

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ROBERT BOSCH LLC and DAIMLER AG,
Petitioner,

v.

ORBITAL AUSTRALIA PTY LTD,
Patent Owner.

Case IPR2015-01258
Patent 5,655,365

Before KEN B. BARRETT, JEREMY M. PLENZLER, and
AMANDA F. WIEKER, *Administrative Patent Judges*.

BARRETT, *Administrative Patent Judge*.

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

I. INTRODUCTION

Robert Bosch LLC and Daimler AG (collectively, “Petitioner”) filed a request for an *inter partes* review of claims 1, 2, 5, 9, 10, 12–14, and 18 of U.S. Patent No. 5,655,365 (“the ’365 patent,” Ex. 1001). Paper 3 (“Pet.”). Orbital Australia Pty Ltd (“Patent Owner”) filed a Patent Owner Preliminary Response. Paper 10 (“Prelim. Resp.”). The Board instituted a trial for claims 1, 2, 5, 9, 10, 12–14, and 18. Paper 11 (“Dec. on Inst.”). Although Petitioner proposed nine grounds of unpatentability, we instituted trial on only one asserted ground of unpatentability for anticipation and four asserted grounds of unpatentability for obviousness. Dec. on Inst. 18.

After institution of trial, Patent Owner filed a Request for Rehearing, arguing, *inter alia*, that our preliminary claim construction was in error. Paper 13, 6. We denied the Request, noting that “Patent Owner’s arguments regarding the constructions of the claim terms can be submitted in its patent owner response, but are not appropriate subject matter for a request on rehearing.” Paper 16, 5; *see id.* at 7. We also notified Patent Owner that a certain aspect of Patent Owner’s proposed claim construction remained unclear to us. *Id.* at 4.

In due course, Patent Owner filed a Patent Owner Response (“PO Resp.”) to the Petition. Paper 19. Petitioner filed a Reply (“Reply”) to Patent Owner’s Response. Paper 23.

Oral hearing was conducted on August 29, 2016. The record contains a transcript of the hearing. Paper 27 (“Tr.”).

The Board has jurisdiction under 35 U.S.C. § 6. This Final Written Decision is issued pursuant to 35 U.S.C. § 318(a).

For the reasons discussed herein, we determine Petitioner has shown by a preponderance of the evidence that claims 1, 2, 5, 9, 10, 12–14, and 18 are unpatentable.

A. Related Proceedings

Both parties identify, as matters involving the '365 patent, a district court case, *Orbital Australia Pty Ltd. and Orbital Fluid Technologies, Inc., v. Daimler AG, Mercedes-Benz USA LLC, Mercedes-Benz US International Inc., Robert Bosch GmbH, and Robert Bosch LLC*, Case No. 3:14-cv-808-REP (E.D. Va.), and Patent Trial and Appeal Board case IPR2015-01259. Pet. 58–59; Paper 5. Additionally, we note that Petitioner filed a Petition in IPR2016-00083 (institution denied) challenging claims of the '365 patent. *See, e.g.*, Paper 20.

B. The '365 Patent

The '365 patent pertains to “a method of operating an internal combustion engine in order to produce high exhaust gas temperatures” in the context of catalytic treatment of exhaust gases to reduce contaminants. Ex. 1001, col. 1, ll. 4–9. The patent explains that the catalyst, to effectively reduce contamination levels, must attain a minimum operating temperature, the “light-off” temperature. *Id.* at col. 1, ll. 10–17. The patent is directed to a method to reduce the time required to raise the catalyst to a light-off temperature condition, for example, upon engine start-up after a period of non-operation, and to maintain that condition. *Id.* at col. 1, ll. 19–25, 49–55.

The '365 patent describes a method where the ignition of the air/fuel mixture within at least one engine cylinder is retarded to a point when the

crankangle is After Top Dead Centre¹ (ATDC) and, while the ignition is so retarded, increasing the fueling rate to that cylinder to a level higher than required when operating normally. *Id.* at col. 1, ll. 56–64. The combination of the retarded ignition and the high fuelling rate results in a high amount of thermal energy available to heat the catalyst. *Id.* at col. 3, ll. 48–54. The specification, explaining why there is a need to increase the fueling rate during the disclosed method of operation, states:

[A]t startup the engine typically will operate at a relatively low load and speed, such as is termed “engine idle”, and therefore the amount of fuel being delivered to the engine is comparatively small and hence, only a relatively small amount of heat is available for raising the temperature of the exhaust gases and hence the temperature of the catalytic material to its “light-off” temperature.

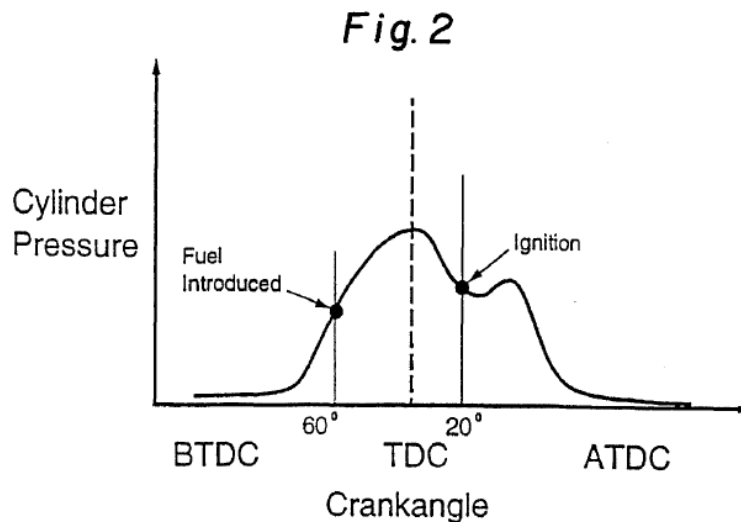
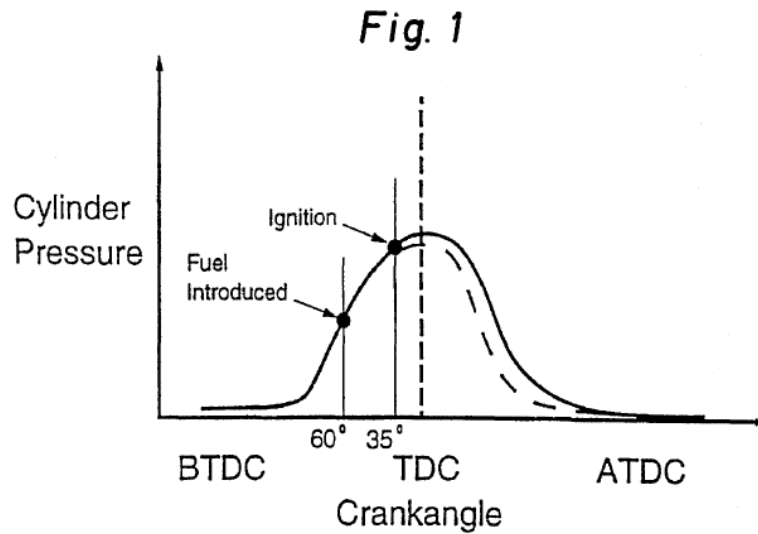
Id. at col. 1, ll. 26–32. The specification provides the following example regarding the increased fueling rate:

In a two-stroke three cylinder 1.2 liter direct injected engine, the anticipated fuel per cycle at normal engine idle is 3 mg/cylinder/cycle whereas when retarded ignition and a high fuelling rate is enabled in accordance with the method of the present invention, the increased fuelling rate may be as high as 18 to 25 mg/cylinder/cycle, i.e[.,] 85% to 115% of the fuelling rate at maximum engine load.

Id. at col. 5, ll. 50–57. In the claimed method, the timing of the introduction of fuel is maintained at before top dead centre (BTDC). *Id.* at col. 6, ll. 16–18 (claim 1).

¹ The '365 patent uses Australian spelling for certain words such as “centre” and “fuelling.” We use in this decision both the Australian and American spellings interchangeably.

Figures 1 and 2 of the '365 patent are reproduced below.



Figures 1 and 2 depict graphs showing the cylinder pressure-crankangle characteristics for a typical direct injected two-stroke internal combustion engine and for such an engine operated according to the method of the '365 patent, respectively. *Id.* at col. 2, ll. 46-52.

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