Trials@uspto.gov
571-272-7822

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

NAVISTAR, INC.,
Petitioner,

v.

FATIGUE FRACTURE TECHNOLOGY, LLC,
Patent Owner.

Case IPR2018-00853
Patent 7,143,915 B2

Before LINDA E. HORNER, BENJAMIN D. M. WOOD, and RICHARD H. MARSCHALL, *Administrative Patent Judges.*

HORNER, *Administrative Patent Judge.*

FINAL WRITTEN DECISION
35 U.S.C. § 318(a) and 37 C.F.R. § 42.73

I. INTRODUCTION

Navistar, Inc. ("Petitioner") filed a Petition requesting *inter partes* review of claims 1, 7, 9, and 10 of U.S. Patent No. 7,143,915 B2 (Ex. 1001, "the '915 patent"). Paper 1 ("Pet."). Fatigue Fracture Technology LLC ("Patent Owner") filed a Preliminary Response. Paper 9 ("Prelim. Resp."). Upon consideration of the Petition and Preliminary Response, we instituted an *inter partes* review pursuant to 35 U.S.C. § 314, as to all of the challenged claims and on all grounds raised in the Petition. Paper 13 ("Inst. Dec.").

Subsequent to institution, Patent Owner filed a Patent Owner Response (Paper 19, "PO Resp."), Petitioner filed a Reply to Patent Owner's Response (Paper 29, "Reply"), and Patent Owner filed a Patent Owner Sur-Reply (Paper 32, "Sur-Reply").

Petitioner filed a Motion to Strike portions of Patent Owner's Sur-Reply and the accompanying Exhibits (Paper 35, "Mot. to Strike") and Patent Owner filed an Opposition to Petitioner's Motion (Paper 38, "Opp. Mot. to Strike").

Petitioner also filed a Motion to Exclude (Paper 40, "Pet. Mot. Exclude"), Patent Owner filed an Opposition to Petitioner's Motion (Paper 48, "PO Opp. Mot. Exclude"), and Petitioner filed a Reply (Paper 50, "Pet. Reply Mot. Exclude").

Patent Owner filed a Motion to Exclude (Paper 45, "PO Mot. Exclude"), Petitioner filed an Opposition to Patent Owner's Motion (Paper 46, "Pet. Opp. Mot. Exclude"), and Patent Owner filed a Reply (Paper 51, "PO Reply Mot. Exclude").

On June 11, 2019, we held an oral hearing. Paper 57 ("Tr.").

This Final Written Decision is entered pursuant to 35 U.S.C. § 318(a). For the reasons that follow, we determine that Petitioner has shown, by a preponderance of the evidence, that claims 1, 7, 9, and 10 of the '915 patent are unpatentable. We also grant, in part, Petitioner's Motion to Strike and Petitioner's Motion to Exclude. We deny Patent Owner's Motion to Exclude.

A. Related Matters

The parties indicate that the '915 patent is asserted in the United States District Court for the Northern District of Illinois, in a case captioned *Fatigue Fracture Technology, LLC v. Navistar, Inc.*, Case No. 1:15-cv-5667 (N.D. Ill.). Paper 7 (Petitioner's Second Updated Mandatory Notices); Paper 5 (Patent Owner's Mandatory Notices). The parties also indicate that related U.S. Patent No. 7,497,361, which is a divisional of the '915 patent, is the subject of a reexamination proceeding (Appl. No. 90/014,120) before this Office. *Id.*

B. Real Parties in Interest

Petitioner identifies only itself as a real party in interest. Pet. 83; Paper 7. Patent Owner identifies only itself as a real party in interest. Paper 5.

C. The '915 Patent

The '915 patent relates to a method to fracture connecting rods. Ex. 1001, 3:3–4. The patent describes that most known methods for fracturing connecting rods apply an outward pressure to the crank bore until the generated stresses are high enough to fracture the connecting rod. *Id.* at 1:30–33. The patent teaches that the large magnitude forces required to fracture connecting rods made of high strength materials have a negative

effect on quality of the fractured connecting rod. *Id.* at 1:39–43. The patent also teaches that such forces cause disadvantages, such as plastic deformation, lack of flexibility in adapting the same technique to different sizes of connecting rods, repeated breakage of force exertion elements of the machine, and poor quality of the fractured connecting rod. *Id.* at 1:43–48. The '915 patent recognizes that some fracture methods attempted to overcome these difficulties by reducing or weakening the cracking area using techniques such as cryogenic cooling and electronic beam hardening. *Id.* at 1:34–38. According to the patent, however, these techniques have "a deleterious effect on material performance." *Id.* at 1:38.

The process of the '915 patent uses several small magnitude forces to raise the stress intensity factor in the connecting rod up to the fracture point to avoid the use of a single large force to fracture the rod. *Id.* at 3:4–8. The '915 patent describes that this approach eliminates many problems associated with the use of large forces and provides better control over the fracturing process, because the contribution of each factor is optimized to achieve the best results. *Id.* at 3:8–11.

In the method described in the '915 patent, time-varying forces, such as harmonic forces, are applied to a pre-notched connecting rod to cause the pre-existing crack to grow incrementally depending on the range of fluctuation in the stress intensity factor. *Id.* at 3:16–20. "[A]s the crack grows, the absolute value of the stress intensity factor will increase." *Id.* at 3:22–24. The '915 patent describes that the time-varying forces are applied simultaneously to two sides of the connecting rod and act along a straight line parallel to the predetermined fracture plane and perpendicular to the axis of the bore cylindrical surface. *Id.* at 3:54–58. "The crack extends, and

fracture may occur, depending on the relative magnitude of stress intensity factor and material fracture toughness." *Id.* at 3:49–52. Alternatively, the time-varying force can be applied in a direction perpendicular to the predetermined fracture plane. *Id.* at 6:41–44.

In addition, a primary pre-stressing force can be applied in a direction perpendicular to, and away from, the predetermined fracture plane by moving an upper jaw of a clamping arrangement away from the fracture plane. *Id.* at 4:3–7. A secondary pre-stressing force can be applied by two static forces equal in magnitude and acting on the same straight line in opposite directions, using the same mechanism used to apply the time-varying forces. *Id.* at 4:14–18. Specifically, two contacts advance until they slightly press the part applying the secondary pre-stressing forces, and then they move forward and backward applying the time-varying forces. *Id.* at 4:18–21. The '915 patent describes that application of these pre-stressing forces is optional and elimination of these pre-stressing forces is not a departure from the scope of the invention. *Id.* at 6:45–48.

The '915 patent describes that in the process a dynamic force is applied at a time instant T_f by increasing the primary pre-stressing force suddenly as an impulsive force at T_f, or at a slower rate within a period centered on T_f. *Id.* at 4:35–38. "The time instant T_f, to be determined by performing several simple tests, by applying the fracturing force during different cycles at different time instants such as T_0 (minimum deformation) or T_{max} (maximum K_I) and comparing the quality of the fractured connecting rods." *Id.* at 4:38–43. "[A] longer period before applying the dynamic force, increases the fatigue effect [imparted by the time varying force]." *Id.* at 4:55–56.

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