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Datasheet for the decision of 4 March 2025

Case Number: T 0433/20 - 3.4.01

Application Number: 11809411.9

Publication Number: 2597930

IPC: H05B6/70, F24C7/02, H05B6/64

Language of the proceedings: EN

Title of invention:
MICROWAVE HEATING DEVICE

Patent Proprietor:
Panasonic Holdings Corporation

Opponent:
BSH Hausgeräte GmbH

Headword:
Microwave heater / Panasonic

Relevant legal provisions:
EPC Art. 52(1), 56, 123(2)
RPBA 2020 Art. 12(4), 12(8)

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Keyword:

Auxiliary Requests 1, 2, 3 - Admission (yes)
Main Request, Auxiliary Requests 1, 2, 3 - Inventive Step (No)
Auxiliary Requests 2, 3 - Added subject-matter (yes)

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Case Number: T 0433/20 - 3.4.01

D E C I S I O N
of Technical Board of Appeal 3.4.01
of 4 March 2025

Appellant: (Patent Proprietor)	Panasonic Holdings Corporation 1006, Oaza Kadoma Kadoma-shi Osaka 571-8501 (JP)
Representative:	SSM Sandmair Patentanwälte Rechtsanwalt Partnerschaft mbB Joseph-Wild-Straße 20 81829 München (DE)
Respondent: (Opponent)	BSH Hausgeräte GmbH Carl-Wery-Strasse 34 81739 München (DE)
Representative:	BSH Hausgeräte GmbH Postfach 83 01 01 81701 München (DE)
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted on 3 December 2019 revoking European patent No. 2597930 pursuant to Article 101(3)(b) EPC.**

Composition of the Board:

Chair	P. Scriven
Members:	T. Petelski
	D. Rogers

Summary of Facts and Submissions

I. The proprietor appealed the Opposition Division's decision to revoke the patent for lack of inventive step for claim 1 of each of the (then) Main Request and Auxiliary Requests 1 to 5 and 7, and for added subject-matter in claim 1 of Auxiliary Request 6.

II. In their statement of grounds of appeal, the proprietor requested that the decision be set aside, and a patent be granted on the basis of either a Main Request, which is identical to Auxiliary Request 7 before the Opposition Division, or one of three auxiliary requests, which were new on appeal.

III. The opponent, in their reply to the appeal, requested that the appeal be dismissed and based their arguments on documents D1, D2/D2a, D3/D3a, D9/D9a/D9b, D10/D10a, and D13/D13a, which were already on file, as well as on newly-filed documents D14 to D22.

IV. The documents relevant for the present decision are the following:

D2: JP 2008 166221 A
D2a: machine translation of D2
D9: WO 2009/128251 A1
D9a: machine translation of D9
D9b: EP 2 268 104 A1 (EP publication corresponding to D9)
D13: JP 2004 184031 A

D13a: machine translation of D13
D14: JP 2005 11620 A
D15: EP 0 240 271 A2
D16: JP 2004 360963 A
D17: US 4,431,888
D18: GB 2 083 923 B
D19: extract from R. Meredith "Engineers' Handbook of Industrial Microwave Heating"; ISBN 0 85296 916 3
D21: DE 36 41 063 A1

V. The opponent requested oral proceedings if the appeal were not dismissed. The proprietor requested oral proceedings unconditionally.

VI. The Board issued a summons to oral proceedings, together with a communication containing its preliminary opinion on the case.

VII. In response, the opponent submitted further arguments, mainly directed to a lack of inventive step starting from D1. These arguments are not relevant for the present decision. Further, the opponent argued that the proprietor's auxiliary requests should not be admitted into proceedings.

VIII. The proprietor, on the other hand, did not reply in substance to the Board's communication. Rather, they declared that they would not attend the oral proceedings.

IX. Oral proceedings were cancelled.

X. The present decision is based on the following claims:

Claim 1 of the proprietor's Main Request, which reads (reference signs omitted):

A microwave heating device comprising:

a heating chamber for housing an object to be heated and for radiating a microwave toward the object to be heated for performing high frequency heating on the object to be heated;

a microwave generating part adapted to generate a microwave for performing high-frequency heating on the object to be heated within the heating chamber, and to output the generated microwave from an output part;

a waveguide having a horizontal propagation path and a vertical propagation path orthogonal to each other such that the microwave generating part is horizontally coupled to the vertical propagation path, for propagating a microwave from the microwave generating part through the horizontal propagation path;

a feeding part which is coupled to the horizontal propagation path and includes an antenna part for radiating, within the heating chamber, the microwave propagated through the waveguide; and

an antenna room which is provided in a ceiling surface of the heating chamber, further is adapted to reflect the microwave radiated in a horizontal direction from the antenna part, and is opened at its lower end portion such that the microwave from the antenna part is radiated within the heating chamber;

characterized in that :

the microwave generating part, the horizontal propagation path and the vertical propagation path are placed on the upper side of the heating chamber,

the antenna room is provided substantially at the center of the ceiling surface of the heating chamber, and is shaped to extend in a circular shape at its lower end portion,

the feeding part is provided in a feeding port formed in the horizontal propagation path in the waveguide so that the feeding part is coupled to the waveguide,

a horizontal propagation distance is defined as a horizontal distance from an inner folding position of the orthogonally-folded waveguide to the center of the feeding port in the horizontal propagation path in the waveguide, along a direction in which the horizontal propagation path extends, and

a vertical propagation distance is defined as a vertical distance from the inner folding

portion of the orthogonally-folded waveguide to the center of the output part of the microwave generating part,

wherein

the waveguide is structured such that the horizontal propagation distance is longer than 1/2 the wavelength of the microwave which propagates through the waveguide and that the vertical propagation distance is smaller than 1/4 the wavelength of the microwave which propagates through the waveguide.

Claim 1 of Auxiliary Request 1, which differs from that of the Main Request in that the definition of the antenna room in the characterizing part reads (reference signs omitted; amendment marked):

..., the antenna room is provided substantially at the center of the ceiling surface of the heating chamber, and is shaped to extend in a circular shape at its lower end portion and, thus, has a circular truncated cone shape, ...

Claim 1 of Auxiliary Request 2, which differs from that of Auxiliary Request 1 in that the characterizing part adds the following (reference signs omitted, amendments marked):

... to the waveguide,

the feeding part includes a shaft part having one end connected to a motor through the feeding port, and the antenna part connected to the other end of the shaft part,

the shaft part includes a portion made of a fluorocarbon resin which is closer to the motor, and a portion made of a metal which is closer to the antenna part,

a gap between the feeding port and the metal portion of the shaft part has a length equal to or more than 5 mm, and then the feeding part is coupled to the horizontal propagation path in the waveguide,

a horizontal propagation distance ...

Claim 1 of Auxiliary Request 3, which differs from that of Auxiliary Request 2 in that the following is added to its end (reference signs omitted, amendment marked):

... through the waveguide (21)~~.~~,

a height (b) of an internal passage of the horizontal propagation path (42) is larger than the vertical propagation distance (V).

XI. The passages from the Board's preliminary opinion that are relevant to the present decision are reproduced below with their original Arabic numbering:

...

Main request - inventive step starting from D2

6. The Opposition Division found that the subject-matter of claim 1 differed from D2 in three points (point 13.1 of the decision):

(a) Space for the antenna, in the form of an antenna room, was provided in the ceiling surface of the heating chamber; and the microwave generating part, as well as the waveguide, was placed on the upper side of the heating chamber.

(b) The horizontal propagation distance was longer than half the wavelength of the microwave which propagated through the waveguide, and the vertical propagation distance was smaller than a quarter of that wavelength.

(c) The antenna room was shaped to extend in a circular shape at its lower end portion.

7. The Opposition Division assessed the differences separately because they did not see a synergistic effect (point 13.2 of the decision). In its assessment, the Opposition Division found that the skilled person, starting from D2, would have arrived at the subject-matter of claim 1 in an obvious way, based on the common technical knowledge (differences (a) and (c)), and by adopting the teaching of D9 (difference (b)). Alternatively, the skilled person would have implemented features (a) and

(c) based on a combination of D2 with D13 (points 13.2 to 13.6, together with points 5, 7, and 8 of the decision).

8. The proprietor did not challenge the findings regarding differences (a) and (b), and the Board sees no reason to deviate from those findings.

9. However, the proprietor did challenge the findings on difference (c). In this regard, the proprietor argued that the feature defined in claim 1

> *... the antenna room (24) is provided substantially at the center of the ceiling surface of the heating chamber (11), and is shaped to extend in a circular shape at its lower end portion, ...*

implied a conical shape for the antenna room and excluded a cylindrical shape. None of the documents on file, in particular not D13, disclosed a conical antenna room.

10. The conical shape defined in claim 1 had the effect of uniformly irradiating the entire heating chamber, and of reducing the contact area between the ceiling of the heating chamber and the waveguide, resulting in a reduction in heat conduction from the heating chamber to the waveguide. The corresponding technical problem was to increase the output efficiency of the microwave generator. None of the documents on file provided a solution to this problem.

11. Contrary to the view of the proprietor, claim 1 does not imply a conical shape for the antenna room. According to claim 1, the antenna room "is shaped to extend in a circular shape at its lower end portion." This means that it not only has a planar circular opening at its lower end, but that the circular shape extends for a certain distance, which must be at an angle to the plane of the circle. Therefore, the antenna room must have at least a partially cylindrical or conical shape (straight or oblique) at its lower end. This includes cylindrical rooms.

12. D2 shows a rectangular cross-section for antenna room 3 but is silent on its three-dimensional shape. Hence, the technical effect of the extended circular shape lies in the provision of a suitable three-dimensional shape

13. The Board agrees with the Opposition Division in that a cylinder would have been an obvious choice for the antenna room 3 in D2, given the need to accommodate rotating antenna 8 (see Figures 1 and 2). In view of the generally limited space, it would have made little sense to make the antenna room larger than necessary.

14. The Board also agrees with the Opposition Division's alternative argument that the skilled person would have adopted the shape of the cylindrical antenna room of the heating device in D13 ("stirring chamber 3"; see Figures 1, 2, and 8), for the heating device in D2.

15. Hence, the subject-matter of claim 1 does not involve an inventive step (Articles 52(1) and 56 EPC).

...

Auxiliary Requests 1, 2, and 3 - admission

21. Auxiliary Requests 1, 2 and 3 were filed, for the first time, with the statement of grounds of appeal. Their admission into proceedings is subject to the Board's discretion under Article 12(4) RPBA.

22. The proprietor *[sic]* has not objected to the admission of these requests and the Board does not raise such an objection of its own motion.

Documents D14 to D22 - admission

23. Documents D14 - D22 were filed, for the first time, with the opponent's reply to the appeal, in reaction to the filing of the new Auxiliary Requests.

24. The admission of D14 - D22 is also subject to the Board's discretion under Article 12(4) RPBA.

25. At this stage, the Board's preliminary view is that they should be admitted, if Auxiliary Requests 1 to 3 are.

Auxiliary Request 1 - inventive step

26. Claim 1 adds, with respect to claim 1 of the main request, the definition that the antenna room "has a circular truncated cone shape".

27. Figure 9 of D13 shows the cross-section of a typical, known (flat) rotating antenna and its chamber. The opposite chamber walls are slanted in opposite directions. Considering the mirror symmetry of the opposite walls in the cross-sectional view, and the general rotation-symmetric chambers in the embodiments of the invention in D13 (Figures 1, 2, and 8), a truncated conical shape of the antenna chamber follows implicitly from Figure 13.

28. Besides D13, truncated cone-shaped chambers were also known, at the priority date of the contested patent, from other microwave ovens, such as those shown in D14 to D18. The advantage of this shape is apparent to the skilled person and lies in the reflection of the microwaves towards the object to be heated.

29. The Board agrees with the opponent that it would have been obvious, for the skilled person, to adopt the teaching of any one of these documents to change the cylindrical shape of the antenna chamber 3 in D2 to a truncated cone shape in order to improve the heating.

30. Therefore, the truncated cone shape cannot contribute to an inventive step of claim 1 (Articles 52(1) and 56 EPC).

31. Hence, Auxiliary Request 1 is not allowable.

Auxiliary Request 2 - added subject-matter

32. Claim 1 differs from claim 1 of Auxiliary Request 1 in additional definitions of the feeding part, which, according to the proprietor, found their alleged basis on pages 20, 21, and 24 of the description as originally filed.

33. The opponent is of the view that the extracted features were inextricably linked by functional or structural connections to other features. Adding the features to claim 1 without these other features was, therefore, an unallowable generalisation.

34. However, the opponent did not explain which other features these were, and how exactly they were linked to the extracted features.

35. The only feature that catches the eye when reading the passages in question is the rotation of the antenna. In the description, a shaft part of the feeding part that connects a motor to an antenna part is not disclosed without the shaft transmitting a rotation of the motor to a rotating antenna part (page 21, lines 3 - 5, and page 24, lines 8 - 9). However, no rotation of the antenna is defined in claim 1.

36. For the latter reason alone, the Board tends to follow the opponent, despite their

inadequate reasoning, in that the features added to claim 1 are an unallowable generalisation of the application as filed (Article 123(2) EPC).

37. Hence, Auxiliary Request 2 is not allowable.

Auxiliary Request 2 - inventive step

38. Figure 1 of D2, and the corresponding paragraphs [0017] to [0019], disclose the coupling of microwaves from waveguide 5 to rotating antenna 8 by inner conductor 7. The inner conductor extends from the waveguide through coupling hole 6 into the antenna chamber 3, where it is attached to rotating antenna 8. At its other end, in the waveguide, the inner conductor merges with dielectric shaft 9, which is connected to motor 11. The dielectric shaft and the inner conductor transmit the rotation of the motor 11 to the antenna 8.

39. In contrast to the subject-matter of claim 1, D2 does not disclose that

(a) the dielectric material of the shaft 9 is fluorocarbon resin; and

(b) the gap between the border of the coupling hole 6 and the inner conductor 7 has a length of at least 5 mm.

40. D2 is silent on which dielectric material is used for the shaft, and on the size of the gap. The respective technical problems are the

selection of an appropriate dielectric material and gap size. The problems are unrelated and need to be assessed independently.

41. The skilled person, aiming to provide a suitable dielectric material to realise shaft 9 in D2, would preferably have chosen a material that was neither conductive nor absorbent for microwaves. The skilled person would have turned to D19, which, on page 20, provides a brief list of such materials. The choice of PTFE (Teflon), a fluoropolymer resin, would have been one of a small number of obvious choices.

42. With regard to the gap size, a value of at least 5 mm would have been an obvious choice, given the increasing risk of flashover for small gap sizes on the one hand (see D21: column 1, lines 27 - 45 and column 3, lines 32 - 35), and the increasing magnitude of an undesired microwave leakage for large gap sizes on the other hand.

43. Therefore, the Board concurs with the opponent's view that the added features do not contribute to an inventive step (Articles 52(1) and 56 EPC).

44. Hence, Auxiliary Request 2 is not allowable for that reason as well.

Auxiliary Request 3 - added subject-matter

45. Claim 1 differs from claim 1 of Auxiliary Request 2 in the additional feature, at the end of the claim:

> *... a height (b) of an internal passage of the horizontal propagation path (42) is larger than the vertical propagation distance (V).*

46. According to the proprietor, the bases for this feature were on page 23, lines 2 - 4, and lines 16 - 17, of the description as originally filed.

47. These passages provide approximate numbers for the height *b* and distance *V* in one particular embodiment:

> *... the height b of the internal passage in the horizontal path 42 in the waveguide 21 is about 16 mm.*
>
> *... the vertical propagation distance V is set to be about 15 mm in the first embodiment.*

48. Irrespective of the fact that the description also allows *V* to be larger than *b*, or of identical size (e.g. if "about" is understood as +/- 2 mm), the generalisation to a condition that *b* is larger than *V*, which includes examples with *b* three times larger than *V*, cannot be derived from a single example of concrete values that fulfil the condition.

49. Hence, the added feature was not originally disclosed (Article 123(2) EPC), thus Auxiliary Request 3 is not allowable.

Auxiliary Request 3 - inventive step

50. D2 is silent on the vertical distance between the output of the magnetron and the folding position. Hence, it does not disclose the added feature.

51. It was part of the common general knowledge that the waveguide was typically folded into an L-shape to allow the magnetron to be arranged horizontally (see Figure 1 of D2). This allowed for a compact design of the heating device.

52. The Board does not recognize a synergetic effect of this feature, and its technical effect, with any of the other features that distinguish the subject-matter of claim 1 from D2.

53. As long as the vertical extension of the magnetron allows it to be fitted into the heating device, there is no reason why the skilled person would have chosen a vertical distance larger than the height of the waveguide. On the contrary, the shorter the distance, the more compact the entire arrangement.

54. Therefore, the added feature cannot contribute to an inventive step of claim 1 (Articles 52(1) and 56 EPC).

55. Hence, Auxiliary Request 3 is not allowable for this reason as well.

Conclusions

56. The Main Request is not allowable for lack of inventive step over a combination of D2 with D9, optionally also with D13.

57. The Board is likely to consider the auxiliary requests, and documents D14 to D22.

58. Auxiliary Request 1 is not allowable for lack of inventive step over a combination of D2 with D9 and one of D13 to D18.

59. Auxiliary Requests 2 and 3 are not allowable, because their respective claim 1 contains subject-matter that extends beyond the application as originally filed and lacks inventive step over a combination of D2 with D9, one of D13 to D18, and D19.

Reasons for the Decision

1. In its preliminary opinion (as reproduced above), the Board expressed its intention to admit the auxiliary requests, as well as documents D14 to D22 into the proceedings.

2. The Board was also of the view that the Main Request and Auxiliary Request 1 were not allowable for lack of inventive step (Articles 52(1) and 56 EPC), and that Auxiliary Requests 2 and 3 were not allowable for added subject-matter (Article 123(2) EPC) and lack of inventive step (Articles 52(1) and 56 EPC).

3. The proprietor did not comment on these points.

4. After further reviewing the case, the Board sees no reason to deviate from its previous view.

5. In particular, considering the fact that the opponent's argument that the auxiliary requests should not be admitted was submitted only after the Board had already assessed them in substance, the Board follows its preliminary intention and exercises its discretion under Article 12(4) RPBA to admit the auxiliary requests into the proceedings, as well as documents D14 to D22.

6. Further, none of the Main Request and the Auxiliary Requests 1 to 3 is allowable, for the reasons put forward in the cited passages of the preliminary opinion.

7. As both parties have had the opportunity of presenting their comments on those reasons, as the proprietor has implicitly withdrawn their (unconditional) request for oral proceedings by announcing that they would not attend, and as the Board's findings are in line with the opponent's main request, the present decision can be issued without having held oral proceedings (Article 12(8) RPBA).

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chair:

D. Meyfarth P. Scriven

Decision electronically authenticated