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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte FATIGUE FRACTURE TECHNOLOGY LLC
Patent Owner and Appellant

Appeal 2020-000236
Reexamination Control 90/014,120
Patent 7,497,361 B2
Technology Center 3900

Before LINDA E. HORNER, DANIEL S. SONG, and
JEREMY M. PLENZLER, *Administrative Patent Judges*.

PLENZLER, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Pursuant to 35 U.S.C. § 134(b) and 306, Sameh Guirgis (Appellant)¹ appeals from the final rejection of claims 1, 3, 5, and 6. An oral hearing was held on January 21, 2020, and a transcript of that hearing is in the record.

We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

¹ Appellant identifies the real party in interest as Fatigue Fracture Technology LLC. Appeal Br. 1.

CLAIMED SUBJECT MATTER

The claims are directed to a method for fracture separation of a part, such as a connecting rod. Claim 1, reproduced below in amended formatted as provided by Appellant, is illustrative of the claimed subject matter:

1. A process for the fracture separation of a part having a cylindrical bore passing there through into a first portion and a second portion, the cylindrical bore having a central axis, the part having two opposed sides proximate to the intersection of a predetermined fracture plane passing through the cylindrical bore and the part, the process including the steps of:

applying at least one fatigue force to at least one of the first portion and the second portion, said at least one fatigue force being applied to fatigue the part by creating fatigue cracks along said predetermined fracture plane and weaken the part for fracture of the part into the first portion and the second portion so as to separate the first portion from the second portion substantially along said predetermined fracture plane, said at least one fatigue force being selected from the group consisting of:

i) a longitudinal cyclic force applied to one of the first portion and the second portion relative to the other of the first portion and the second portion, said longitudinal cyclic force being applied in a direction substantially perpendicular to said predetermined fracture plane, and

ii) a lateral cyclic force applied to each of the opposed sides of the part, each of said lateral cyclic forces being applied along a substantially straight line that is substantially parallel to the predetermined fracture plane and substantially perpendicular to the central axis, where at any time instant, each of said lateral cyclic forces being substantially equal in magnitude and acting opposite in direction to one another; and

applying a dynamic force to one of the first portion and the second portion relative to the other of the first portion and the second portion, of the part weakened with fatigue cracks therein,

in a direction substantially perpendicular to said predetermined fracture plane and-the fatigue cracks, to thus separate the first portion from the second portion via a brittle fracture.

REFERENCES

The prior art relied upon by the Examiner is:

Name	Reference	Date
Bayliss	US 3,155,300	November 3, 1964
Brovold	US 4,754,906	July 5, 1988
Cavallo	US 5,699,947	December 23, 1997

REJECTIONS

Claims 1, 3, 5, and 6 are rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement.

Claims 1, 3, 5, and 6 are rejected under 35 U.S.C. § 112, second paragraph, as indefinite.

Claims 1, 3, 5, and 6 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Bayliss and Cavallo.

Claims 1, 3, 5, and 6 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Brovold and Bayliss.

OPINION

Written Description

The Examiner explains that “[c]laim 1 recites that the portions of the part subject to the process are separated ‘via a brittle fracture’” and determines that the Specification “lacks adequate written description for this claimed subject matter.” Ans. 3. The Examiner explains that “Patent Owner has asserted that support for claim 1 is found in [the Specification] at column

1, lines 57–62,” but “this section . . . is directed to technical background, and not to a description of a new and unobvious invention.” *Id.*

The Examiner is correct that Appellant points to column 1, lines 57–62 of the Specification as providing written description support for the brittle fracture limitation in the claim. Appeal Br. 12. Appellant, however, additionally contends that the Specification discloses that the applied “forces . . . stress the connecting rod *within the linear elastic regime*” and “a person skilled in the art will understand that the invention refers to a *brittle fracture which takes place only under linear elastic conditions.*” *Id.* at 13 (emphasis added) (referencing Spec. 4:12–15, 46–48). Although “[t]he examiner agrees that the Guirgis invention is to be carried out, generally, under linear elastic conditions to which the principle of superimposed forces is applicable,” the Examiner explains that “claim 1 does not recite the forces identified in the passages found at columns 3–4.” Ans. 13. The Examiner explains that “claim 1 broadly recites a fracture separation process that utilizes a fatigue force for ‘creating fatigue cracks’ and a dynamic force for effecting ‘a brittle fracture.’” *Id.* Appellant has the better position.

The Examiner does not dispute, let alone address in a sufficient manner, Appellant’s contention that one skilled in the art would understand that stressing only under elastic conditions necessarily results in a brittle fracture. Therefore, because the Specification states that “[a]ll of the external forces used . . . stress the connecting rod within the linear elastic regime” (Spec. 4:46–48), we have no reason to believe this description does not provide written description for the “brittle fracture” recited in the claims

if a brittle fracture necessarily results from stressing only under elastic conditions.

Accordingly, we do not sustain the Examiner's decision to reject claims 1, 3, 5, and 6 as failing to comply with the written description requirement.

Indefiniteness

The Examiner determines that the phrase "brittle fracture" renders the claims indefinite, explaining that "the general term 'brittle' is ambiguous and encompasses a wide range of materials." Final Act. 3. Appellant responds that "the Examiner has intentionally confused the meaning of the term 'brittle fracture' with the term 'brittle material,'" which "are distinct in the literature." Reply Br. 8 (citing various references in support of contention). Appellant has the better position.

The claim recites the phrase "brittle *fracture*" (emphasis added), not brittle material. The Specification refers to the term "brittle" when discussing material failure types, rather than types of materials. Spec. 1:57–59. The evidence provided by Appellant also supports this proposition. *See* Reply Br. 8 (citing various definitions to support Appellant's contentions). Based on the record before us, we are not persuaded that the phrase "brittle fracture" results in the ambiguity asserted by the Examiner.

Accordingly, we do not sustain the Examiner's decision to reject claims 1, 3, 5, and 6 as indefinite.

Obviousness–Bayliss/Cavallo

The Examiner finds that Bayliss teaches the majority of limitations recited in claims 1, 3, 5, and 6. Final Act. 6. For example, Bayliss teaches “applying alternating stresses to induce rapid fatigue failure of the bar at the weakened section” (Bayliss 1:17–19), which the Examiner cites as corresponding to the “longitudinal cyclic force,” which “creat[es] fatigue cracks . . . and weaken[s] the part for fracture of the part” (Final Act. 6)².

Appellant alleges, without explanation, in the Appeal Brief, that the alternating force in Bayliss cited by the Examiner is not used to create a fracture. Appeal Br. 16. At oral hearing, however, Appellant acknowledged that Bayliss discloses fracture and that little breaks have to be happening in order for the piece to break in Bayliss. *See* Tr. 12:8–16. Appellant acknowledged that fatigue cracks are formed in Bayliss. *See* Tr. 16:20–24. There is no other dispute regarding the Examiner’s findings based on Bayliss.

The Examiner finds that Bayliss does not teach “the method being used both to fatigue fail a connecting rod, and with the application of a final ‘dynamic force.’” Final Act. 6. The Examiner finds that Cavallo teaches “that connecting rods are beneficially manufactured by parting a cap from the rod portion so that the two rod parts can be reconnected in a desirable manner, and to simplify the production cycle in general.” *Id.* at 7 (citing Cavallo 1:7–44). The Examiner also finds that Cavallo teaches the recited “dynamic force.” *Id.* (citing Cavallo 2:66–3:13), *see also id.* at 8. Again,

² The quoted language is from claim 1, including underlining found in the claim.

there is no actual dispute by Appellant as to these findings. *See* Appeal Br. 16–18. This was confirmed at oral hearing. Although initially disputing the finding that Cavallo teaches the recited “dynamic force” because Cavallo’s force is an additive force (Tr. 18:19–19:10), Appellant later acknowledged that Cavallo teaches the recited “dynamic force” because Appellant’s Specification also describes its dynamic force as an additive force (*id.* 19:11–19).

Accordingly, we are left with no actual dispute from Appellant regarding the Examiner’s findings for this rejection. Indeed, Appellant acknowledged this at oral hearing. *See* Tr. 19:18–26 (clearly acknowledging that rationale for the proposed combination is the only disputed issue).

As for the rationale, the Examiner explains that “[t]he fatigue failure method/process disclosed in Bayliss would benefit from the application of a final force that imparts an instantaneous peak stress/force to complete the fracture separation.” Ans. 18. The Examiner reasons that it would have been obvious to fatigue a part (as taught by Bayliss) before applying a final fracture force (as taught by Cavallo) because it

would be readily apparent to one skilled in the art the application of a final peak stress/force, such as is taught in Cavallo, to a part that has been fatigue-weakened as disclosed in Bayliss, would result in the fracture separation being completed in an efficient manner. In this regard, the magnitude of the final separation force would logically be less than that needed to separate a non-fatigue-weakened part (for example), and the final separation force would require less time to effect the part separation as compared to the time needed to separate the part using only the superimposed fatigue stressing disclosed in Bayliss.

Id. at 19. Simply stated, the Examiner’s rationale is that one skilled in the art would have readily appreciated that it makes sense to weaken a part before applying a final peak load because that initial fatigue of the part reduces the magnitude required for the final load and using that final peak load reduces the time for part separation.

Appellant contends that “[u]sing Bayliss in view of Cavallo will result in a considerably more expensive fracture process, where cryogenic cooling or a similar technique is required and heavier blanks will be needed along with additional machining of the parts.” Appeal Br. 17. Appellant further contends that “there is no expectation of any improvement or gain from applying the teachings in the Bayliss patent over a period of a few seconds (it needs a much longer time period) with the teachings in the Cavallo patent.” Appeal Br. 17 (citing Yu Declaration ¶ 53). The cited portion of the Yu Declaration asserts:

One skilled in the art will not contemplate using Bayliss in view of Cavallo. Bayliss process should take hours to be completed on a connecting rod. No improvement or gain would be expected from applying Bayliss process, over a period of few second[s], in combination of Cavallo’s process. The skilled artisan will expect that using Bayliss in view of Cavallo will result in a considerably more expensive fracture process, where cryogenic cooling or a similar technique will be required and heavier blanks will be needed and significant additional machining will be required. In the meantime, the artisan will not expect any improvement or gain from applying Bayliss over a period of few seconds, while the Bayliss requires hours to fracture the part.

Yu Declaration ¶ 53. Appellant further contends that “[t]here is no motivation to combine the references because each reference independently

accomplishes the separation of a part or part of a metal bar using different methodologies.” Appeal Br. 17.

Appellant’s contentions are not persuasive. As for Appellant’s contentions related to Bayliss’s use of a cooling step, we note that the claims do not preclude the use of such a cooling step. Although the use of a cooling step in Bayliss may add cost, it comes with benefits. Combining Bayliss’s fatigue method and Cavallo’s parting process reduces the parting force applied at the end by Cavallo. Cavallo teaches that reducing the parting force is desirable. Cavallo 2:3–9 (noting quick wear of contact surfaces), 2:22–30 (noting yielding and elongation of the cap). With respect to the alleged lack of “improvement or gain from applying Bayliss over a period of few seconds,” the Examiner does not propose, nor do the claims require, applying the cyclic force for only a few seconds. As Appellant acknowledged at oral hearing, one skilled in the art would understand how to combine the general teachings of Bayliss and Cavallo to achieve the improved arrangement of fatigue weakening followed by a dynamic force to break a part as explained by the Examiner. *See, e.g.*, Tr. 14:20–21 (acknowledging that one skilled in the art would understand how long to apply a fatigue force like that taught by Bayliss).

Appellant’s contentions regarding the Examiner’s proposed combination of teachings essentially amount to an allegation that the proposed combination is based on hindsight. *See* Tr. 20:12–15 (“Using hindsight, after I’ve read all of these, possibly; but the references that were cited, all of them are fatigue to fail. So, looking at these references today, that’s the only comment I can make. I mean it makes sense.”). The

Appeal 2020-000236
Reexamination Control 90/014,120
Patent 7,497,361 B2

Examiner's rejection, however, does not rely on impermissible hindsight because one skilled in the art would arrive at the proposed combination without relying on Appellant's disclosure for guidance. As Appellant acknowledged, "it makes sense to weaken a part with a fatigue fracture before you apply a final peak force." Tr. 20:4–15. That is, consistent with the Examiner's rationale, one skilled in the art would find it desirable to first weaken a part via fatigue to reduce a required fracture force magnitude. *See* Ans. 18–19.

For at least these reasons, we are not apprised of error in the rejection of claim 1. Appellant relies on the unpersuasive arguments presented for claim 1 for the patentability of claims 3, 5, and 6. Appeal Br. 18.

Obviousness–Brovold/Bayliss

Because we affirm the Examiner's decision to reject claims 1, 3, 5, and 6 as being unpatentable over Bayliss and Cavallo, we do not reach the rejection of those same claims as being unpatentable over Brovold and Bayliss.

CONCLUSION

The Examiner's rejections under 35 U.S.C. § 112 are reversed. The Examiner's rejection under 35 U.S.C. § 103(a) based on Bayliss and Cavallo is affirmed. We do not reach the Examiner's rejection under 35 U.S.C. § 103(a) based on Brovold and Bayliss.

DECISION SUMMARY

In summary:

Claims Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
1, 3, 5, 6	112 ¶ 1	Written Description		1, 3, 5, 6
1, 3, 5, 6	112 ¶ 2	Indefiniteness		1, 3, 5, 6
1, 3, 5, 6	103(a)	Bayliss, Cavallo	1, 3, 5, 6	
1, 3, 5, 6	103(a)	Brovold, Bayliss	n/a	n/a
Overall Outcome			1, 3, 5, 6	

REQUESTS FOR EXTENSIONS OF TIME

Requests for extensions of time in this ex parte reexamination proceeding are governed by 37 C.F.R. § 1.550(c). *See* 37 C.F.R. § 41.50(f).

AFFIRMED

Appeal 2020-000236
Reexamination Control 90/014,120
Patent 7,497,361 B2

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