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Datasheet for the decision of 27 January 2023

Case Number: T 0549/21 - 3.3.05

Application Number: 12425076.2

Publication Number: 2626336

IPC: C03C27/04, F24S20/20, F24S70/00

Language of the proceedings: EN

Title of invention:
A glass-to-metal joint for a solar receiver

Patent Proprietor:
Archimede Solar Energy SRL

Opponent:
BOTTI & FERRARI S.R.L.

Headword:
Glass to metal joint/Archimede

Relevant legal provisions:
EPC Art. 100(a), 56
RPBA Art. 13(2)

Keyword:
Main request and auxiliary request 1 - inventive step (no)
Late-filed auxiliary requests - admitted (no)

Decisions cited:
T 0939/92, T 1102/00

Catchword:

Europäisches Patentamt
European Patent Office
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Beschwerdekammern

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Case Number: T 0549/21 - 3.3.05

D E C I S I O N
of Technical Board of Appeal 3.3.05
of 27 January 2023

Appellant: (Patent Proprietor)	Archimede Solar Energy SRL Loc. Cimacolle 464 06056 Massa Martana (PG) (IT)
Representative:	Marietti, Andrea Marietti, Gislon e Trupiano S.r.l. Via Larga, 16 20122 Milano (IT)

Decision under appeal: **Decision of the Opposition Division of the European Patent Office posted on 13 April 2021 revoking European patent No. 2626336 pursuant to Article 101(3)(b) EPC.**

Composition of the Board:

Chairman E. Bendl
Members: G. Glod
S. Fernández de Córdoba

Summary of Facts and Submissions

I. The patent proprietor's (appellant's) appeal concerns the opposition division's decision revoking European patent EP 2 626 336 B1.

II. The opposition was withdrawn during opposition proceedings. Therefore, the former opponent is no longer party to the proceedings.

III. The following document cited in the impugned decision is of relevance here:

D1: GB 2 103 350 A

IV. Claim 1 of the patent as granted (main request) reads as follows:

" *1. A glass-to-metal sealing device (10) of a solar receiver, the device (10) comprising a metal collar (11) and a glass cylinder (12) to be sealed together, the device comprising the following features:*
b) the metal collar (11) is made of an austenitic alloy having a thermal expansion coefficient in the range of [3.5,6.0] 10^{-6} $°C^{-1}$ in the temperature range of [50 - 450]°C;
c) the end portion of the metal collar (11) is beveled so as to increase its mechanical flexibility;
d) the end portion of the metal collar (11) is processed via a thermal treatment in order to establish a bond between the metal and the glass surfaces;
the device being ***characterised in that*** *it further comprises the following feature :*
a) the glass cylinder (12) is made out of a borosilicate glass having a thermal expansion

coefficient in the range of [3.1,3.5] · 10-6 °C-1 in the temperature range of [50,450]°C."

V. With the grounds of appeal the appellant submitted auxiliary request 1, wherein claim 1 includes, at the end, the following amendments (highlighted by the board):

"*the device ~~being characterised in that it~~ further comprise~~s~~sing the following feature:*
a) the glass cylinder (12) is made out of a borosilicate glass having a thermal expansion coefficient in the range of [3.1,3.5] · 10-6 °C-1 in the temperature range of [50,450]°C~~.~~;
the device being characterized in that the beveling of the end portion of the metal collar (11) is performed so as to obtain longitudinal sections having a trapezoidal-like shape in which the minor base (m) is at the free end of the metal collar (11)."

VI. In reply to the communication under Article 15(1) RPBA 2020, auxiliary requests 2 and 3 were submitted.

Compared to auxiliary request 1, auxiliary request 2 includes the following feature at the end:

"*and wherein the ratio between the length of the minor base (m) and the length of the major base (M) of the trapezoidal-like shape is greater than 0.25.*"

Compared to auxiliary request 1, auxiliary request 3 includes the following feature at the end:

"*and wherein the length of the major base (M) is in the range of [0.3, 0.6] mm and the length of the minor base (m) is in the range of [0.15, 0.3] mm.*"

VII. Oral proceedings took place on 27 January 2023.

VIII. The appellant's arguments, insofar as they are relevant to the present decision, can be summarised as follows:

The combination of a collar made of Kovar and hard glass of the borosilicate type amounted to a deviation from the general teaching of D1. In addition, in D1, there was no suggestion of employing a borosilicate glass having the specific thermal expansion coefficient of claim 1 of the patent.

D1 did not disclose the trapezoidal-like shape present in claim 1 of auxiliary request 1.

Auxiliary requests 2 and 3 were submitted in response to the communication under Article 15(1) RPBA 2020. They are intended to better specify the shape of the end portion of the metal collar. The submission thereof was not unfair in view of the absence of any other party.

IX. The appellant requests that the impugned decision be set aside and that the opposition be rejected (patent be maintained as granted), or, alternatively, that the patent be maintained on the basis of auxiliary request 1 submitted with the statement of grounds of appeal or on the basis of auxiliary request 2 or 3, submitted on 25 November 2022.

Reasons for the Decision

Main request

1. Article 100(a) EPC in combination with Article 56 EPC

1.1 The invention relates to a glass-to-metal sealing device.

1.2 D1 is the closest prior art. Figures 2A and 2B illustrate a specific embodiment wherein the end of the lead glass tube is fused to the inside surface of the knife-edged end of the metal collar. It is disclosed that the use of a copper tube or collar makes it possible to join it to soft lead glass and also to soda glasses with a linear thermal expansion coefficient of from 9 to $10*10^{-6}$ $°C^{-1}$. It is also disclosed that it can even be joined to hard glasses of the borosilicate type having thermal coefficients as low as $3*10^{-6}$ $°C^{-1}$ (page 1, lines 114 to 127).

1.3 The board agrees with the opposition division that a problem relating to lower costs cannot be accepted with respect to D1 (see point 17.2.1 of the decision under appeal), since claim 1 is not limited in that respect. Therefore, the problem to be solved is to provide an alternative glass-to-metal sealing device.

1.4 The problem is solved by the device according to claim 1, characterised by the combination of a metal collar made of an austenitic alloy having a thermal expansion coefficient in the range of from 3.5 to 6.0 * 10^{-6} $°C^{-1}$ in the temperature range of 50 to 450°C and a glass cylinder made out of a borosilicate glass having

a thermal expansion coefficient in the range of 3.1 to 3.5 * 10^{-6} $°C^{-1}$ in the temperature range of 50 to 450°C.

1.5 The solution is obvious for the following reasons.

D1 teaches that, besides copper, other alloys, such as Kovar, can be used (page 2, lines 16 to 17). This is also in line with claim 8. The skilled person understands that Kovar - in the same way as copper - can be used with all the glasses mentioned in the paragraph cited above (page 1, lines 114 to 127). The passage cited by the appellant (page 1, lines 56 to 67) does not restrict the teaching of D1 to ordinary, commercially available glasses, but merely indicates that such glasses can be used even with metal tubes having a coefficient of thermal expansion much greater than that of the glass. There is no teaching that only such ordinary, commercially available glasses are to be used. Understanding the text in D1 in this way would be contrary to the disclosure on page 1, lines 114 to 127, and to claim 9 of D1. D1 is not limited to a specific combination of metal and glass, but clearly teaches that there are many possibilities including glasses and metals having different thermal expansion coefficients. This is reflected in the passages cited above and in claims 8 and 9, wherein claim 9 also refers back to claim 8.

It should also be noted that, if the problem to be solved is the provision of an alternative, the presence of a pointer to the solution is not mandatory (T 1102/00, Reasons 14). D1 offers many possibilities, but a mere arbitrary choice being made from the possible solutions cannot be regarded as involving an inventive step (T 939/92, Reasons 2.5.3).

D1 also clearly discloses hard glasses of the borosilicate type with thermal expansion coefficients as low as $3*10^{-6}$ °C^{-1}, which means that the claimed range of 3.1 to 3.5 * 10^{-6} °C^{-1} is also encompassed. No particular advantage or effect is attributable to the claimed range. Therefore, it is considered an arbitrary choice within the much broader range of D1.

1.6 To conclude, the subject-matter of at least claim 1 lacks an inventive step in view of D1, and the main request thus fails.

Auxiliary request 1

This request, wherein claim 1 includes the feature of claim 2 of the patent, was filed with the statement of grounds of appeal and corresponds to auxiliary request 1 on which the impugned decision was based except that the characterising part has been moved.

2. Article 56 EPC

The opposition division's conclusion still applies in particular when considering the following disclosure on page 1, lines 52 to 67, of D1 (emphasis added by the board):

"*if the glass is sealed to the inside surface of a metal tube of high expansion, the stresses will be largely compressive. According to one feature of the invention, therefore, the glass is sealed to the inside surface of the metal tube. Furthermore,* ***the thickness of the tube should be reduced*** *and, according to a further feature of the invention, the thickness of the tube is reduced in the end portion to a knife edge, preferably with a taper angle of less than 10°.*

Preferably also, the end of the metal tube is flared outwardly.
In this way, ordinary commercially available glasses can be sealed to metal tubes in solar collectors, even when the metal tube has a coefficient of thermal expansion which is much greater than that of the glass."

It is obvious to the skilled person from said passage that according to a preferred embodiment the end portion is a knife edge, but that any end portion having a reduced thickness is considered acceptable according to the invention. In view of the ambiguous terminology "trapezoidal-like shape" and the lack of indication of a minimum length of the bases of the trapezoid (see impugned decision, Reasons 18.1.2), a clear distinction between a triangle and a trapezoid cannot be made. Therefore, the indication in D1 is considered to include a trapezoidal-like shape as claimed in claim 1 of the auxiliary request at issue here. Improved mechanical properties cannot therefore be recognised over the whole scope of claim 1.

In addition, the change from a triangular-like shape (as in D1) to a trapezoidal-like shape is continuous and is certainly considered by the skilled person reading the cited passage. Therefore, the additional feature as compared to the main request is clearly within the teaching of D1 and cannot form the basis of an inventive step.

Consequently the subject-matter of at least claim 1 of the current auxiliary request 1 also lacks an inventive step and the auxiliary request thus fails as well.

Auxiliary requests 2 and 3

3. Article 13(2) RPBA 2020

These requests were submitted after the issue of the summons to oral proceedings, meaning that Article 13(2) RPBA 2020 applies. According to said article any amendment to a party's appeal case made after notification of a summons to oral proceedings is not, in principle, to be taken into account unless there are exceptional circumstances, which have been justified with cogent reasons by the party concerned.

In the present case there are no exceptional circumstances.

The communication pursuant to Article 15(1) RPBA 2020 was completely in line with the impugned decision and did not bring up any new objection or argument. It should be noted that the impugned decision already explicitly indicated that claim 1 did not include a minimum length of the bases m and M that would establish a criterion which clearly distinguished trapezoidal-like shape from non-trapezoidal shape (point 18.1.2). Furthermore, the communication pursuant to Article 15(1) RPBA does not constitute an invitation to submit further requests (Case Law of the Boards of Appeal of the EPO, 10th edition, 2022, III.C.6.4.2).

The fact that the former opponent had withdrawn its opposition is also not considered to imply the presence of exceptional circumstances. Article 13(2) RPBA 2020 is not restricted to *inter partes* proceedings. Moreover, it is the primary object of the appeal proceedings to review the decision under appeal in a judicial manner (Article 12(2) RPBA 2020). However,

taking into account the auxiliary requests would require the board to examine whether the added features could involve an inventive step, the board thereby having to consider for the first time documents not mentioned in the impugned decision. This illustrates that taking into account these requests would lead to a fresh case and that this would certainly go beyond reviewing the decision.

In summary, there are no exceptional circumstances that would justify the submission of the requests at such a late stage of the proceedings. Consequently the requests are not taken into account.

Order

For these reasons it is decided that:

The appeal is dismissed

The Registrar: The Chairman:

C. Vodz E. Bendl

Decision electronically authenticated