a cleaning operation by sucking peripheral dust or foreign materials while autonomously moving in a predetermined region. Such robot cleaners are provided with a chargeable battery and at least one sensor for avoiding obstacles while moving. (see for example Reference 1, Background of the Invention, paragraph [006]).

(viii) Self-propelled, self-steering floor cleaning devices may store maps of the environment in which they operate (Acknowledged in the Description of the Patent in suit, paragraph [0008]. See also, for example, Reference 1).

(ix) Floor cleaning devices are known which autonomously clean rooms and automatically create maps of the rooms in which they are located, as well as save the maps to a storage medium (Acknowledged in the Description of the Patent in suit, paragraph [0003]. See also, for example, Reference 3).

(x) Sensors of a floor cleaning devices can detect features for recognising its position within an environment and identification of its location within a stored map. (Acknowledged in the Description of the Patent in suit, paragraph [0008]. See also, for example, Reference 1).

(xi) Using sensors, floor cleaning devices can compare features in a room with

a stored map and determine their position in a room (known in the art as 'localisation') and then carry out a cleaning task assigned to that room. This 'localisation' is necessary for a floor cleaning device when it is placed in an arbitrary position (such as when first placed in a new location or room), when it is moving around (for example to account for odometry errors caused by wheel slip etc), and when it is restarted (for example after unexpected stopping caused by safety systems, mechanical failure or the like). (Acknowledged in the Description of the Patent in suit, paragraph [0003]. See also, for example, References 1 and 3).

(xii) It is desirable to control and program a robot system such that it can be given multiple tasks in different areas, wherein the robot system can finish the tasks in each different area without a human operator being required. (See for example, Reference 3, Background of the Invention, column 1, lines 48-51).

(xiii) The behaviour of cleaning personnel within home environments is studied to optimise the performance of cleaning robots. (see for example Reference 2 and cross-cited academic articles

- 52. The observer comments that just because these facts (i) to (xiii) are referred to in the 'Background of the Invention' sections of the various References 1 to 4, or in the Patent in Suit, does not mean they are CGK. Furthermore, that a statement is made in one or two references is insufficient to show it would have been common general knowledge at the priority date of the invention.
- 53. Whilst it can be problematic to rely of Patent documents to demonstrate CGK, in general I am willing to accept that these are general statements that would be common general knowledge to the person skilled in the art. However, I would note that 'fact' (xi) appears to relate to more *specific* features (e.g. localisation when positioned in new room, moving around and/or restarting) rather than generalised statements. In particular, these features are not discussed in the 'Background of the Invention' but form part of the specific embodiments of References 1&3, and it is thus not readily apparent that such features are only disclosed from Patent documents. I would also note that 'fact' (xiii) appears to be too generalised as Reference 2 relates to *optimal path planning* based on the behaviour of cleaning personnel rather than *optimising any performance* of a cleaning robot.
- 54. The requester has defined (based on correspondence during the pre-grant process) the key inventive concept in claims 1&10 as: "the performance of the cleaning task to not be carried out, to be interrupted or to be ended if the result of the determination in relation to the room recognition is negative". However, this would appear to be the difference between Reference 3 and claims 1&10.
- 55. It is my opinion that the inventive concept resides in "when executing a cleaning plan, examining a sensor signal(s) of a floor cleaning device for features indicative of a room in which it is located, checking if the features are present in a stored map, and determining before or during the cleaning task, whether the device is placed is a particular room associated with a cleaning task(s), and if the result of the determination in relation to the room recognition is negative the performance of the cleaning task is not carried out, interrupted or ended"

- 56. The difference between the inventive concept and Reference 3 lies is integers (f) and (g) in claim 1 i.e. "the performance of the cleaning task to not be carried out, to be interrupted or to be ended if the result of the determination in relation to the room recognition is negative".
- 57. The requester has argued that the skilled programmer seeking to develop an efficient and useful floor cleaning device would be aware of, as part of their CGK, points (i) to (xiii). In particular, point (xiii) of the CGK, (also known from Reference 2) is that cleaning robots are designed to emulate the behaviour of cleaning personnel. A cleaner assigned a specific cleaning task, who arrives in an incorrect location that is not associated with the particular set task, will stop cleaning or fail to initiate cleaning on discerning that they are in the wrong location.
- 58. Thus according to the requester, the allegedly inventive concept of claim 1 is simply an obvious automation of human behaviour. Furthermore, a common task of a programmer with ordinary skill will be to follow basic logic. Consequently, if an autonomous device seeking to carry out a task in a particular room, fails to confirm its location within the particular room, then it follows that there are several obvious and logical choices which include that the task should be stopped, interrupted or not carried out. This is an obvious consequence of negative room determination in order to save resources and ensure the machine operates with maximum efficiency. The allegedly inventive steps in claim 1 are easily derivable using simple logic according to the requester and therefore would be obvious to the skilled person.
- 59. The observer submits that robot behaviour cannot be considered to be a mere automation of human behaviour. While a human being would always know where they are located, a robot does not have an a priori knowledge of its location and will need a map of the robot operation area and/or appropriate sensors to locate itself. In fact, claim 1 of the Patent does not require the robot to have a map of the whole robot area, but merely of the rooms to be cleaned. This means that, if the kitchen is not part of the rooms to be cleaned, the robot might not have a room of the kitchen. The robot would thus be in the kitchen and not know it. However, since the kitchen is not a room to be cleaned, the robot does not need to know that it is located in the kitchen. It merely needs to determine, based on sensor data, whether or not the room corresponds to any of the mapped rooms to be cleaned. This behaviour is completely different from that of a human being.
- 60. The observer further submits that the step of not carrying out, interrupting or ending the performance of the cleaning task associated with the particular room requires being able to determine that the room in which the device is placed is not the particular room. This previous step cannot be seen as a normal, logical step. In fact, the robot normally follows a predetermined path and would, thus, have no reason to check whether it is in a room to be cleaned. Instead, such a determination might take time and slow down the operation of the robot. However, according to claim 1, the step of determining whether the room is a room to be cleaned can be carried out quickly as the robot merely checks whether features of the room in which the robot is located match specific features of the particular room.
- 61. The requester, however, notes that robots at the priority date of the invention typically continuously localise within their environment. This can be important for obstacle avoidance for example, and/or to understand their location relative to a

charging station, and/or to ensure they follow a set path which might not be determinable from relative data due to factors like wheel slippage.

62. It is my opinion that identifying the difference between the inventive concept and Reference 3 as the 'mere automation of human behaviour' oversimplifies the invention. By using room determination (for a task(s)) – the invention provides an efficient (or at least distinct) process for an appropriate non-performance or interruption of a robot's cleaning task. There is nothing in Reference 3 pointing towards the specific process of a particular room determination and the consequential performance of the robot – rather it only refers to the general process of localisation using stored maps and changing a task path based on an obstacle. I would also note that the alleged CGK in Reference 2 relates to user behaviour being used as a basis for path planning and does not point towards or disclose user behaviour with respect to an incorrect room. Therefore, it is my opinion that the differences between claim 1 and the Reference 3 involve an inventive step. Similarly, claim 10 also involves an inventive step.

Whether claims 1&10 are inventive in light of the combination of all of References 1 to 4, or the combination of Reference 2, Reference 3 and CGK

- 63. The requester has argued that, in order to establish whether the claims are obvious, <u>all</u> cited References 1 to 4 should be considered alongside one another and in combination with the acknowledged CGK of the notional skilled person. In particular, they have raised the new question of the Patent lacking an inventive step in view of Reference 2 and Reference 3 in combination with the CGK.
- 64. The requester also considers that all References 1 to 4 are inherently compatible as the References all lie in the same field of autonomous cleaning robots and all robots described have similar functionality and operate in a similar manner. Further, all of the References are directed towards the similar technical problem of improving efficiency of cleaning operations alongside localisation (or clear position detection) of the robot using comparisons with known features.
- 65. The observer has submitted that, as there is no cross-referencing between the References 1-4, and nor does any one Reference direct the skilled person to do anything that would be obviously found in another, it has not been established that the skilled person would have considered the teachings together.
- 66. In order to substantiate a mosaic-type argument, it is generally necessary to consider whether there is a reasonable basis or motivation for expecting that the skilled person, when addressing the problem at hand, to combine the teachings of two or more documents. As cautioned by Laddie J (as he was then) in Pfizer⁸ at [66], it must be likely that the skilled person would have considered the teaching from each together:

"When any piece of prior art is considered for the purposes of an obviousness attack, the question asked is "what would the skilled addressee think and do on the basis of the disclosure?" He will consider the disclosure in the light of the common general knowledge and it may be that in some cases he will also think it obvious to supplement the disclosure by consulting other readily accessible publicly available

⁸ Pfizer Ltd's Patent [2001] FSR 16

information. This will be particularly likely where the pleaded prior art encourages him to do so because it expressly cross-refers to other material. However, I do not think it is limited to cases where there is an express cross-reference. For example if a piece of prior art directs the skilled worker to use a member of a class of ingredients for a particular purpose and it would be obvious to him where and how to find details of members of that class, then he will do so and that act of pulling in other information is itself an obvious consequence of the disclosure in the prior art."

- 67. This echoes the judgment of Whitford J in Dow Chemical Company⁹, where he indicated that it is necessary to consider whether the documents are ones that the seeker of information would come across and consider together. The Manual of Patent Practice (at paragraph 3.43) also provides some guidance around combining documents, and lists factors that can be considered before doing so.
- I note that none of the References 1 to 4 explicitly refer to any of the others, and nor 68. is there anything in any of the References which would actually direct the skilled person to any of the other References. Whilst References 1 to 4 can be said to be in the same general field of localisation of robot cleaners, as this field is prima facie vast, it does not seem likely that the skilled would have (1) come across these documents and (2) would consider them together - particularly as it has not been demonstrated that any of these References themselves are well known. Furthermore, as discussed in Manual of Patent Practice 3.41, the greater the number of documents which must be so combined to reach the invention, the more likely on the whole that there is an inventive step. Requiring the person skilled in the art to consider all four documents together, three of which are Patent specifications, in my opinion points towards an inventive step. I would further note that the opinion request does not actually discuss how these four documents are to be combined or mosaicked to render obvious claims 1&10. Consequently, it is my opinion that the skilled person would not combine or mosaic all of References 1 to 4, and therefore they do not demonstrate a lack of inventive step in claims 1&10.
- 69. With regard to the combination or mosaicking of Reference 2 and Reference 3 and CGK, whilst it is more likely that the person skilled in the art would have considered such teachings together, such a combination is not felt to render obvious claims 1&10. In particular neither Reference 2 nor Reference 3 disclose integers (f) and (g) in claim 1, nor has it been shown by the requester that integers (f) and (g) are CGK. Thus claims 1&10 are inventive for the similar reasons as discussed above in paragraphs 56-62 above. Therefore, it is my opinion that claims 1&10 are inventive in light of the combination of Reference 2 and Reference 3 and CGK.

Sufficiency

- 70. The specification must disclose an invention clearly and completely enough for it to be performed by a person skilled in the art, as required by Section 14(3) of The Act.
- 71. The requester has argued that the Patent provides no detailed information to the skilled person regarding the form or requirement of the cleaning plans. Nor are there any specific instructions to the skilled person regarding how a room may be recognised as a particular room and how that is differentiated from the collective

⁹ Dow Chemical Company (Mildner's Patent) [1973] RPC 804

disclosure of the prior art which permits general detection of the features of the environment enabling room recognition.

- 72. Furthermore, the requester suggests that there are no detailed instructions for the skilled person within the description regarding each of: "not carrying out, interrupting or ending the performance of the cleaning task associated with a particular room". In particular, for integer (g) to be non-obvious, it must necessarily be meaningful and significant relative to the prior art, and there should be sufficient detail enabling the performance of any such unique and non-obvious steps (of which there is none). The requester submits that there is a 'squeeze' argument if the claims include an inventive step, there should be sufficient detail in the specification to enable the skilled person to achieve that non-obvious method step. In particular, if integer (g) is non-obvious and not immediately evident to a skilled person, the specifics of the robotic and programming choices that are not obvious should be adequately described such that they can be recreated.
- 73. It is my opinion that the Patent sufficiently discloses to the person skilled in the cleaning plans at, e.g. paragraph 54 of the description, and also adequately discloses how a room is to be recognised at, e.g. paragraphs 66&79 of the description. I also consider that an example of integer (g) is disclosed at paragraphs 72&73 of the description. Furthermore, the person skilled in the art would readily understand and be able to implement a robot that can "not carry out, interrupt or end" a cleaning task.
- 74. With regard to the 'squeeze' argument, I would note that the inventive concept lies in the defined *interrelationship and/or logical steps between the features of claim 1*, such as the interrelationship between features (f) and (g), and thus there is no contradiction between the claims being both inventive and sufficient.
- 75. Therefore, it is my opinion that claims 1&10 are sufficient.

Excluded matter

- 76. The requester has argued that claims 1&10 are excluded from patentability under Section 1(1)(d) and Section 1(2)(c) of the UK Patents Act 1977 as a mental act, method of doing business and/or a computer program as such.
- 77. In *Aerotel*¹⁰ the Court of Appeal set out the following four-step test for determining whether a proposed invention is excluded under Section 1(2). This was expressed in *Emotional Perception*¹¹ as:
 - (1) Properly construe the claim.
 - (2) Identify the actual contribution (although at the application stage this might have to be the alleged contribution).
 - (3) Ask whether it falls solely within the excluded matter.
 - (4) If the third step has not covered it, check whether the actual or alleged

¹⁰ Aerotel Ltd v Telco Holdings Ltd & Ors Rev 1 [2006] EWCA Civ 1371, [2007] RPC 7

¹¹ Comptroller-General of Patents, Designs and Trade Marks v Emotional Perception AI Ltd [2024] EWCA Civ

contribution is actually technical.

Step 1 – Properly construe the claims

78. There is not felt to be any particular difficulty in construing claims 1&10 for the purposes of assessing excluded matter.

Step 2 - Identify the actual or alleged contribution

79. The requester identifies the actual contribution of the invention "as carried out by a computer program enabling the device to follow one of three required options". However, in my opinion this assessment of the contribution ignores the problems said to be solved, how it works and the advantages. In particular, I consider the contribution to reside in:

"A robot cleaning device which determines, before or during a cleaning task, whether the room in which the floor-cleaning device is placed is the particular room associated with the cleaning task using sensors and a stored map and, if not, the performance of the cleaning task is not carried out, interrupted or ended. This can conserve resources and prevent unnecessary cleaning when the device cannot carry out its cleaning operation because it is in the wrong location."

<u>Steps 3 & 4 – Ask whether the contribution falls solely within the excluded subject</u> matter and check whether the contribution is actually technical in nature

- 80. The requester argues that the process steps performed in the claims equate to a scheme, rule or method of performing a mental act, ... or doing business, or a program for a computer. The device performs one of three options, none of which make a contribution to the art which is technical in nature.
- 81. The contribution relates to a robotics device and method of controlling such a device and, in my opinion, clearly does not relate to 'a purely mental implementation'¹².
- 82. The decision in $AT\&T/CVON^{13}$ provides guidance in the form of a number of signposts which may indicate that a computer program provides a technical contribution. The signposts were updated in *HTC v Apple*¹⁴ and are as follows:

i) whether the claimed technical effect has a technical effect on a process which is carried on outside the computer;

ii) whether the claimed technical effect operates at the level of the architecture of the computer; that is to say whether the effect is produced irrespective of the data being processed or the applications being run;

iii) whether the claimed technical effect results in the computer being made to operate in a new way;

¹² See e.g. The MOPP 1.31

¹³ Knowledge Ventures LP and Cvon Innovations Ltd v Comptroller General of patents [2009] EWHC 343 (Pat)

¹⁴ HTC Europe Co Ltd v Apple Inc [2013] EWCA Civ 451

iv) whether the program makes the computer a better computer in the sense of running more efficiently and effectively as a computer;

v) whether the perceived problem is overcome by the claimed invention as opposed to merely being circumvented.

- 83. It is my opinion that the contribution has a technical effect external to the computing device i.e. not carrying out, interrupting or ending a cleaning task upon determination that it is not in a particular room based on sensor information which satisfies at least signpost (i).
- 84. Whilst the performance of a cleaning task based on room determination could *itself* be seen as a method of doing business the contribution is suitably tied to a technical application, namely the control of a robot, and thus, in my opinion, does not relate solely to a business method¹⁵
- 85. Therefore, it is my opinion that the contribution does not relate solely to excluded matter and is technical in nature. Claims 1&10 therefore do not relate to excluded matter as such.

Conclusion

- 86. I decline to issue an opinion with regards to novelty and inventive step and References 1,2&4 respectively or in combination.
- 87. I am of the opinion that claims 1&10 are novel and inventive in light of Reference 3. It is also my opinion that the person skilled in the art would not combine References 1 to 4, and thus they do not demonstrate a lack of inventive step in claims 1&10. Claims 1&10 are also considered to be inventive in light of the combination of Reference 2 and Reference 3 and common general knowledge.
- 88. I am also of the opinion that the invention has been sufficiently disclosed and does not relate to excluded subject matter as such.

Ben Widdows Examiner

NOTE

This opinion is not based on the outcome of fully litigated proceedings. Rather, it is based on whatever material the persons requesting the opinion and filing observations have chosen to put before the Office.

¹⁵ Such reasoning is consistent with BL O/198/06 [Touch Clarity Limited], for example.