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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte KATHRYN M. MARTIN, DAVID GREY SMITH, and THOMAS J. RAMBACH

Appeal 2019-000300
Application 13/429,217
Technology Center 3600

Before JOHN C. KERINS, STEFAN STAICOVICI and LEE L. STEPINA, *Administrative Patent Judges*.

KERINS, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Appellant[1] seeks our review under 35 U.S.C. § 134(a) from the Examiner's Final Office Action dated August 10, 2017 ("Final Act."), rejecting claims 11–30. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM-IN-PART.

[1] We use the term "Appellant" to refer to the real party in interest as identified in the Appeal Brief, i.e., Global Nuclear Fuel – Americas, LLC. Appeal Br. 1.

THE INVENTION

Appellant's invention relates to a fuel spacer for use in a nuclear fuel assembly. Claims 11–13, reproduced below, are illustrative of the claimed subject matter.

> 11. A fuel spacer for use in a nuclear fuel assembly, the spacer comprising:
>
> a plurality of grid openings configured to receive a fuel rod through the spacer; and
>
> a perimeter band surrounding the grid openings and forming an outer boundary of the fuel spacer, wherein the perimeter band includes at least one specialized bathtub on an outer face of the perimeter band, and wherein the specialized bathtub includes an elastic resistive member and a corresponding rigid deflection limiter.
>
> 12. The fuel spacer of claim 11, wherein the elastic resistive member has a transverse length to contact a channel surrounding the nuclear fuel assembly, and wherein the corresponding rigid deflection limiter has a transverse length shorter than the transverse length of the elastic resistive member.
>
> 13. The fuel spacer of claim 12, wherein a difference between the transverse length of the elastic resistive member and the transverse length of the corresponding rigid deflection limiter is a length of a plastic deformation threshold of the elastic resistive member in the transverse direction so that the elastic resistive member cannot undergo plastic deformation due to a mutual planar contact to the deflection limiter.

THE REJECTIONS

The Examiner rejects:

(i) claims 13–16, 19, 29, and 30 under 35 U.S.C. § 112, second paragraph, as being indefinite;

(ii) claims 11–22, 24, and 27 under 35 U.S.C. § 102(b) as being anticipated by Hayakawa[2] (JP 2009-133736, published June 18, 2009); and

(iii) claims 13–16 and 19 under 35 U.S.C. § 103(a) as being unpatentable over Hayakawa;

(iv) claims 23, 25, and 26 under 35 U.S.C. § 103(a) as being unpatentable over Hayakawa;

(v) claim 28 under 35 U.S.C. § 103(a) as being unpatentable over Hayakawa in view of Edsinger (US 2006/0045232 A1, published Mar. 2, 2006); and

(vi) claims 29 and 30 under 35 U.S.C. § 103(a) as being unpatentable over Hayakawa in view of Eom (US 7,835,484 B2, issued Nov. 16, 2010).

DISCUSSION

Claims 13–16, 19, 29, and 30--§ 112, 2d paragraph--Indefiniteness

The Examiner determines that the expression "a length of plastic deformation threshold," appearing in claims 13 and 19, is indefinite. The Examiner takes the position that the person of ordinary skill in the art would not know precisely when an elastic resistive member would undergo plastic deformation, because the limit for plastic deformation can be affected by "various and undisclosed factors, such as material, ambient temperature, age of apparatus, degree of corrosion, etc." Final Act. 4. The Examiner additionally notes that a potential infringer would not know if its apparatus

[2] The first-named inventor on this reference is "Takaguchi," however, Appellant and the Examiner refer to the reference as "Hayakawa." *See, e.g.*, Final Act. 4. We do so herein as well, in order to maintain consistency with the briefing. Reference made herein is to the English-language translation of record dated July 2015 and identified as "PTO 15-102794."

will infringe on the claims containing this limitation, because the same factors will prevent that party from knowing whether its structure will or will not plastically deform. *Id.* The Examiner also avers that "[t]he 'prevention of deformation' is not an examinable structural limitation, but also suggests that potential infringer will have to determine whether a structure it is producing does not perform in the manner set forth in claims 13 and 19. Ans. 7. Finally, the Examiner produces literature evidencing that a particular alloy, Inconel X-718 "displays 'unexpected' deformation at certain temperatures. *Id.* at 8.

None of the above persuades us that the limitation is indefinite. A party having to test its products to determine whether or not they fall within, or outside, the scope of a claim does not give rise to indefiniteness. Further, prevention of plastic deformation for particular device configurations resembling those claimed, and using particular materials, can be determined by deforming the member in a manner as it would be deformed in its expected service. Any variation of a plastic deformation threshold due to temperature differences would be accounted for by the person of ordinary skill in the art by designing for use at particular operating temperatures or ranges of temperature.

The rejection of claims 13 and 19, and of claims 14–16 depending from claim 13, is not sustained.

The Final Action indicates that claim 29 is rejected on the basis that there is insufficient antecedent basis for "the elastic resistive members" recited therein, and that claim 30 is rejected based on its dependency from claim 29. Final Act. 4. An Advisory Action dated January 19, 2018, indicates that a reply dated January 10, 2018, amending claim 29 to fix the

antecedent basis issue was entered. The Answer does not expressly withdraw the rejection, but also does not address it in any manner. Our review of the record shows that claim 29 currently recites "the elastic resistive member[]," singular, which obviates the antecedent basis issue. To the extent that the rejection has not been withdrawn, it is not sustained.

Claims 11–22, 24, and 27--§ 102(b)--Hayakawa

Claims 11, 12, 17, 18, 20, 24, and 27

Appellant presents no substantive arguments for independent claims 11 and 17, nor for claims 12, 24, and 27 that depend from claim 11 and claims 18 and 20 that depend from claim 17. Accordingly, the rejection of these claims as anticipated by Hayakawa is summarily sustained.

Claims 13–16 and 19

The Examiner finds that Hayakawa discloses that lobes 14a positioned near corners of a band operate to limit deformation of centrally-located elastic resistive member 22. Final Act. 6. The Examiner points to a disclosure that a part of a lobe nearest a band corner "will take charge of load in a spacer locally," and that a "soundness tolerance in the mechanical strength of a spacer can be improved by distributing each [lobe] of a fuel spacer side surface, and inhibiting generating of a local concentrated load." *Id.*, quoting Hayakawa ¶ 11.

Appellant maintains that claims 13 and 19 require a specific structural relationship among the elastic and rigid members, noting that "subtracting the rigid member's length from the elastic member's length must give the length of the elastic member's plastic deformation threshold." Appeal Br. 13. Appellant argues that Hayakawa is silent in terms of such a relationship

between lobes 14 and elastic member 22. We agree. The language pointed to by the Examiner discusses only lobes 14 taking on some load, and the discussion of distribution of loads does not necessarily give rise to a structure having the limitation identified above in claims 13 and 19.

The rejection of claims 13 and 19, and of claims 14–16 depending from claim 13, as being anticipated by Hayakawa, is not sustained.

Claim 21

Claim 21 depends from claim 11, and recites that the elastic resistive member is stamped from the perimeter band such that the perimeter band does not overlap with the elastic member in a transverse direction. Appeal Br. 27 (Claims Appendix). The Examiner cites to Hayakawa Figure 4a in support of the finding that this limitation is disclosed. Final Act. 9. The Examiner observes that the showing of no interruption between elastic resistive member 22 and perimeter band 9 of Hayakawa evidences the absence of overlap between the band and the elastic member. *Id.*

Appellant argues that Hayakawa does not disclose that the elastic member 22 is formed by stamping, and further maintains that Figure 4a evidences that the perimeter band 9 "runs under" the elastic member, as seen by the presence of a continuous perimeter line extending under the member. Appeal Br. 20–21. We understand Appellant's latter argument, and observe the line referred to, but it is possible that the line said to run under the elastic member is representative of the wall of the perimeter band extending above and/or under the elastic member. Nonetheless, it appears to be possible, at a minimum, that the perimeter band also runs behind or under the elastic member, with Figure 4a being inconclusive on this matter.

The uncertainty as to whether this claim element is or is not met by Hayakawa precludes us from sustaining the anticipation rejection of claim 21.

Claim 22

Claim 22 also depends from claim 11, and recites that the rigid deflection limiter is stamped from the perimeter band, and that the perimeter band does not overlap with the rigid deflection limiter in the transverse direction. Appeal Br. 28 (Claims Appendix). The Examiner again directs attention to Figure 4a of Hayakawa, and cites disclosures that the lobes 14a are "integrally provided by the side surface of this band 9," and that the lobes are "provided by each side of the aforementioned band. Final Act. 10, quoting Hayakawa ¶¶ 5, 10.

As with claim 21, Appellant argues that Hayakawa does not disclose forming lobes 14a by stamping, and that the line in Figure 4a representing perimeter band 9 runs under lobe 14a. Appeal Br. 20–21. For the same reasons discussed above with respect to claim 21, the illustration in Figure 4a does not allow us to support the Examiner's findings. The quoted text describing the lobes as being "integrally provided by the side surface of the band," does not unequivocally mean that the lobes are stamped out of the material of which the band is made. The expression "provided by," could possibly refer to the positioning of the lobes on the perimeter band, and it is possible as well that "integrally provided" is intended to convey or include permanent affixing of the lobe to the band, such that they would be regarded as being integral.

We do not sustain the rejection of claim 22 as being anticipated by Hayakawa.

Claims 13–16 and 19--§ 103(a)--Hayakawa

The Examiner asserts that, to the extent that claims 13 and 19 are not anticipated by Hayakawa, the subject matter of the claims would have been obvious in view of Hayakawa. Final Act. 11–13. In particular, the Examiner reasons that the Hayakawa elastic member 22 would have been obviously designed to not break prior to the point at which side deflection limiters 14a contact the channel to distribute the load to the two side deflection limiters and the elastic member. *Id.* at 12. According to the Examiner, if the band with elastic member 22 and lobes 14a were not so designed, the device would not be able to fulfill the stated purpose of "inhibiting generating of a local concentrated load." *Id.* at 13, quoting Hayakawa ¶¶ 9, 11. The Examiner also points out that Hayakawa includes a disclosure to the effect that the provision of elastic member 22 allows for a degree of design freedom, including changing the degree of elasticity of the member, as well as the width and projection height of the member. *Id.*, quoting Hayakawa ¶ 19.

Appellant replies that, even if elastic member 22 were to undergo plastic deformation prior to contact being made between lobes 14a and the channel, that does not necessarily mean that elastic member will break, and further, a material undergoing plastic deformation also will continue to exert resistive force. Appeal Br. 16–17. According to Appellant, the load distribution sought by Hayakawa would be obtained regardless of any attempt to set the height of the elastic member 22 and lobes 14a such that elastic member 22 would reach its plastic deformation threshold just as lobes 14a contact the channel. *Id.*

Appellant additionally maintains that the spacing of lobes 14a from elastic member 22 in Hayakawa effectively precludes the lobes from acting to protect elastic member from potentially plastically deforming, and would need to be moved closer in proximity to have such a function or effect. Appeal Br. 17–18. As Appellant notes, however, the concept of having two rigid members flanking an elastic member in order perform this function is disclosed, on the record before us, only in Appellant's disclosure. *Id.*

Not only do we find Appellant's argument to be persuasive of error in the Examiner's conclusion of obviousness, we additionally view Hayakawa's specific alleged advance over the art discussed in that reference to be at least partially at cross-purposes to Appellant's claimed invention. Hayakawa discloses that, in one prior art configuration, lobes of uniform height are disposed regularly along the four sides of the channel. Hayakawa ¶ 5. In another, "the protrusion height of the lobes at the center and both ends among multiple lobes provided on each side of a fuel spacer is set higher than that of the other lobes." *Id.*, ¶ 6.

For its part, Hayakawa discloses reducing the height of the lobes positioned near the corners of the band, relative to the height of lobes positioned near the center. *Id.*, ¶ 10. This configuration, according to Hayakawa, is to conform the heights of the projections to the channel expansion that occurs during reactor operation, described mainly as the side surfaces of the channel tending to bow outwardly. *Id.*, ¶¶ 7, 11. This configuration, too, would have the effect, when an elastic member is used as a central lobe, of increasing the height differential between the elastic member, and the lateral members disposed in the corner regions, thereby potentially allowing for plastic deformation of the elastic member prior to

the corner lobes contacting the inner surface of the channel upon experiencing a significant (i.e., seismic) load.

The rejection of claims 13 and 19, and that of claims 14–16 depending from claim 13, as being unpatentable over Hayakawa, is not sustained.

Claims 23, 25, and 26--§ 103(a)--Hayakawa

Appellant does not present any substantive argument traversing the rejection of claims 23, 25, and 26 as being unpatentable over Hayakawa. These claims depend from independent claim 11, the rejection of which was summarily sustained above. Accordingly, this rejection is also summarily sustained.

Claim 28--§ 103(a)--Hayakawa/Edsinger

Claim 28 depends from claim 11. Appellant presents no substantive arguments traversing this rejection. This claim depends from independent claim 11, the rejection of which was summarily sustained above. Accordingly, this rejection of claim 28 is summarily sustained.

Claims 29 and 30--§ 103(a)--Hayakawa/Eom

Claim 29 depends from claim 11 and requires that the perimeter band have a plurality of specialized bathtubs, that each of the specialized bathtubs have a single elastic resistive member and only two rigid deflection members, and that the perimeter band does not completely extend directly between the elastic resistive member and the two corresponding rigid deflection limiters. Appeal Br. 29 (Claims Appendix). The Examiner and Appellant agree that the latter limitation may be characterized as there being

a break or a gap, with no band material present, between the elastic resistive member and the adjacent rigid deflection members. *See* Final Act. 18; Appeal Br. 22.

The Examiner notes that Hayakawa does not disclose such a break or gap, and cites to Eom as disclosing a break in a spacer grid having an elastic resistive member 63 flanked by rigid deflection members 7, with Figure 6c showing a break on either side of the elastic resistive member, identifying the spaces above and on either side of spring 63 as the locations of the breaks. Final Act. 18–19. The Examiner concludes that it would have been obvious to combine the teachings of Eom with Hayakawa to produce a perimeter band having an elastic resistive member flanked by rigid deflection members, wherein a break would exist on either side of the deflection member. *Id.* at 19. The rationale for the combination is that the resulting structure would have an elastic resistive member that could deform elastically without being too restricted by the band. *Id.*

Appellant argues that Eom does not disclose the areas asserted by the Examiner to be breaks or gaps actually are such, and further asserts that those areas between spring 63 and dimples 7 are solid material, and form a continuous band in the depth direction. Appeal Br. 22. Appellant cites to Figure 6b of Eom in support of this position. *Id.* at 23.

A preponderance of the evidence supports the Examiner's position that Eom discloses breaks or gaps formed in the base strip of Eom at upper and lower extents of spring 63. Although Eom does not describe in text that such gaps are present, a person of ordinary skill in the art viewing Figures 6a–6e collectively would understand that the drawings show gaps, and not solid material, at the areas in question. Taking Figure 6b, relied on by

Appellant for the proposition that there are no gaps present, if no such gaps were present, the raised area terminating at the surface to which reference numeral 63 points would not appear as shown, and would instead appear as a solid protruding surface much in the same manner as leg 634 is shown in the same drawing figure. As a further example, in Figure 6d, which is a sectional view, the elements seen looking past the hatched areas representing the edge at which the cross-section is taken (section line P–P in Figure 6a), include an end view of the legs 634 extending upwardly, which again would not appear in this manner if there were solid material extending from the base strip up to the level at which the legs protrude. Additionally, if no gaps existed all of the structure extending above the base strip would be hatched, indicating solid structure extending upwardly from the base strip.

Accordingly, Appellant's argument directed to Eom does not apprise us of error in the Examiner's position. Appellant further does not present any argument directed to the propriety of the combination. Accordingly, we sustain the rejection of claim 29 as being unpatentable over Hayakawa and Eom. Claim 30, which depends from claim 29, is not separately argued, and thus falls with claim 29.

DECISION

The rejection of claims 13–16, 19, 29, and 30 under 35 U.S.C. § 112, second paragraph, as being indefinite is reversed.

The rejection of claims 11, 12, 17, 18, 20, 24, and 27 under 35 U.S.C. § 102(b) as being anticipated by Hayakawa is affirmed.

The rejection of claims 13–16, 19, 21, and 22 under 35 U.S.C. § 102(b) as being anticipated by Hayakawa is reversed.

The rejection of claims 13–16 and 19 under 35 U.S.C. § 103(a) as being unpatentable over Hayakawa is reversed.

The rejection of claims 23, 25, and 26 under 35 U.S.C. § 103(a) as being unpatentable over Hayakawa is affirmed.

The rejection of claim 28 under 35 U.S.C. § 103(a) as being unpatentable over Hayakawa in view of Edsinger is affirmed.

The rejection of claims 29 and 30 under 35 U.S.C. § 103(a) as being unpatentable over Hayakawa in view of Eom is affirmed.

CONCLUSION

In summary:

Claims Rejected	Basis	Affirmed	Reversed
13–16, 19, 29, and 30	§ 112, ¶ 2 indefiniteness		13–16, 19, 29, 30
11–22, 24, and 27	§ 102(b) Hayakawa	11, 12, 17, 18, 20, 24, 27	13–16, 19, 21, 22
13–16 and 19	§ 103(a) Hayakawa		13–16, 19
23, 25, and 26	§ 103(a) Hayakawa	23, 25, 26	
28	§ 103(a) Hayakawa, Edsinger	28	
29, 30	§ 103(a) Hayakawa, Eom	29, 30	
Overall Outcome		11, 12, 17, 18, 20, 23–30	13–16, 19, 21, 22

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED-IN-PART