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Paper 38
Entered: September 11, 2018

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

CATERPILLAR INC.
Petitioner,

v.

ERNIE BROOKINS,
Patent Owner.

Case IPR2017-01020
Patent 7,824,290 B1

Before JILL D. HILL, BEVERLY M. BUNTING, and TIMOTHY J. GOODSON, *Administrative Patent Judges.*

HILL, *Administrative Patent Judge.*

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

I. INTRODUCTION

Caterpillar Inc. ("Petitioner") filed a Petition requesting an *inter partes* review of claims 1–10 ("the challenged claims") of U.S. Patent No. 7,824,290 B1 (Ex. 1001, "the '290 patent"). Paper 1 ("Pet."). Ernie Brookins ("Patent Owner") filed a Preliminary Response. Paper 29. We instituted *inter partes* review of all grounds and all claims challenged in the Petition. Paper 30, 7, 25 (Dec. on Inst."). After institution, Patent Owner filed a Patent Owner's Response (Paper 32, "PO Resp."), and Petitioner filed a Reply (Paper 34, "Reply"). An oral hearing was held on June 5, 2018, and a copy of the transcript was entered into the record. Paper 37 ("Tr.").

We issue this Final Written Decision pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73 regarding the patentability of claims 1–10. For the reasons set forth below, we conclude Petitioner has shown, by a preponderance of the evidence, that claims 1–10 are unpatentable.

A. Related Matters

The parties indicate that the '290 patent has been asserted in *Ernie Brookins v. Caterpillar Inc.*, 3:16-cv-00291 (D.N.D.). Pet. 3; Paper 28, 2. Additionally, Patent Owner states that the '290 patent has also been asserted in: *Brookins Hybrid Drive Systems, LLC v. M.A.C., Inc.*, 3:12-cv-00101 (D.N.D.); *Warp Speed Torque Drive, LLC v. M.A.C., Inc.*, 3:13-cv-00045 (D.N.D.); and *Brookins v. Parker-Hannifin Corp.*, 3:15-cv-00065 (D.N.D.). Paper 28, 2–3.

B. The '290 Patent (Ex. 1001)

The '290 patent is directed to a rotational power distribution and control system including a hydrostatic pump/motor, the system being

operable to function "similarly to a typical automotive manual clutch" or as a "continuously or infinitely variable transmission[]." Ex. 1001, Abstract. The '290 patent is also directed to methods related thereto. *Id.*

Figure 1 is reproduced below.

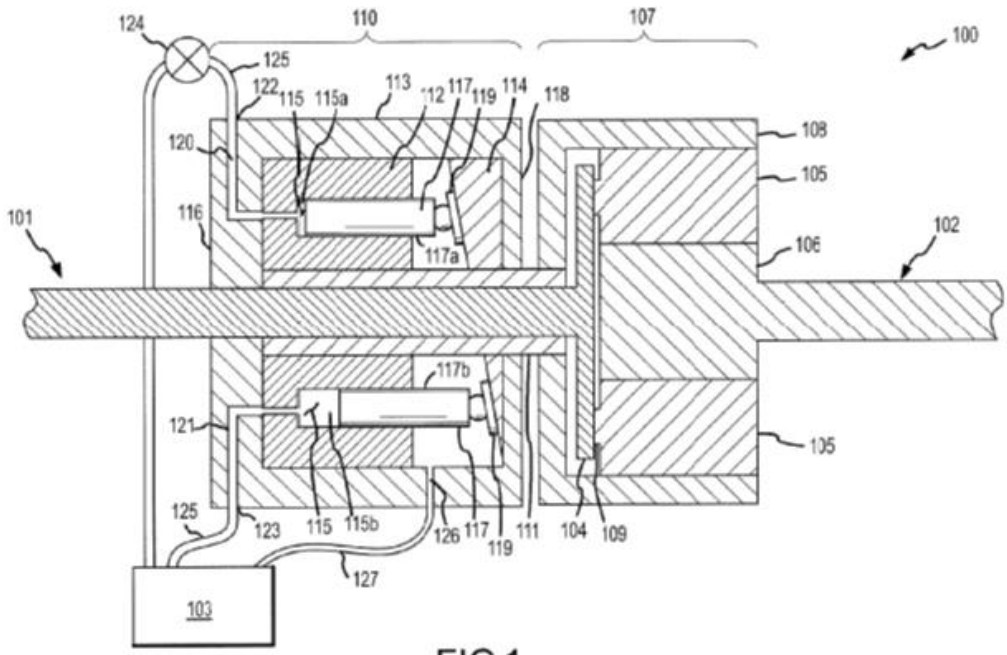

FIG.1

Figure 1 is a cross-sectional schematic view of an embodiment of a rotational power distribution and control system configured as a hydraulic clutch. *Id.* at 8:59–61.

Figures 1–3 are described in the '290 patent as illustrating "hydraulic clutch system" embodiments of a rotational power distribution and control system. *Id.* at 8:59–67. Figures 4A and 4B are described as illustrating a "continuously variable transmission drive system[]" embodiment of the rotational power distribution and control system. *Id.* at 9:1–4. Figures 5–7 and 8A–8G are described as illustrating a "pump/motor hybrid drive system" embodiment of the rotational power distribution and control system. *Id.* at 9:5–17.

The embodiment of the rotational power and control device 100 illustrated in Figure 1 includes planetary gear set 107, hydrostatic (or other hydraulic) pump 110, a first rotational interface in the form of first shaft 101, a second rotational interface in the form of second shaft 102, and hydraulic circuit 103. *Id.* at 10:42–48, 12:12–15. First shaft 101, second shaft 102, and hydrostatic pump 110 each interface with a different one of the three main components (i.e., sun gear 106, planet carrier 104, and ring gear 108) of planetary gear set 107. *Id.* at 10:52–58.

In a planetary gear set, a direct mechanical interconnection can be achieved between any two of the three main components by holding the third main component stationary. *Id.* at 11:40–43. For example, if hydrostatic pump 110 holds ring gear 108 stationary, rotation of planetary carrier 104 by first shaft 101 will result in rotation of sun gear 106 and second shaft 102. *Id.* at 11:43–45. However, if ring gear 108 is allowed to rotate freely, rotation of planetary carrier 104 by first shaft 101 will not result in rotation of sun gear 106 and second shaft 102. *Id.* at 11:54–61.

Hydrostatic pump 110 has housing 113 and cylinder block 112 with axial bores 115 in which pistons 117 are slidably disposed. *Id.* at 12:27–40. Housing 113 includes stationary angled swash plate 114 that slidably interfaces with each of pistons 117 as the pistons rotate with their cylinder block 112 relative to housing 113 and swash plate 114. *Id.* at 12:33–44. As pistons 117 rotate relative to housing 113 and swash plate 114, the inclination of swash plate 114 causes the rotating pistons to be compressed in their bores as they rotate along certain portions of swash plate 114, which causes fluid to flow from the cylinder block via first port 122 of hydrostatic pump 110. *Id.* at 12:63–13:41.

Planetary gear set 107 has a "free-wheeling mode" where the input is effectively disconnected from the output by letting the third component of planetary gear set 107 (i.e., ring gear 108 in the embodiment of Figure 1) free wheel. In a second, "locked mode," the third component of planetary gear set 107 is held stationary, allowing the other two components (i.e., sun gear 106 and planetary carrier 104 in the embodiment of Figure 1) to be interconnected and transfer rotational force therebetween. *Id.* at 13:42–49. Additionally, in a "third mode," by selectively applying a variable resistance to the third component, the ratio of rotation of the other two components can be continuously varied between the free-wheeling mode and the locked mode. *Id.* at 13:49–53.

Such variable resistance is attained using a valve 124 that restricts fluid flow from first port 122 of the hydrostatic pump 110. *Id.* at 13:54–57. This flow restriction prevents fluid from leaving the bore of pistons 117 as they are compressed via swash plate 114, and the resultant friction within hydrostatic pump 110 thereby prevents relative rotation of cylinder block 112 and housing 113, such that rotation of ring gear 108 is prevented, causing rotational force to be transmitted from first shaft 101 and planetary carrier 104 to second shaft 102 and sun gear 106. *Id.* at 13:54–14:3, 14:7–17. "[B]y regulating the flow through valve 124, the ratio of the rotational rate of the first shaft 101 with respect to the rotational rate of the second shaft 102 may be continuously varied." *Id.* at 14:3–7.

C. Prosecution History of the '290 Patent (Ex. 1003)

Patent Owner, Mr. Brookins, makes certain arguments based on a restriction requirement and subsequent election that occurred during

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