

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ACES FUEL INJECTION, INC.

Petitioner,

v.

HOLLEY PERFORMANCE PRODUCTS, INC.

Patent Owner.

IPR CASE No.: IPR2026-00434

U.S. Patent No. 12,203,434

Title: FUEL INJECTION THROTTLE BODY

**PETITION FOR *INTER PARTES* REVIEW
OF U.S. PATENT NO. 12,203,434**

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LIST OF EXHIBITS

EXHIBIT NO.	DESCRIPTION
Ex. 1001	U.S. Patent No. 12,203,434 (the "'434 Patent")
Ex. 1002	File History for the Application of U.S. Patent No. 12,203,434
Ex. 1003	U.S. Patent No. 7,735,475 ("Farrell")
Ex. 1004	U.S. Patent No. 9,303,578 ("Wittkopf")
Ex. 1005	U.S. Patent No. 9,115,671 ("Benoit")
Ex. 1006	Declaration of Mr. Kenneth Farrell

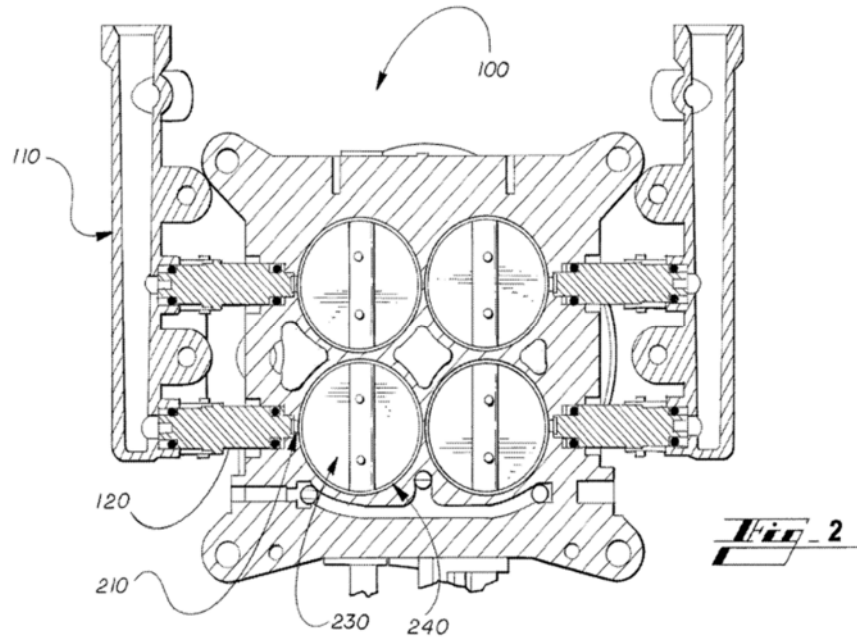
I. INTRODUCTION

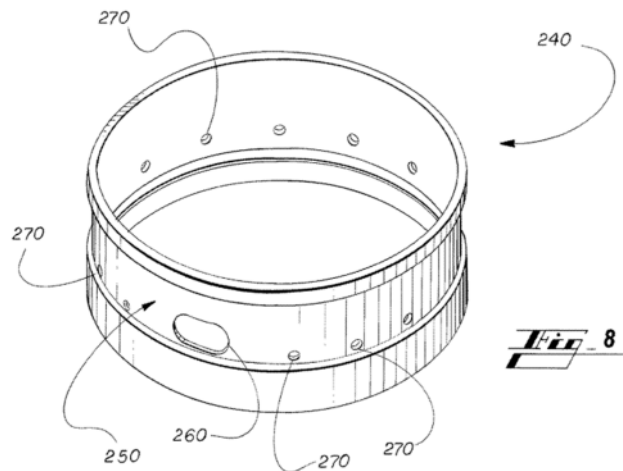
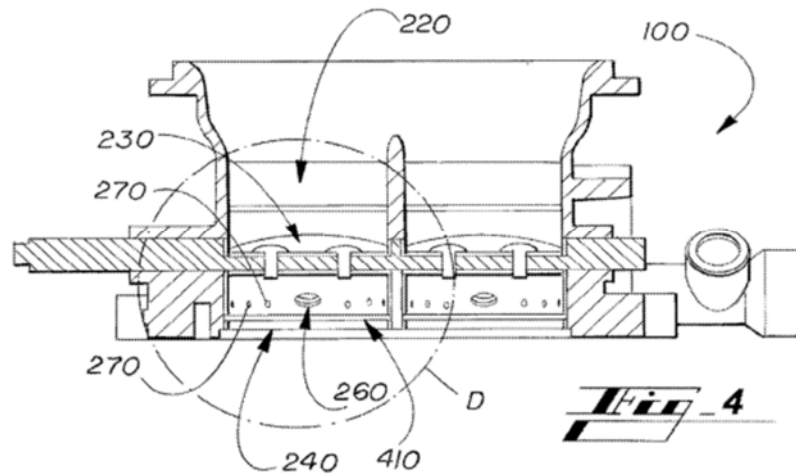
The Petitioner, Aces Fuel Injection, Inc. ("Aces"), pursuant to 35 U.S.C. §§ 311-319 and 37 C.F.R. § 42.100 *et seq.*,¹ respectfully requests *Inter Partes* Review ("IPR") of claims 1-12 of U.S. Patent No. 12,203,434 ("the '434 Patent," Ex. 1001). Petitioner's request is supported by the Expert Declaration of Kenneth Farrell (Ex. 1006) ("Farrell Decl."), and the other exhibits submitted herewith.

In general, as illustrated in FIGS. 2, 4, and 8 below, the claims of the '434 Patent are directed to a throttle body fuel injection system "for a non-carbureted internal combustion engine" and that is intended to replace a carburetor. The claimed system includes a throttle body (100) with at least one air intake (220) capable of allowing an airflow to move vertically from an upper end to a lower end of the air intake, a fuel injector (120) associated with each air intake, a fuel port (210) associated with each air intake and capable of receiving fuel from the

¹ Unless otherwise stated, all statutory and regulatory citations herein are to 35 U.S.C. or 37 C.F.R. All exhibits cited herein have been stamped with Exhibit and page numbers (e.g., "Ex. 1002 – 1," "Ex. 1002 – 2"). Unless otherwise stated, all exhibit citations are to the stamped page numbers, not the original page numbers, or to column and line number ranges (e.g. "1:10-1:15").

corresponding fuel injector, a fuel channel (250) in each air intake and communicating with and configured to receive fuel from the fuel port, a plurality of orifices (260, 270) disposed annularly about the air intake and allowing fuel to pass from the fuel channel into the air intake, a rotating throttle plate (230) for varying airflow moving through the air intake; and an electronic controller (or "ECU," not shown) for controlling the fuel injector.

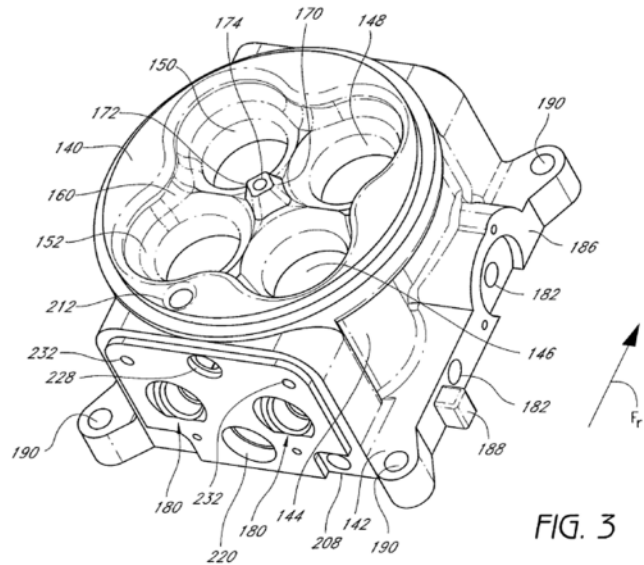
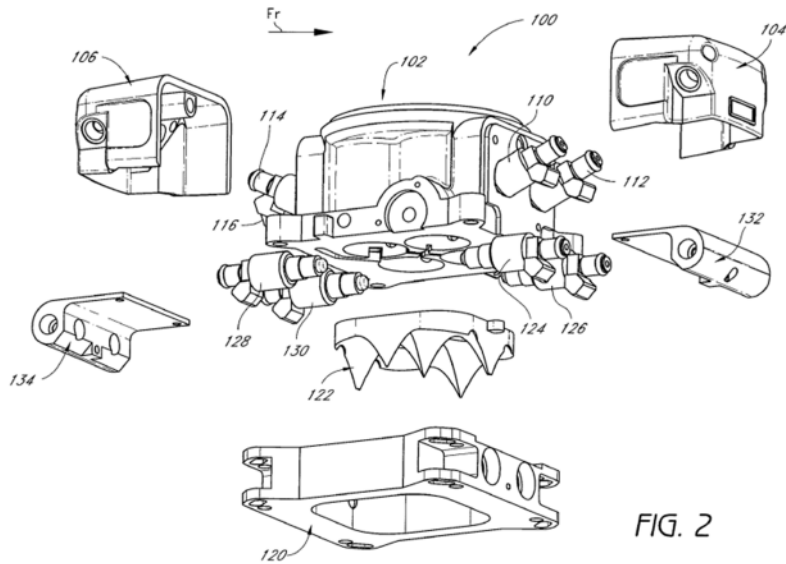




The Board should institute IPR because there is at least a reasonable likelihood that Petitioner will prevail. § 314(a). Moreover, there are no persuasive grounds for denying institution under § 314(a) or § 325(d). This is Petitioner's first petition challenging any claim of the '434 Patent, and the petition raises arguments that have not previously been presented to the Office.

As briefly outlined immediately below and as further detailed in Section X of this Petition, each of the claims of the '434 Patent is unpatentable as obvious under 35 U.S.C. § 103 ("Section 103") over Farrell in view of Wittkopf or, alternatively, in view of Benoit.

As shown in FIGS. 2 and 3 below, Farrell teaches a fuel injection body (100) that is sized and configured to replace a carburetor and that includes a main throttle body (102) with multiple air intake passages (i.e., passages 146, 148, 150, 152) extending between a top surface and a bottom surface, each passage having a throttle plate (not shown, but discussed starting at Col. 3, line 65) for controlling airflow. Fuel injectors (110, 112, 114, 116) are mounted to the throttle body and direct fuel into the air intake passages. An ECU (not shown, but discussed starting at Col. 8, line 48) controls operation of the fuel injectors, including their timing and amount.



Meanwhile, as shown in FIG. 4 below, Wittkopf describes a fuel port (i.e., fuel injection conduit 142) that is capable of receiving fuel from an electronic fuel injector (104), a fuel channel (i.e., circumferential groove 146) that communicates with the fuel port to receive fuel, and a plurality of orifices (i.e., grooves 144)

disposed annularly about the air intake that allow fuel to pass from the fuel channel into the air intake.

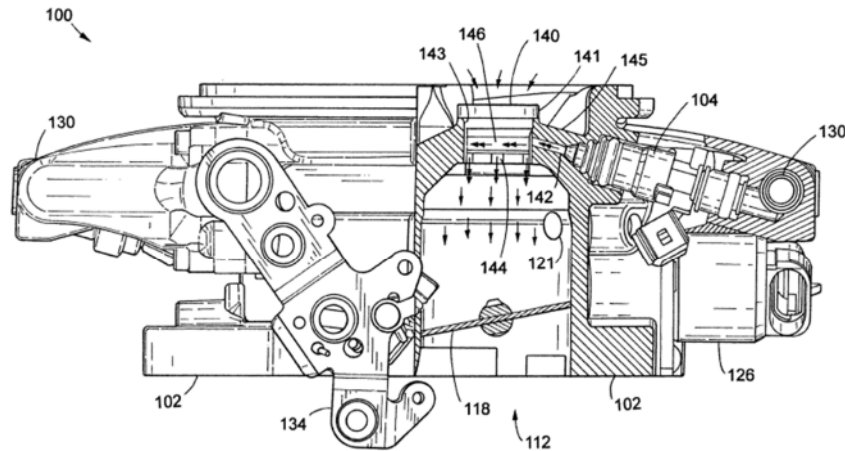
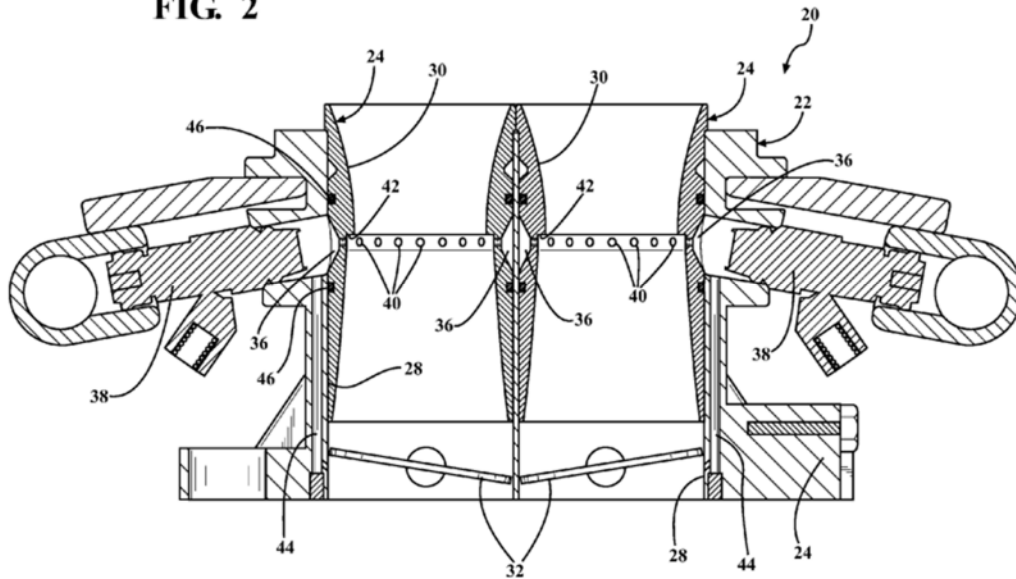


FIG.4

Similarly and alternatively, as shown in FIG. 2 below, Benoit describes a fuel port (i.e., the area between fuel injector 38 and cavity 36) that is capable of receiving fuel from an electronic fuel injector, a fuel channel (i.e., cavity 36) that communicates with the fuel port to receive fuel, and a plurality of orifices (i.e., apertures 40) disposed annularly about the air intake that allow fuel to pass from the fuel channel into the air intake.

FIG. 2



Thus, the Board should institute IPR and cancel claims 1-12 of the '434 Patent under Section 103 as obvious over Farrell in view of Wittkopf or, alternatively, in view of Benoit.

II. MANDATORY NOTICES

A. Real Parties-In-Interest (37 C.F.R. § 42.8(b)(1))

Petitioner certifies that Aces Fuel Injection, Inc. is a real party-in-interest.

B. Related Matters (37 C.F.R. § 42.8(b)(2))

Petitioner identifies the following related judicial matter: *Holley Performance Products Inc. v. Aces Fuel Injection, Inc.*, Civil Action No. 1:26-cv-00059-CEA-CHS, pending in the Eastern District of Tennessee. The '434 Patent is being

asserted in that proceeding. Petitioner has not filed any concurrent petitions concerning the '434 Patent.

C. Identification of Counsel (37 C.F.R. § 42.8(b)(3))

Petitioner appoints the following counsel:

Lead Counsel	Back-up Counsel
Stephen D. Adams USPTO Reg. No. 67,581 Chambliss, Bahner & Stophel, P.C. 605 Chestnut Street, Suite 1700 Chattanooga, TN 37450 Tel: (423) 757-0211 sadams@chamblisslaw.com	John G. Jackson (to seek admission <i>pro hac vice</i>) Chambliss, Bahner & Stophel, P.C. 605 Chestnut Street, Suite 1700 Chattanooga, TN 37450 Tel: (423) 757-0246 jjackson@chamblisslaw.com Susie Lodico (to seek admission <i>pro hac vice</i>) Chambliss, Bahner & Stophel, P.C. 605 Chestnut Street, Suite 1700 Chattanooga, TN 37450 Tel: (423) 757-0271 slodico@chamblisslaw.com

Please direct all correspondence to lead counsel and back-up counsel at the contact information above. Petitioner consents to electronic mail service at the email addresses identified above.

D. Service Information (37 C.F.R. § 42.8(b)(4))

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This Petition is being served by Federal Express Next Business Day Delivery (w/
copy via email) to the correspondence address of Patent Owner's counsel of record
at the following address:

Marc Lorelli
Brooks Kushman
150 W. Second St., Suite 400N
Royal Oak, MI 48067-3846
mlorelli@brookskushman.com

E. Power of Attorney (37 C.F.R. § 42.10(b))

Petitioner's Power of Attorney form is filed concurrently herewith in accordance
with 37 C.F.R. § 42.10(b).

III. FEE PAYMENT (37 C.F.R. § 42.15(a))

Petitioner has submitted payment of the required fees for this Petition set forth in §
42.15(a) at the time of filing via credit card. Petitioner will promptly remit
payment of any additional fees upon notification by the Board.

IV. GROUNDS FOR STANDING

Pursuant to § 42.104(a), Petitioner certifies that the '434 Patent is available for IPR
and that Petitioner is not barred or estopped from requesting IPR on ground raised
in this petition. As demonstrated below, the '434 Patent is unpatentable as
summarized in the table below:

Ground	'434 Patent Claims	Basis for Challenge
1	1-12	Claims 1-12 of U.S. Patent No. 12,203,434 to Flynn <i>et al.</i> are unpatentable under Section 103 as obvious over Farrell (Ex. 1003) in view of Wittkopf (Ex. 1004) or, alternatively, in view of Benoit (Ex. 1005)

V. TECHNICAL BACKGROUND

The present invention relates generally to fuel injection systems for internal combustion engines, and in particular to throttle body fuel injection systems designed for replacing or retrofitting carburetor-based fuel delivery systems. See, e.g., Ex. 1004, 1:8-1:10 (Wittkopf "relat[ing] generally to fuel injection systems for internal combustion engines, and in particular to single point throttle body fuel injection systems designed for retrofitting vintage carburetion fuel delivery systems").

A carburetor is a mechanical device that mixes fuel with air for internal combustion engines. Traditional carburetors use a Venturi tube to create low pressure areas that draw fuel from a float bowl into the air stream. (Ex. 1004, 1:13-1:37) However, carburetors have inherent limitations: they cannot precisely control

fuel-air ratio under varying conditions, and they provide less than optimal atomization of fuel, particularly during cold starts and transients. Fuel injection systems address these limitations by using electronic control to deliver precise amounts of atomized fuel directly into the intake manifold. (Ex. 1004, 1:38-1:58)

Throttle Body Injection (TBI) is a form of single-point fuel injection in which one or more fuel injectors are located in a throttle body that mounts to the intake manifold in place of a carburetor. (Ex. 1004, 1:66-2:3) ("single point injection, also known as throttle body injection, uses one or more fuel injectors (64) located generally in a single location the throttle body (62)"). A fuel injector is an electromechanical device that meters and atomizes fuel; application of an electrical current lifts a spring-loaded needle within a pintle valve off its seat, allowing pressurized fuel to be sprayed through an injector nozzle. (Ex. 1004, 1:51-2:11)

The duration of the injection event (i.e., the pulse width) is controlled by an Electronic Control Unit (ECU) based on engine speed and load signals, with inputs including a mass airflow sensor or MAP sensor, throttle position, and oxygen feedback. (Ex. 1004, 2:20-2:59) As explained by Mr. Farrell, these structural features were well-understood in the industry by the time of the alleged invention. (Ex. 1006, ¶¶ 12, 28)

A. Prior Art Throttle Body Fuel Injection Systems

Prior art throttle body fuel injection systems were designed to replace carburetors in automotive applications. U.S. Patent No. 7,735,475 to Farrell *et al.* (Ex. 1003, "Farrell") teaches a fuel injection body that is "sized and configured to replace a carburetor, such as a standard 4150 double pumper carburetor." (Ex. 1003, 2:44-2:46) The Farrell device includes a main throttle body with multiple passages (146, 148, 150, 152) extending between a top surface and a bottom surface, each passage having a throttle plate for controlling airflow. (Ex. 1003, 3:14-3:29) Fuel injectors are mounted to the throttle body and direct fuel into each of the passages (Ex. 1003, 3:46-3:64)

U.S. Patent No. 9,303,578 to Wittkopf *et al.* (Ex. 1004, "Wittkopf") improves upon basic TBI systems, including that described by Farrell, which is specifically referenced in Wittkopf, by providing an annular fuel distribution ring that introduces pressurized fuel into the air stream through downward-facing outlets at or near the bottom end of the ring. (Ex. 1004, 3:7-3:62; 4:10-4:27) The Wittkopf ring is a two-piece construction with a ring-shaped insert having axial grooves that distribute fuel circumferentially around the bore. (Ex. 1004, 4:28-4:38) Unlike carburetor venturis, the Wittkopf distribution ring has "substantially straight sides

for minimal pressure drop" and does not create low pressure zones according to the Venturi effect. (Ex. 1004, 5:51-5:63)

Next, U.S. Patent No. 9,115,671 to Benoit (Ex. 1005, "Benoit") teaches a hybrid carburetor and fuel injection assembly that uses Venturi-shaped inserts to establish low pressure regions in the airflow. (Ex. 1005, Abstract) The Benoit device includes annular cavities formed between the housing and the inserts, with a plurality of uniformly distributed apertures for delivering fuel into the low pressure region. (Ex. 1005, 3:6-3:40) This design uses pressure differential between the pressurized fuel in the cavity and the low pressure airflow to improve atomization. (Ex. 1005, 3:41-3:64)

B. Control Systems for Fuel Injection

Modern electronic fuel injection systems use a microprocessor-based ECU to control fuel delivery. The ECU determines injector pulse width based on algorithms that calculate the amount of fuel required for the current operating condition. Wittkopf teaches a "feed forward" algorithm that "controls the fuel injection as a function of the position of the idle air control motor so that as the idle air control circuit is opened, the pulse widths of the fuel injector signals are increased." (Ex. 1004, Abstract) This allows the open-loop fuel mixture to be more

accurate during idle transitions and eliminates rough, unstable idle conditions associated with prior art systems. (Ex. 1004, 4:54-4:61)

The Wittkopf system also includes driver circuitry for creating a periodic pulse signal to actuate the fuel injector, wherein the pulse width is determined as a function of the sum of a first value representative of an initial fuel pulse width and a second value representative of a position of the idle air control valve. (Ex. 1004, 8:9-8:29) Additionally, the ECU uses lookup tables for target air/fuel ratio and volumetric efficiency to determine fuel delivery across the operating range. (Ex. 1004, 2:31-2:59)

C. Aftermarket Retrofit Applications

A significant market exists for retrofitting older vehicles originally equipped with carburetors to use electronic fuel injection. This market includes classic cars, hot rods, and performance vehicles where owners desire the reliability and performance benefits of EFI while maintaining the traditional appearance of a carburetor-mounted intake. (Ex. 1003, 1:15-1:35) "The hot rod industry and the aftermarket industry in general still crave the sleek wireless appearance of a carbureted engine." (Ex. 1003, 1:39-1:41)

Throttle body fuel injection systems are particularly well-suited for these retrofit applications because they can be installed as a "bolt-in" replacement for existing

carburetors with minimal modifications to the intake manifold or surrounding components. (Ex. 1004, 2:60-3:6) This niche market has driven development of throttle body assemblies that mimic the physical dimensions and mounting patterns of popular carburetor models, such as the 4150 and 4150-style four-barrel carburetors. (Ex. 1003, 2:43-2:51)

D. Summary of Prior Art Disclosure

Accordingly, as demonstrated above, as of the priority dates of the '434 Patent, a person of ordinary skill in the art would have been familiar with the following key concepts and teachings from the prior art: (1) throttle body fuel injection systems designed to replace carburetors, including those with multiple air passages and integrated fuel injectors (Ex. 1003); (2) annular fuel distribution rings for improved fuel atomization and distribution within throttle body bores (Ex. 1004); (3) hybrid carburetor-fuel injection assemblies using Venturi-shaped passages and annular cavities for fuel delivery (Ex. 1005); (4) electronic control systems using feed-forward algorithms and idle air control to manage fuel delivery during varying operating conditions (Ex. 1004); and (5) the need for bolt-in-place retrofit systems for converting carbureted engines to electronic fuel injection. Mr. Farrell confirms from his personal experience in the field that each of these concepts was well-understood by a POSA at or before the priority date of the '434 Patent. (Ex. 1006,

¶¶ 28, 32) Indeed, Mr. Farrell was himself actively developing and commercializing throttle body EFI retrofit systems incorporating these precise design features during this period. (Ex. 1006, ¶¶ 9-12)

VI. THE '434 PATENT

The '434 Patent, entitled "Fuel injection throttle body," issued on January 21, 2025.

A. Challenged Claims

Petitioner requests IPR for all of the claims of the '434 Patent and requests that the Board cancel those claims as unpatentable. The '434 Patent includes 12 claims, of which claims 1 and 7 are independent. The independent claims are reproduced below:

1. A fuel injection throttle body for a non-carbureted internal combustion engine, comprising:
an air intake extending through said fuel injection throttle body in a vertical orientation;
said air intake capable of allowing an airflow to move from an upper end to a lower end of said air intake;
a fuel port in said fuel injection throttle body and capable of receiving fuel from an electronic fuel injector;
a fuel channel in fluid communication with said fuel port to receive said fuel;

a plurality of orifices disposed annularly about said air intake allowing said fuel to pass from said fuel channel into said air intake;

a throttle plate disposed in said air intake and rotatable on a shaft, said throttle plate movable to vary the airflow moving through the air intake; and,

an electronic controller which controls said electronic fuel injector.

7. A fuel injection throttle body for a non-carbureted internal combustion engine, comprising:

a plurality of air intakes that extend between an upper end of said fuel injection throttle body and a lower end wherein airflow moves through from said upper end to said lower end;

each air intake of said plurality of air intakes having a fuel port disposed in said fuel injection throttle body, and capable of receiving fuel from an electronic fuel injector;

each said electronic fuel injector configured to be in fluid communication with a fuel supply;

a fuel channel disposed within each said air intake, said fuel channel receiving fuel from said electronic fuel injector;

a plurality of orifices disposed in an annular ring allowing
said fuel to flow from said fuel channel into said air
intake;
wherein said fuel passes through said plurality of orifices
and mixes with said airflow moving between said
upper end and said lower end;
a throttle shaft having a throttle plate thereon, said throttle
plate rotatably disposed within said air intake; and,
an electronic control unit to control said fuel from each
said electronic fuel injector.

Thus, claim 1 requires an "air intake," while claim 7 requires a "plurality of air intakes." Claims 1 and 7 also each require a "fuel channel" and a "plurality of orifices" disposed annularly about the air intake or provided in an annular ring, where the plurality of orifices allows fuel to flow from the fuel channel into the air intake.

Claims 2-3 and 8-9 depend from claims 1 and 7, respectively, and require that the air intake (or plurality of air intakes) be either two air intakes or four air intakes, respectively. Claim 4 depends from claim 1 and requires the electronic controller be "disposed on a side" of the throttle body. Claims 5 and 10 depend from claims 1 and 7, respectively, and require that the plurality of orifices comprise "one or more sizes." Claim 6 depends from claim 1 and requires a "fuel ring" that is disposed

within the air intake. Similarly, claim 11 depends from claim 7 and requires an "annular ring" that is disposed in one of the plurality of air intakes. Claim 6 further requires that the claimed "fuel ring" be "formed in said fuel injection throttle body, or said fuel ring, or both." Similarly, claim 12, which depends from claim 7, requires that the "fuel channel" be "formed in said fuel injection throttle body, or said fuel ring, or both."

B. Prosecution History

The '434 Patent (U.S. Patent No. 12,203,434) issued from Application No. 17/882,762, filed August 8, 2022. The '434 Patent claims priority through a chain of related applications to U.S. Provisional Application No. 61/892,706, filed October 18, 2013, which constitutes the earliest effective filing date of the '434 Patent for prior art purposes.

In particular, the '434 Patent is a continuation of U.S. Application No. 16/778,341, which issued as U.S. Patent No. 11,409,894 (the "'894 Patent"). That application was itself a continuation of U.S. Application No. 15/986,571, filed May 22, 2018, which issued as U.S. Patent No. 10,570,866. That application was a division of U.S. Application No. 14/156,813, filed January 16, 2014, which issued as U.S. Patent No. 10,012,197. Application No. 14/156,813 claims priority to U.S.

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Provisional Application No. 61/892,706, filed October 18, 2013. The complete priority chain is therefore:

Application No.	Type	Filing Date	Patent No.
61/892,706	Provisional	Oct. 18, 2013	N/A
14/156,813	Non-provisional	Jan. 16, 2014	10,012,197
15/986,571	Divisional	May 22, 2018	10,570,866
16/778,341	Continuation	Jan. 31, 2020	11,409,894
17/882,762	Continuation	August 8, 2022	12,203,434 (the '434 Patent)

During prosecution of Application No. 17/882,762, the Examiner issued a Non-Final Office Action on May 10, 2023 (Ex. 1002, p. 374), which was corrected and re-issued on September 18, 2023 (Ex. 1002, p. 318). In the Office Action, the Examiner rejected all 14 claims under 35 U.S.C. § 102(a)(1) as anticipated by U.S. Patent No. 3,800,769 ("Graffman"). (Ex. 1002, pp. 324-327)

In response, Patent Owner cancelled claims 7 and 14 and amended both independent claims (i.e., claims 1 and 8) (Ex. 1002, p. 310-312) to require an "electronic" fuel injector. In its remarks, Patent Owner argued:

"*Graffman* teaches a low profile carburetor, of the type generally, that [Patent Owner] discusses in the background of the application (see last sentence of [0003]). The *Graffman* device does not comprise a fuel injector. The claims 1 and 8 are not anticipated for this reason."

"Nonetheless, [Patent Owner] further distinguishes the prior art to further clarify that the fuel injector is an electronic fuel injector. The prior art does not provide an electronic fuel injector because it is a carburetor."

(emphasis in original) (Ex. 1002, p. 314)

In a Final Rejection issued January 11, 2024, the Examiner rejected each of the pending claims (*i.e.*, claims 1-6 and 8-13) under Section 103 as being unpatentable over *Graffman* in view of U.S. Patent No. 4,589,389 ("*Kosuge*") (Ex. 1002, pp. 251-257).

In its Reply to the Final Rejection, Patent Owner submitted with an After Final Consideration Pilot (AFCP) 2.0 Request on June 11, 2024, proposing to amend the preamble of independent claims 1 and 8 to read: "A fuel injection throttle body for an internal combustion engine...." (Ex. 1002, p. 229-230). In its remarks, Patent Owner argued: "the instant claims are directed to use with an internal combustion engine..." (Ex. 1002, p. 233).

Following an Examiner-Initiated Interview on June 19, 2024, the Examiner indicated that the proposed amendment "raises new issues" and could not be approved under the AFCP 2.0 guidelines. (Ex. 1002, p. 215). The Examiner issued an AFCP 2.0 Decision on June 25, 2024 rejecting the AFCP 2.0 request, and subsequently issued an Advisory Action on June 25, 2024 clarifying that the prior art taught carburetors and "a carbureted engine is considered an internal combustion engine." (Ex. 1002, p. 214).

Subsequently, Patent Owner filed a Request for Continued Examination (RCE) on July 8, 2024 (Ex. 1002, pp. 201-202), and participated in a second Examiner-Initiated Interview on September 11, 2024. (Ex. 1002, pp. 27-28). In the interview, authorization was given for an Examiner's Amendment. The Notice of Allowability mailed September 16, 2024 indicates that "[t]he Applicant agrees to amend claims 1 and 8 as shown in the attached Allowability Notice." (Ex. 1002, pp. 27-28). In particular, Patent Owner agreed to amend the preamble of claims 1 and 8 to read: "A fuel injection throttle body for [[an]] a non-carbureted internal combustion engine...." (Ex. 1002, pp. 24-25) This amendment was entered via an Examiner's Amendment in the Notice of Allowability mailed September 16, 2024. A Notice of Allowance was issued on September 16, 2024. (Ex. 1002, p. 19)

Critically, the prosecution history reflects that Patent Owner ultimately relied upon the "non-carbureted internal combustion engine" limitation to distinguish the claims from the prior art of record. As demonstrated below, each of Farrell, Wittkopf, and Benoit is expressly directed to electronic fuel injection systems intended to replace carburetors on internal combustion engines, which is precisely the technological field Patent Owner claimed during prosecution. None of the prior art of record considered by the Examiner shared this characteristic, but Farrell, Wittkopf, and Benoit do.

VII. PERSON OF ORDINARY SKILL IN THE ART

The level of ordinary skill in the art is informed by the type of problems encountered in the art and the prior art solutions to those problems. See *Custom Accessories, Inc. v. Jeffrey-Allan Indus., Inc.*, 807 F.2d 955, 962 (Fed. Cir. 1986); see also *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995) (affirming Board's reliance on references of record to determine skill level). A person of ordinary skill in the art ("POSA") at the time of the alleged invention would have had either: (1) a bachelor's degree in mechanical engineering, automotive engineering, or a related field; or (2) at least two to three years of experience in the design, development, or testing of fuel injection systems for internal combustion engines, together with

familiarity with throttle body fuel injection systems, carburetor-to-EFI conversions, air-fuel ratio control, and electronic control unit programming. (Ex. 1006, ¶ 15).

VIII. CLAIM CONSTRUCTION

In an IPR, the terms of challenged claims are construed "in accordance with the ordinary and customary meaning of such claim as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent," just as they are in district court. 37 C.F.R. § 42.100(b); *Phillips v. AWH Corp.*, 415 F.3d 1303, 1313-14 (Fed. Cir. 2005) (*en banc*).

Petitioner does not believe any terms in the challenged claims require construction beyond their plain and ordinary meaning for purposes of this proceeding. Although Petitioner has attempted to identify all claim construction issues relevant to this Petition and to construe terms consistent with prevailing jurisprudence, Petitioner respectfully requests the opportunity to present additional claim construction positions in the event that further attention to claim construction is required in this proceeding. Nevertheless, Petitioner offers the following constructions to assist the Board:

A. "Annular Ring" / "Fuel Ring"

The terms "annular ring" and "fuel ring," where "fuel ring" appears exclusively in Claim 6, are used interchangeably in the '434 Patent and should both be construed to mean a ring-shaped structure positioned within the air intake of the throttle body that carries a fuel channel and a plurality of orifices for distributing fuel into the air intake. The '434 Patent specification describes the annular ring as including "an annular fuel channel 250 for distributing fuel around the annular ring 240 to a plurality of fuel discharge orifices 260 and 270," with the "plurality of fuel discharge orifices 260 and 270...configured to atomize and spray the fuel into the air intake 220 from multiple directions." (Ex. 1001, 2:49-2:52) The specification further discloses that "in various embodiments the annular ring 240 may be coupled to the throttle body 100 by one or more of a press fit, threads, a friction fit, mechanical fasteners, adhesives, and welds." (Ex. 1001, 3:53-3:56) The annular ring may be formed separately from the throttle body, or may share portions of the fuel channel with the throttle body. (See Ex. 1001, 3:37-3:39) ("the annular fuel channel 250 may be a part of the throttle body 100 rather than of part of the annular ring 240").

B. "Orifice"

The term "orifice" should be construed to mean an opening through which fuel is discharged from the fuel channel into the air intake. This construction is consistent with the specification's use of "fuel discharge orifices 260 and 270" as the openings through which pressurized fuel exits the annular fuel channel and enters the air flow as atomized fuel. (Ex. 1001, 2:50-2:52) The specification confirms that the orifices "may each be a variety of shapes having close to the same orifice opening areas," (Ex. 1001, 3:12-3:13) including "circular, ovular, elliptical, and/or polygonal shapes," (Ex. 1001, 2:60) and that they are "configured to atomize and spray the fuel into the air intake 220 from multiple directions." (Ex. 1001, 2:51-2:52) The specification further teaches specific embodiment sizes, a primary fuel discharge orifice of 0.25 inch diameter or 0.28 to 0.40 inch wide ovular-slot, and secondary fuel discharge orifices of 0.047 to 0.100 inch diameter, confirming that the orifices are discrete openings of defined size and shape. (Ex. 1001, 2:61-3:2)

C. "Fuel Channel"

The term "fuel channel" should be construed to mean a passage that distributes pressurized fuel circumferentially around the annular ring from the fuel port to the plurality of orifices. The specification describes "an annular fuel channel 250 for distributing fuel around the annular ring 240 to a plurality of fuel discharge orifices

260 and 270." (Ex. 1001, 2:48-2:50) The specification further confirms that the fuel channel may be formed by the annular ring alone, the throttle body alone, or a combination of both: "the annular fuel channel 250 may be a part of the throttle body 100 rather than of part of the annular ring 240. In other embodiments the throttle body 100 and annular ring 240 may include complimentary portions of the annular fuel channel 250." (Ex. 1001, 3:37-3:42) This construction is consistent with the claim language, which recites a "fuel channel...formed in said fuel injection throttle body, or said fuel ring, or both." (Ex. 1001, Claims 6 and 12)

D. "Fuel Port"

The term "fuel port" should be construed to mean the passage or opening through which pressurized fuel from the fuel injector enters the annular ring and air intake. The specification states that "[e]ach fuel injector 120 provides fuel through a fuel port 210 into an annular ring 240 positioned in an air intake 220 of the throttle body 100 below the throttle plate 230." (Ex. 1001, 2:44-2:47) The specification further confirms that the ECU "regulates the amount of fuel flowing through the fuel port 210 into the air intake 220." (Ex. 1001, 3:20-3:22) Thus, the fuel port is the interface between the fuel injector and the annular ring/throttle body, and is structurally and functionally distinct from the orifices through which fuel is ultimately discharged into the air stream.

E. "Air Intake"

The term "air intake" should be construed to mean a bore or passage in the throttle body through which air flows during engine operation and within which the annular ring is positioned. The specification discloses that "[i]n various embodiments the throttle body 100 may have one or more air intakes 220 with each air intake 220 including a throttle plate 230, a fuel injector 120, and an annular ring 240." (Ex. 1001, 3:33-3:36) The specification further describes that "the inner wall of the air intake 220 and the annular ring 240 form a smooth continuous surface to aid air flow," confirming that the air intake is the bore within which the annular ring is received and through which air flows. (Ex. 1001, 3:46-3:48)

IX. IDENTIFICATION OF CHALLENGE AND RELIEF REQUESTED

Petitioner requests review and cancellation of claims 1-12 of the '434 Patent under Section 103 as obvious over Farrell in view of Wittkopf or, alternatively, in view of Benoit.

A. The Relevant Prior Art

Petitioner relies on the following prior art for the ground of unpatentability:

U.S. Patent No. 7,735,475 (Ex. 1003, "Farrell")

Petition for *Inter Partes* Review of
Patent No. 12,203,434
Case IPR2026-00434

Farrell was filed on September 19, 2008, claims priority to U.S. Provisional Application No. 60/979,702, which was filed October 12, 2007, and also claims priority to U.S. Provisional Application No. 61/052,903, which was filed May 13, 2008. Farrell was initially published as US 2009/0145406 A1 on June 11, 2009, and was subsequently published as U.S. Patent No. 7,735,475 on the date of issuance which was June 15, 2010. Because the '434 Patent has an earliest effective filing date of October 18, 2013, Farrell qualifies as prior art under at least post-AIA 35 U.S.C. § 102(a)(1).

U.S. Patent No. 9,303,578 (Ex. 1004, "Wittkopf")

Wittkopf was filed on May 11, 2012, was initially published as US 2013/0298868 A1 on November 14, 2013, and was subsequently published as U.S. Patent No. 9,303,578 on the date of issuance which was April 5, 2016. Because the '434 Patent has an earliest effective filing date of October 18, 2013, Wittkopf qualifies as prior art under at least post-AIA 35 U.S.C. § 102(a)(2).

U.S. Patent No. 9,115,671 (Ex. 1005, "Benoit")

Benoit was filed on November 7, 2012, was initially published as US 2014/0123944 A1 on May 8, 2014, and was subsequently published as U.S. Patent No. 9,115,671 on the date of issuance which was August 25, 2015. Because the

'434 Patent has an earliest effective filing date of October 18, 2013, Benoit qualifies as prior art under at least post-AIA 35 U.S.C. § 102(a)(2).

B. Motivation to Combine

1. Farrell, Wittkopf, and Benoit Are Analogous Art

Farrell, Wittkopf, and Benoit are clearly analogous art under Section 103. For prior art to be analogous, it must satisfy one of two tests: (1) the art is from the same field of endeavor, regardless of the problem addressed; or (2) if the reference is not within the field of the inventor's endeavor, whether the reference still is reasonably pertinent to the particular problem with which the inventor is involved. See *In re Deminski*, 796 F.2d 436, 442 (Fed. Cir. 1986); see also *In re Wood*, 599 F.2d 1032, 1036 (CCPA 1979); *In re Bigio*, 381 F.3d 1320, 1325 (Fed. Cir. 2004).

All three references satisfy the first test in that they are in the same field of endeavor as the '434 Patent, relating to retrofit throttle body electronic fuel injection systems designed to replace carburetors in internal combustion engines. This field of endeavor is defined by reference to the structure and function of the claimed invention as perceived by one of ordinary skill in the art. *In re Bigio*, 381 F.3d at 1326.

Patent Owner's own prosecution history confirms this technological field. By successfully arguing that Graffman does not teach an "electronic fuel injector," and

by amending the claims to specifically require a "non-carbureted internal combustion engine," Patent Owner expressly defined its invention as an electronic fuel injection system distinct from carburetor systems. (Ex. 1002, pp. 24-25) The Examiner allowed the claims after Patent Owner amended the claims to require a non-carbureted internal combustion engine and argued that the prior art failed to disclose an electronic fuel injector. (Ex. 1002, p. 25)

However, unlike Graffman, each of Farrell, Wittkopf, and Benoit expressly relates to electronic fuel injection systems intended for use with non-carbureted internal combustion engines, the precise technological field Patent Owner claimed during prosecution. Mr. Farrell confirms that all three references are from the same field of endeavor, namely aftermarket throttle body EFI systems designed to replace carburetors in internal combustion engines, and that a POSA at the time of the alleged invention would have recognized all three as addressing the same fundamental design challenges in that field. (Ex. 1006, ¶¶ 16, 26).

2. Motivation to Combine Farrell with Wittkopf or Benoit

A POSA would have been motivated to combine the teachings of Farrell (Ex. 1003) with either Wittkopf (Ex. 1004) or Benoit (Ex. 1005) because all references are directed to aftermarket throttle body fuel injection (TBI) systems designed to replace carburetors in internal combustion engines, and all address the same

fundamental technical problems: fuel distribution, mixing, and drivability in retrofit EFI systems.

Farrell teaches a fuel injection body "designed for replacement of existing carburetors." (Ex. 1003, Abstract) Wittkopf similarly discloses a throttle body fuel injection system "designed and arranged to easily replace four-barrel carburetors." (Ex. 1004, 4:12-4:14) Benoit teaches a "hybrid carburetor and fuel injection assembly for delivering a fuel and air mixture into an intake manifold of an engine." (Ex. 1005, Abstract) All three are electronic fuel injection systems utilizing electronic fuel injectors and electronic control units (ECUs), precisely the technological field Patent Owner distinguished from carburetors during prosecution.

Critically, unlike Graffman (the primary prior art the Examiner initially cited against the '434 Patent), Farrell, Wittkopf, and Benoit each teach the specific combination the Examiner found absent from the prior art, namely, an electronic fuel injector combined with an annular ring structure having a fuel channel and plurality of orifices for distributing pressurized fuel into the air intake.

Farrell provides a known carburetor-replacement throttle body platform with multiple bores, throttle shafts/plates, injectors, and an ECU mounted on the throttle body assembly. (Ex. 1003, 2:56-2:60; 3:14-3:16; 3:65-4:4; 8:48-8:54)

Wittkopf teaches a specific and improved annular fuel distribution ring (ring 140) supplied by an injector via a conduit and groove structure, which "introduces pressurized fuel into the air stream" and provides "superior mixing" through "downward-facing outlets." (Ex. 1004, 5:51-5:54; 6:6-6:20) Wittkopf expressly identifies improved fuel distribution and mixing, particularly at idle and across operating conditions, as objectives of the annular ring approach. (Ex. 1004, 6:18-6:23)

Benoit teaches a specific annular fuel distribution structure comprising annularly-shaped cavities (36) supplied by high-pressure fuel injectors (38), with a plurality of apertures (40) that are "generally uniformly spaced from one another around the circumference" of each insert. (Ex. 1005, 3:65-4:1) Benoit teaches that "the fuel from the annularly-shaped high pressure cavities 36 is generally uniformly delivered into the flow of air around the perimeter of the Venturi-shaped barrel 30 to create a more uniform air and fuel mixture." (Ex. 1005, 4:1-4:5)

As the named inventor of the '475 Patent, Mr. Farrell confirms from his own experience that a POSA working in this field would have recognized the known limitations of a standard throttle body platform and would have been motivated to incorporate an annular fuel distribution structure, whether Wittkopf's ring design or

Benoit's cavity-and-insert design, to achieve improved fuel atomization and distribution. (Ex. 1006, ¶¶ 24, 32-33).

Thus, a POSA would have been motivated to incorporate either Wittkopf's annular fuel distribution ring or Benoit's annular cavity structure into Farrell's known carburetor-replacement throttle body platform to achieve the improved mixture preparation and distribution benefits described by both secondary references, while retaining Farrell's throttle body architecture, throttle shaft/plates, injector mounting, and ECU integration. This represents a predictable combination of familiar elements according to known methods to achieve an expected result. See *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 416 (2007).

3. No Teaching Away or Incompatibility

Neither combination (Farrell + Wittkopf, nor Farrell + Benoit) would have presented any teaching away from the combination. To the contrary, each secondary reference specifically identifies the same problems, namely fuel distribution, mixing, and atomization in carburetor replacement systems, that a POSA would have sought to solve. Each reference's solution is compatible with and complementary to Farrell's throttle body platform. A POSA would have had every reason to combine these references and no reason to avoid doing so.

Moreover, because each of the proposed combinations involves substituting or adding a known annular fuel distribution structure (from Wittkopf or Benoit) into a known throttle body platform (Farrell) to achieve the predictable result of improved fuel atomization and distribution, a POSA would have had a reasonable expectation of success in making either combination. *KSR*, 550 U.S. at 421 ("A person of ordinary skill is also a person of ordinary creativity, not an automaton.").

Mr. Farrell confirms this assessment. In his experience developing and commercializing these systems, there is no technical incompatibility between Farrell's throttle body platform and either the annular ring structure of Wittkopf or the insert-and-cavity structure of Benoit. (Ex. 1006, ¶ 25).

X. THE CLAIMS OF THE '434 PATENT ARE INVALID

As provided below and by the accompanying declaration of Mr. Kenneth Farrell (Ex. 1006), claims 1-12 are unpatentable as obvious under Section 103 over Farrell (Ex. 1003) in view of either Wittkopf (Ex. 1004) or Benoit (Ex. 1005). Mr. Farrell's declaration provides technical support for each of the claim element mappings set forth below. (Ex. 1006, ¶¶ 27-38). For each claim limitation below, Petitioner provides citations to Farrell and at least one of Wittkopf or Benoit, establishing that either combination teaches the claimed subject matter.

A. Independent Claims

Independent claim 1 and 7 are each directed to a "fuel injection throttle body for a non-carbureted internal combustion engine." Claims 1 and 7 each generally require (1) one or more air intakes that extend through the throttle body and that allow air to flow vertically through the throttle body, (2) a fuel port that receives fuel from an electronic fuel injector, (3) a fuel channel in the air intake that communicates with and receives fuel from the fuel port, (4) a plurality of orifices that allow fuel to flow from the fuel channel and to mix with air in the air intake, (5) a throttle plate mounted to a throttle shaft that is rotatable within the air intake for controlling air flow through the air intake, and (6) an electronic control unit for controlling the electronic fuel injector and the amount of fuel.

As demonstrated below, each limitation of independent claim 1 and independent claim 7 is taught by Farrell in combination with Wittkopf or, alternatively, with Benoit.

1. Independent Claim 1

[1.0] A fuel injection throttle body for a non-carbureted internal combustion engine, comprising:

The '434 Patent explains the technological context of its invention:

"Factory car producers moved away from this type of fuel injection [i.e., throttle body fuel injection or "TBI"] as government emissions standards increased in the mid-to-late 1980's. However, the aftermarket automotive parts industry started selling aftermarket TBI fuel injection systems in the late 1980's. These systems were designed to replace the carburetor on older carbureted vehicles from the 1960's to 1980's."

(Ex. 1001, 1:28-1:34)

The '434 Patent therefore claims a throttle body fuel injection system specifically designed for the aftermarket carburetor-replacement market, which is the same technological field occupied by prior art references Farrell, Wittkopf, and Benoit.

Farrell is directly in this field. Its title itself declares its purpose: "Fuel Injection Body Sized to Replace Carburetor Body." (Ex. 1003, Title) The Abstract similarly states: "A fuel injection unit is designed for replacement of existing carburetors."

(Ex. 1003, Abstract)

Farrell explains this same market context in its Background:

"Carbureted automobiles ceased to be manufactured in large numbers. The carburetor was replaced with electronic fuel injection (EFI), which has become the standard of the auto manufacturing industry. The hot rod

industry and the aftermarket industry in general are
beginning to accept EFI as an alternative to carburetion."

(Ex. 1003, 1:21-1:26)

Thus, Farrell's throttle body fuel injection system is precisely the type of
aftermarket system described in the '434 Patent, namely, one that is designed to
retrofit onto carbureted vehicles to convert them to electronic fuel injection.

Farrell discloses:

"The fuel injection body 100 comprises a main throttle
body 102, a first end cap 104 and a second end cap 106.
Each of the end caps 104, 106 generally covers two fuel
injectors, for a total of four fuel injectors 110, 112, 114,
116, that are mounted to the main throttle body 102."

(Ex. 1003, 2:56-2:60; FIG. 2)

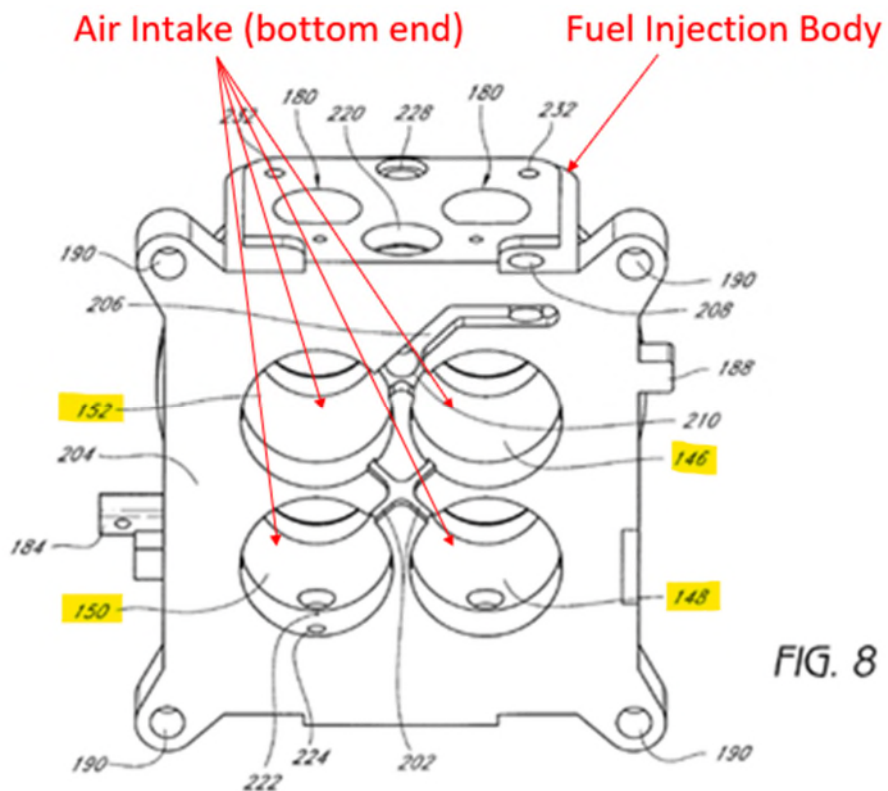
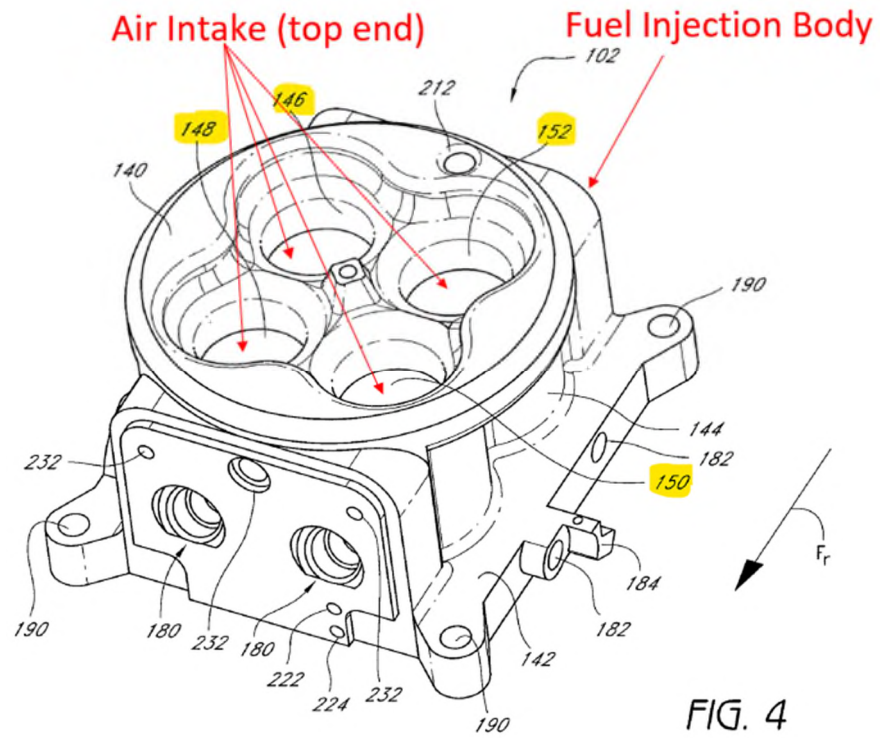
Farrell teaches a fuel injection body "designed for replacement of existing
carburetors" for internal combustion engines. (Ex. 1003, Abstract; 1:18–19)

Farrell's system therefore provides the foundational structure, which includes a
throttle body with multiple air intakes (passages 146, 148, 150, 152), fuel injectors,
throttle plates on shafts, and an ECU, all designed for the same carburetor-
replacement purpose as the '434 Patent. Wittkopf similarly discloses a throttle body
fuel injection system "designed and arranged to easily replace four-barrel

carburetors." (Ex. 1004, 4:13–4:14) Benoit teaches a hybrid fuel injection and carburetor assembly for delivering a fuel and air mixture into an intake manifold of an engine. (Ex. 1005, Abstract; 2:65–3:2) All three references are directed to aftermarket carburetor-replacement fuel injection systems for internal combustion engines, the precise technological field of the '434 Patent. (Ex. 1006, ¶¶ 16, 26)

[1.1] an air intake extending through said fuel injection throttle body in a vertical orientation; said air intake capable of allowing an airflow to move from an upper end to a lower end of said air intake;

According to Farrell, the "top surface 140 and the lower flange 142 are spaced apart by a main portion 144 of the main throttle body 102." (Ex. 1003, 3:12-3:14; FIG. 4) Further, "[f]our passages 146, 148, 150, 152 extend through at least a majority of the main portion 144 from the top surface 140 through the lower flange 142." (Ex. 1003, 3:14-3:16; FIGS. 4 and 8)



Each of the passages (146, 148, 150, 152) defines a venturi having a tubular shape that is constricted in the middle and flared at both ends, and "[a]ir flowing through the venturi will increase in velocity through the constricted portion and the air pressure will drop while passing through the constricted portion." (Ex. 1003, 3:25-3:28; FIG. 5) These passages function as air intakes that extend vertically through the throttle body from the upper end (top surface 140) to the lower end (lower flange 142), allowing airflow to move from the upper end to the lower end as required by Claim 1.

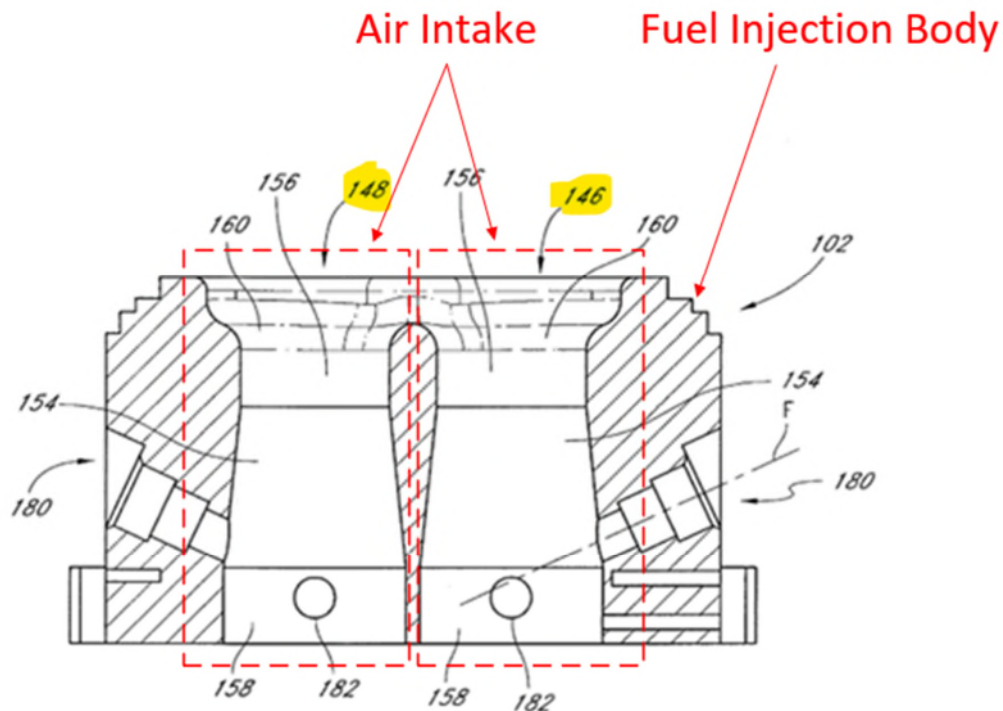
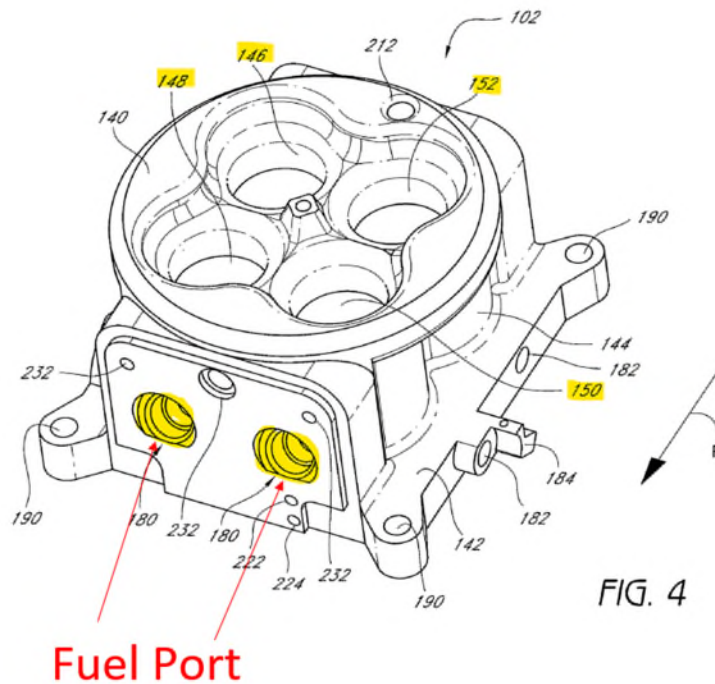


FIG. 5

[1.2] a fuel port in said fuel injection throttle body and capable of receiving fuel from an electronic fuel injector;

Farrell teaches this limitation. Farrell discloses that "each passageway 146, 148, 150, 152 intersects with a fuel injector receptacle 180" and that "each of the receptacles 180 extends from a side surface of the main throttle body 102 into a corresponding one of the passageways 146, 148, 150, 152." (Ex. 1003, 3:46-51; FIG. 5) Farrell further expressly discloses that fuel flows through the fuel introduction ports (244) and fuel distribution passages (242) to supply the fuel injectors (110, 112, 114, 116), confirming that the receptacles (180) are the openings through which pressurized fuel from the fuel injectors is introduced into each air intake passageway. Ex. 1003, 6:19-6:34 ("fuel supplied to the fuel distribution passages 242 can be supplied to the fuel injectors 110, 112, 114, 116... [f]uel would pass from the fuel introduction port through the fuel distribution passages... [t]he fuel in the four fuel distribution passages 242 would then be supplied to the fuel injectors 110, 112, 114, 116") A POSA would understand that Farrell's receptacles (180) constitute fuel ports, i.e., the openings in the throttle body through which pressurized fuel from the fuel injectors enters the annular ring and is then introduced into each of the air intakes.



To the extent any further support is needed, both Wittkopf and Benoit expressly teach this limitation in unambiguous terms, confirming that this is a well-known and standard structural feature of throttle body fuel injection systems.

Wittkopf expressly teaches a fuel injection conduit (142) formed within a radial spoke (145) of the fuel distribution ring (140) through which each fuel injector (104) delivers fuel into the ring and from there into the air stream. Wittkopf states: "At least one spoke 145 for each ring 140 includes a fuel injection conduit 142 that supplies ring 140 with fuel from an injector 104," and further describes how "fuel flow[s] from injector 104 through conduit 142, through circumferential groove 146, and through axial grooves 144 to discharge downwardly at or near the bottom

end of ring 140." (Ex. 1004, 6:3-6:13) A POSA would understand Wittkopf's fuel injection conduit (142), i.e., the passage through which fuel travels from the injector into the fuel distribution ring and air intake, as the fuel port through which pressurized fuel is introduced into the throttle body.

Benoit likewise expressly teaches a fuel port. Benoit discloses that each fuel injector (38) "is in fluid communication with one of the annularly shaped cavities 36 for delivering a high-pressured flow of fuel into its respective cavity 36," and that the housing "present[s] a high pressure cavity in fluid communication with said fuel injector for receiving the fuel." (Ex. 1005, Claim 2) The interface between each fuel injector (38) and its associated high pressure cavity (36), i.e., the passage through which pressurized fuel is delivered from the injector into the annular cavity and from there through the apertures (40) into the air stream, is precisely the fuel port claimed. A POSA would readily recognize this as the functional and structural equivalent of the claimed fuel port.

Each of Farrell, Wittkopf, and Benoit therefore teaches a fuel port through which pressurized fuel from a fuel injector is introduced into the throttle body and delivered into the air intake. (Ex. 1006, ¶¶ 30-31)

[1.3] a fuel channel in fluid communication with said fuel port to receive said fuel;

Wittkopf teaches a circumferential groove (146) that constitutes a fuel channel in fluid communication with the fuel port (i.e., the point at which injector (104) couples to the throttle body via conduit (142)) to receive fuel. Wittkopf discloses that "[e]ach injector 104 feeds fuel into a circular fuel distribution ring 140 via a fuel injection conduit 142" (Ex. 1004, 5:51-5:52) and that "[a] circumferential groove 146 formed about insert 141 fluidly connects axial outlet grooves 144 with fuel injection conduit 142." (Ex. 1004, 6:6-6:9; see FIGS. 3, 4) This circumferential groove (146) constitutes a fuel channel that is in fluid communication with the fuel injection conduit (142), which receives fuel from electronic fuel injector (104), exactly as recited in limitation [1.3].

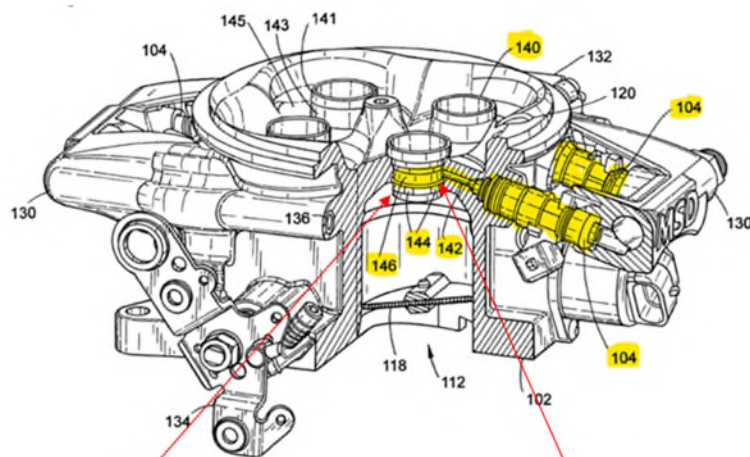
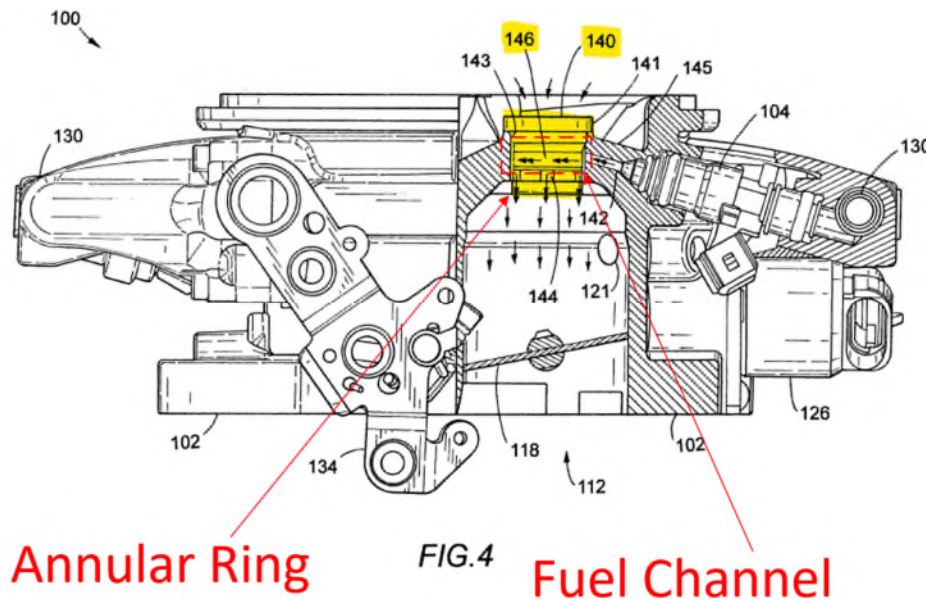


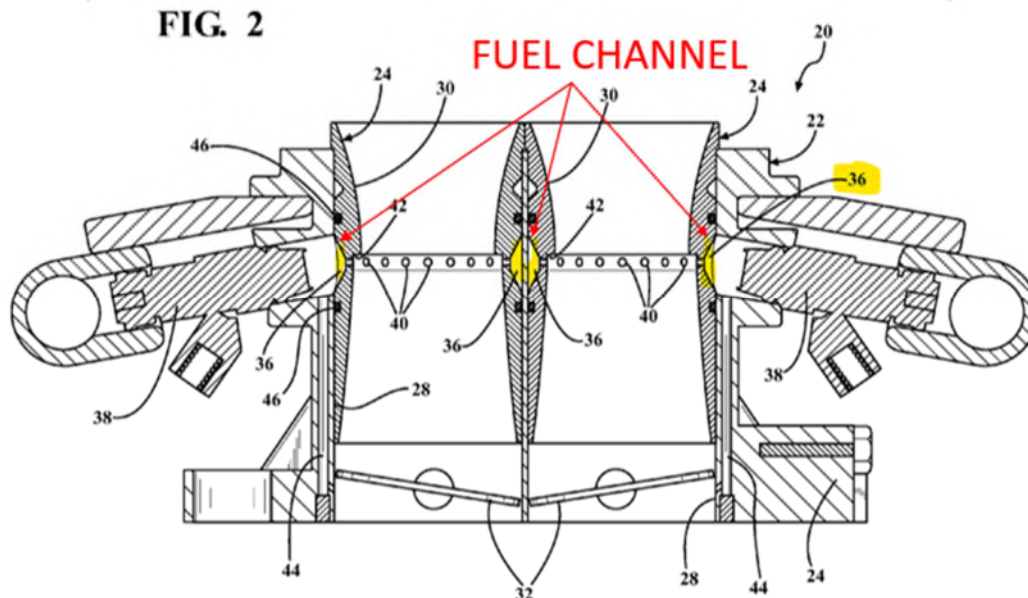
FIG.3

Annular Ring

Fuel Channel



Benoit likewise teaches annularly-shaped high pressure cavities (36) that constitute fuel channels in fluid communication with the fuel port to receive fuel. Benoit discloses that "each of the fuel injectors 38 is in fluid communication with one of the annularly-shaped cavities 36 for delivering a high-pressured flow of fuel into its respective cavity 36." (Ex. 1005, 3:44-3:48) In Benoit, the fuel injectors (38) attach to the housing (22) at the fuel port, i.e., the point on the throttle body capable of receiving fuel from an electronic fuel injector, and each high-pressure cavity (36) is the fuel channel in fluid communication with that fuel port to receive fuel. A POSA would understand that Benoit's annularly-shaped high pressure cavities (36) constitute a "fuel channel in fluid communication with said fuel port to receive said fuel" as recited in limitation [1.3].



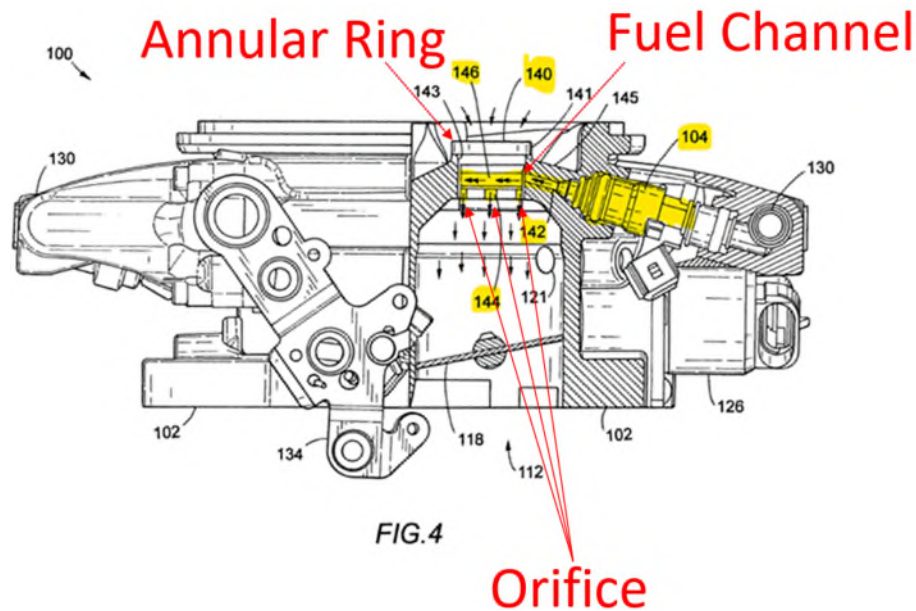
[1.4] a plurality of orifices disposed annularly about said air intake allowing said fuel to pass from said fuel channel into said air intake;

Wittkopf discloses an improved annular fuel distribution ring (140) designed to provide superior fuel distribution and mixing in throttle body fuel injection systems. It provides:

"Insert 141 includes axial grooves 144 intervalled about the exterior circumference of insert 141. A circumferential groove 146 formed about insert 141 fluidly connects axial outlet grooves 144 with fuel injection conduit 142, thereby allowing fuel to flow from injector 104 through conduit 142, through circumferential groove 146, and through axial grooves 144 to discharge downwardly at or near the bottom end of ring 140. Although axial grooves 144 and

circumferential groove 146 are shown formed in insert 141, in an alternative embodiment either the axial grooves, the circumferential groove, or both, may be formed within the interior of outer housing 143."

(Ex. 1004, 6:6-6:17; See FIG. 4)



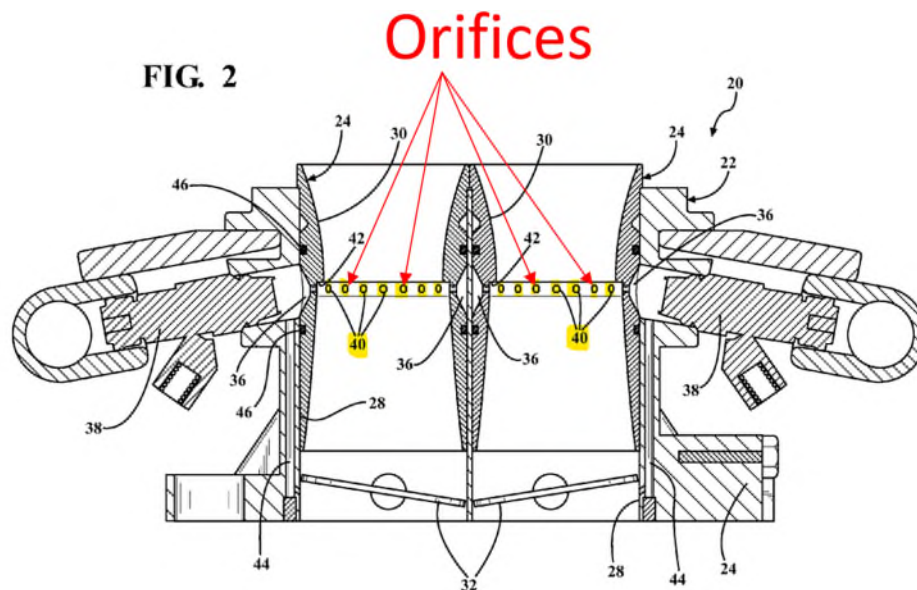
The axial grooves 144 in Wittkopf constitute a "plurality of orifices disposed annularly about [the] air intake." Wittkopf explicitly teaches that these grooves are "intervals about the exterior circumference of insert 141." Wittkopf further states: "Each injector 104 feeds fuel into a circular fuel distribution ring 140 via a fuel injection conduit 142. Fuel distribution ring 140 introduces pressurized fuel into the air stream." (Ex. 1004, 5:51-5:53) The reference also teaches that, in a preferred embodiment, "each injection ring 140 includes six axial outlets 144,

although a greater or lesser number can be used as desired." (Ex. 1004, 6:23-6:25)

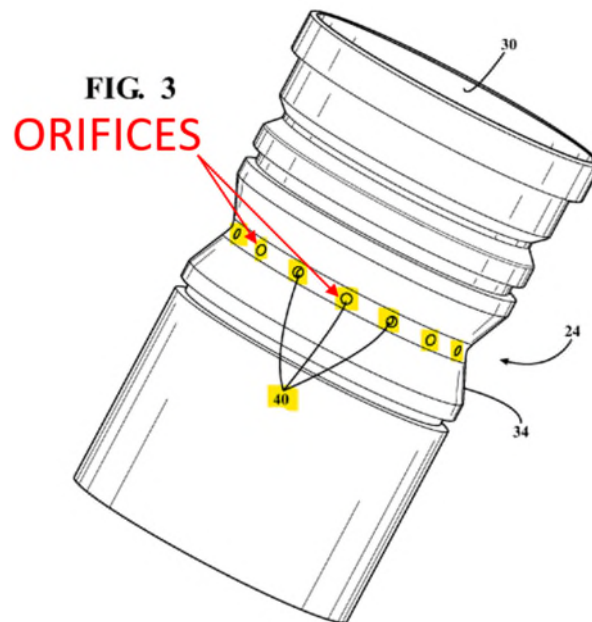
This expressly teaches a plurality of orifices.

Benoit teaches that each insert (26) includes "a plurality of apertures 40 which extend from the grooves 34 to the narrow areas of the Venturi-shaped barrels 30."

(Ex. 1005, 3:49-3:51) These apertures constitute "a plurality of orifices disposed annularly about [the] air intake" allowing fuel to pass from the fuel channel (cavity 36) into the air intake (barrel 30).



Benoit further teaches that "[a]s shown in FIG. 3, the apertures 40 for delivering the high pressure fuel into the low pressure flow of air are generally uniformly spaced from one another around the circumference of each insert 26." (Ex. 1005, 3:65-4:4) This confirms the orifices are disposed annularly around the air intake.



Benoit explicitly states that "the fuel from the annularly-shaped high pressure cavities 36 is generally uniformly delivered into the flow of air around the perimeter of the Venturi-shaped barrel 30 to create a more uniform air and fuel mixture." (Ex. 1005, 4:1-4:4) This demonstrates that the fuel passes through the orifices and mixes with the airflow as claimed.

[1.5] a throttle plate disposed in said air intake and rotatable on a shaft, said throttle plate movable to vary the airflow moving through the air intake; and,

Farrell teaches this limitation. Farrell discloses that "two throttle shaft apertures 182 ... extend fully through the main throttle body 102," and are "sized and configured to accommodate a throttle shaft, which is attached to a suitable throttle valve, such as a throttle plate or the like. The throttle shafts will be rotatable within

the throttle shaft apertures 182." (Ex. 1003, 3:65–4:4; FIGS. 5, 7, 10) Farrell further discloses that the centerline of each fuel injector receptacle (180) "extends to a location just above a throttle valve shaft aperture 182," and that "the fuel injectors direct fuel to cover [the] upper surface [of] the throttle blade to improve fuel atomization." (Ex. 1003, 3:54–3:59) This confirms that the throttle shaft apertures (182) accommodate throttle shafts bearing throttle plates that are positioned within the air intake passages (146, 148, 150, 152) below the fuel injectors, and that those throttle plates are the surfaces upon which atomized fuel is directed, thereby confirming their operative role in regulating air flow through the passages. A POSA would understand that Farrell's throttle shafts and throttle plates, rotatable within the throttle shaft apertures (182) in the air intake passages, are disposed within the air intake for rotation therein to vary the air flow moving through the throttle body.

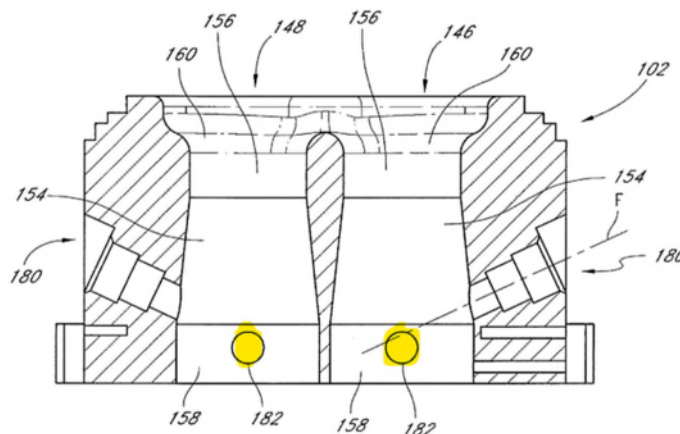
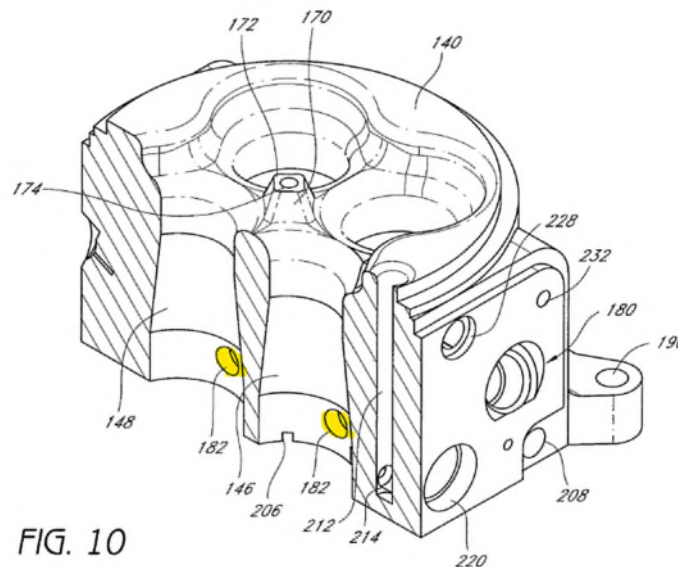
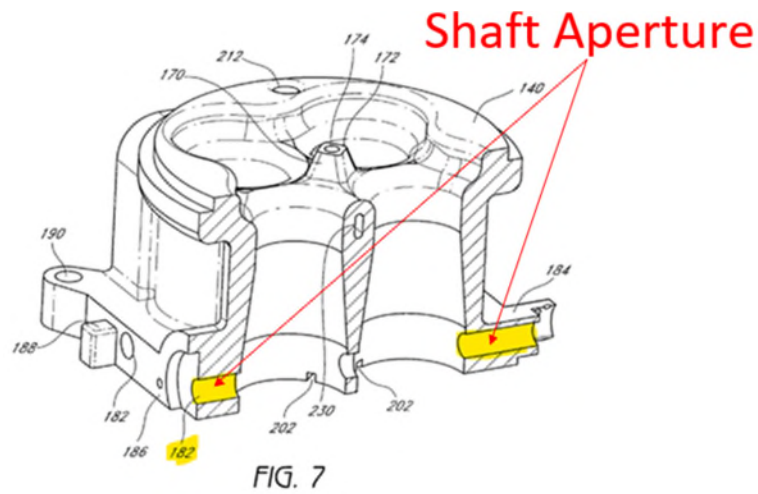


FIG. 5



Wittkopf expressly and unambiguously teaches this limitation through both its specification and its claims. The Summary of the Invention discloses "a throttle body assembly with four main bores, each with a throttle plate and an associated fuel injector." (Ex. 1004, 4:14-4:17) The preferred embodiment confirms this structure: "throttle body assembly 100 preferably includes...four main bores 112 (each with a throttle plate 118)," with fuel injectors (104) "preferably located above the throttle plates 118." (Ex. 1004, 5:40-5:49) Wittkopf's Claim 1 expressly

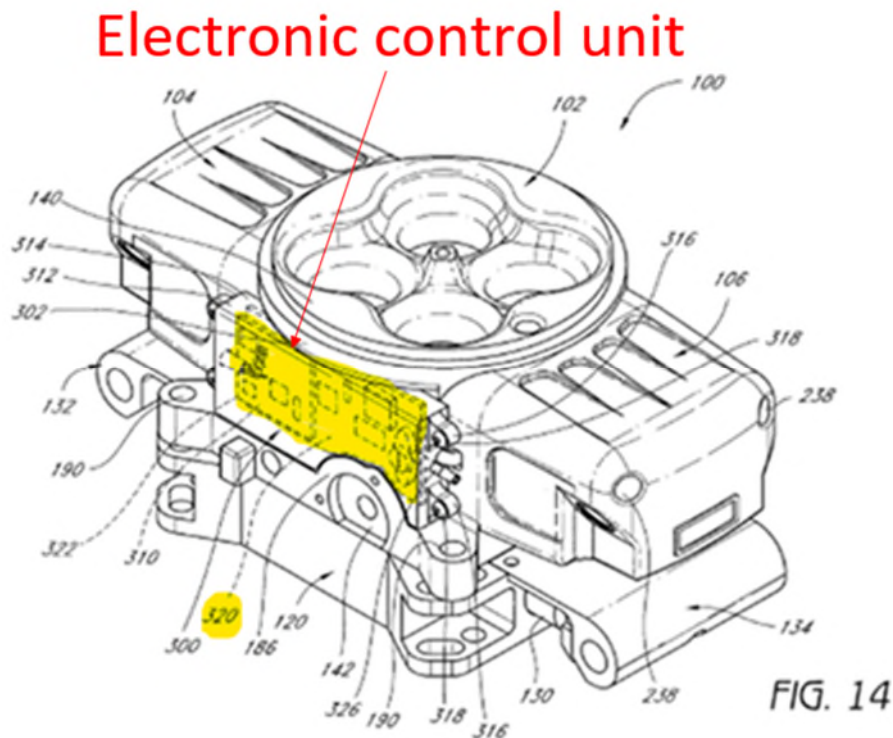
recites "a throttle valve (118) disposed in said bore," confirming the throttle plate is disposed within the air intake bore. (Ex. 1004, Claim 1) Wittkopf further confirms that the throttle blades regulate air flow by rotation, stating that "IAC circuitry 120 bypasses throttle blades, which are shut when the engine is idling (although a closed throttle still allows a small amount of air to enter the manifold)." (Ex. 1004, 6:36-6:39) The positional relationship of the throttle valve within the bore is further confirmed by Wittkopf's Claim 1, which places the IAC inlet port (121) "downstream of said first point and upstream of said throttle valve," establishing that the throttle valve (118) is the downstream-most control element within the bore, the element whose rotational position varies the air flow moving through the bore into the intake manifold. (Ex. 1004, Claim 1) A POSA would immediately recognize Wittkopf's throttle valve (118) disposed in bore (112) and rotatable to control air flow as the structural and functional equivalent of the claimed throttle shaft and throttle plate disposed within the air intake for rotation therein to vary air flow.

Benoit likewise expressly teaches this limitation. Benoit's Claim 1 recites "a throttle valve disposed in each of said bores adjacent said outlet ends and pivotably connected to said housing for selectively controlling the flow of air through each of said bores." (Ex. 1005, Claim 1) The specification further confirms: "As is

common with conventional carburetors, a throttle valve 32 is disposed in each of the bores 28 adjacent the ends of the Venturi-shaped barrels 30 for selectively controlling the volume of the flow of air through the barrels 30." (Ex. 1005, 3:24-3:28) Benoit further explains that "because the throttle valves 32 are closed (or substantially entirely closed) during idling, the pressure of the air below the throttle valves 32 is typically lower than above the throttle valves 32," confirming that the throttle valves regulate air flow by rotation within the bore. (Ex. 1005, 4:35-4:42) A POSA would readily recognize Benoit's pivotably connected throttle valve (32) disposed within bore (28) for selectively controlling air flow as the structural and functional equivalent of the claimed throttle shaft and throttle plate disposed within the air intake for rotation therein to vary air flow. (Ex. 1006, ¶ 29)

[1.6] an electronic controller which controls said electronic fuel injector.

Farrell discloses that "a small housing 300" can be mounted to the throttle body to house circuitry including an ECU, and that "the main board 320, and particularly an ECU that is defined by the main board 320, can control the injection timing and amount." (Ex. 1003, 8:48–54; FIG. 14) A POSA would understand that controlling injection timing and amount constitutes controlling fuel flow from the electronic fuel injector as claimed.



Accordingly, each and every limitation of independent Claim 1 is taught by the combination of Farrell and Wittkopf, or alternatively, by the combination of Farrell and Benoit.

2. Independent Claim 7

Claim 7 recites substantially the same structural limitations as Claim 1, with the following differences: (1) Claim 7 requires a plurality of air intakes rather than a single air intake, with each air intake having its own fuel port, fuel channel, and orifices; (2) the fuel channel is recited as "disposed within each said air intake" and "receiving fuel from said electronic fuel injector" rather than being "in fluid

communication with said fuel port"; (3) the orifices are expressly recited as "disposed in an annular ring," whereas Claim 1 requires only that they be "disposed annularly about said air intake"; (4) Claim 7 expressly requires each electronic fuel injector to be "configured to be in fluid communication with a fuel supply," an element not separately recited in Claim 1; (5) Claim 7 includes an express "wherein" clause requiring that fuel passing through the orifices mixes with the airflow; and (6) Claim 7 expressly recites a throttle shaft having a throttle plate thereon, whereas Claim 1 recites only the throttle plate rotatable on a shaft.

For all structural elements common to Claim 1, the analysis set forth above with respect to Claim 1 is incorporated herein by reference. The additional and differing elements of Claim 7 are addressed below.

[7.0] A fuel injection throttle body for a non-carbureted internal combustion engine, comprising:

This preamble is identical to Claim 1. As discussed above in Claim 1, Farrell teaches a fuel injection throttle body designed for replacement of existing carburetors. (Ex. 1003, Abstract).

[7.1] a plurality of air intakes that extend between an upper end of said fuel injection throttle body and a lower end wherein airflow moves through from said upper end to said lower end;

This limitation corresponds to limitation [1.1] from Claim 1. As discussed above in Claim 1, Farrell discloses "four passages 146, 148, 150, 152 extend[ing] through at least a majority of the main portion 144 from the top surface 140 through the lower flange 142." (Ex. 1003, 3:14-3:16) Each of these passages extends vertically through the throttle body from an upper end (top surface 140) to a lower end (lower flange 142), allowing airflow to move from the upper end to the lower end. Because Farrell discloses four such passages, it necessarily discloses "a plurality of air intakes that extend between an upper end of said fuel injection throttle body and a lower end." Petitioner's analysis of [1.1] from Claim 1 is incorporated herein by reference.

[7.2] each air intake of said plurality of air intakes having a fuel port disposed in said fuel injection throttle body, and capable of receiving fuel from an electronic fuel injector;

This limitation corresponds to limitation [1.2] from Claim 1, applied to each of the plurality. As discussed above in Claim 1, Farrell teaches that each air passage (146, 148, 150, 152) "intersects with a fuel injector receptacle 180" that "extends from a

side surface of the main throttle body 102 into a corresponding one of the passageways." (Ex. 1003, 3:46-3:51; FIGS. 4 and 5)

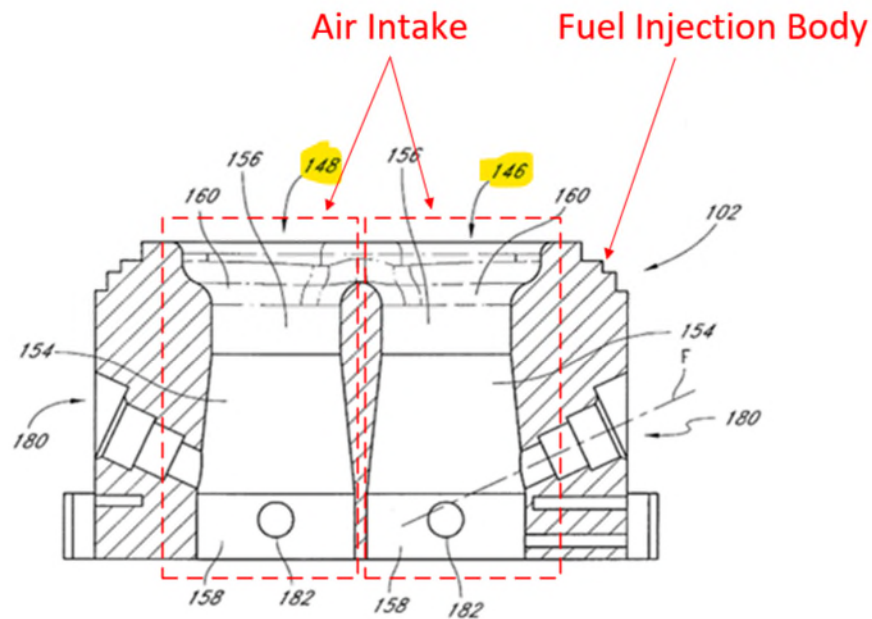
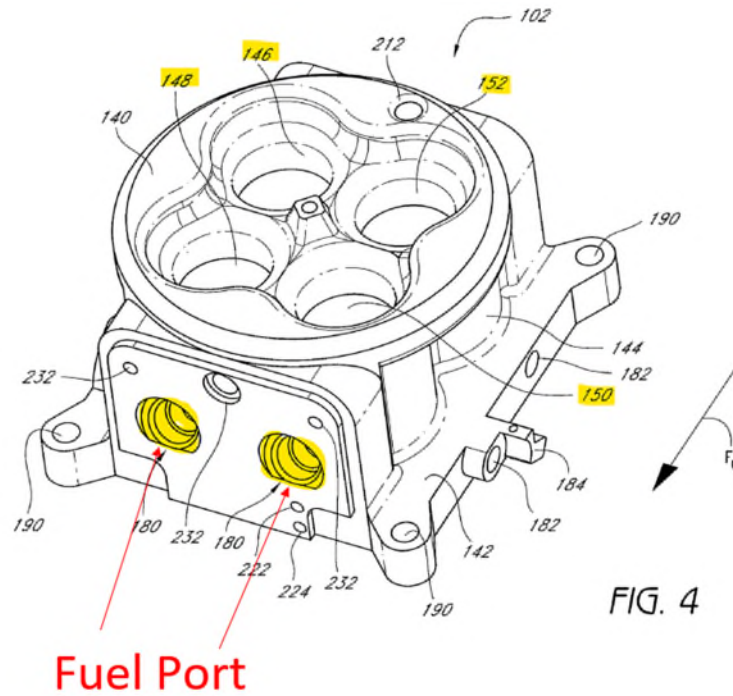


FIG. 5

These fuel injector receptacles (180) receive electronic fuel injectors (110, 112, 114, 116). Because Farrell teaches that each of the four passages intersects with a fuel injector receptacle, Farrell discloses that "each air intake of said plurality of air intakes" has a fuel port capable of receiving fuel from an electronic fuel injector.

Petitioner's analysis of [1.2] from Claim 1 is incorporated herein by reference.

[7.3] each said electronic fuel injector configured to be in fluid communication with a fuel supply;

Farrell teaches that fuel can be supplied to the fuel injectors through fuel introduction ports and fuel distribution passages. Specifically, "a fuel injector supply port 250 can be positioned along each of the fuel distribution passages 242 at a location between the fuel introduction port 244 and the connector passage 240. Thus, fuel supplied to the fuel distribution passages 242 can be supplied to the fuel injectors 110, 112, 114, 116." (Ex. 1003, 6:16-6:22) Farrell further teaches that "the fuel supply hose can be mounted to either the front or rear fuel introduction ports 244 on either side of the fuel injection body 100." (Ex. 1003, 6:43-6:45) Farrell's integrated fuel supply system thus places each of the four electronic fuel injectors in fluid communication with a fuel supply, satisfying limitation [7.3]

Wittkopf similarly teaches fuel injectors (104) supplied via a fuel rail in fluid communication with a fuel supply, with fuel flowing through distribution conduits

to each injector. (Ex. 1004, 5:40-5:52) Benoit likewise teaches fuel injectors (38) supplied with pressurized fuel from a fuel supply for delivery into the annular cavities (36). (Ex. 1005, 3:41-3:48) Farrell's integrated fuel supply system thus places each of the four electronic fuel injectors in fluid communication with a fuel supply, satisfying limitation [7.3], and this structure is confirmed by both Wittkopf and Benoit.

[7.4] a fuel channel disposed within each said air intake, said fuel channel receiving fuel from said electronic fuel injector;

This limitation is similar to limitation [1.3] but specifies "within each said air intake" for a plurality of air intakes.

Wittkopf teaches that each insert (140) includes a circumferential groove (146) that receives fuel from a fuel injector (104). Specifically, "[e]ach injector 104 feeds fuel into a circular fuel distribution ring 140 via a fuel injection conduit 142" and "a circumferential groove 146 formed about insert 141 fluidly connects axial outlet grooves 144 with fuel injection conduit 142." (Ex. 1004, 5:51-5:52; 6:6-6:9)

Because Farrell discloses four air intakes, a POSA would understand that each could incorporate Wittkopf's annular fuel distribution ring (with its circumferential groove acting as a fuel channel) within each air intake.

Benoit teaches that each insert (26) includes a high pressure cavity (36) that receives fuel from a fuel injector (38). Specifically, "each of the fuel injectors 38 is in fluid communication with one of the annularly-shaped cavities 36 for delivering a high-pressured flow of fuel into its respective cavity 36." (Ex. 1005, 3:44-3:48) Because Farrell discloses four air intakes, a POSA would understand that each could incorporate Benoit's insert structure, i.e., a fuel channel (cavity 36) within each air intake receiving fuel from an electronic fuel injector.

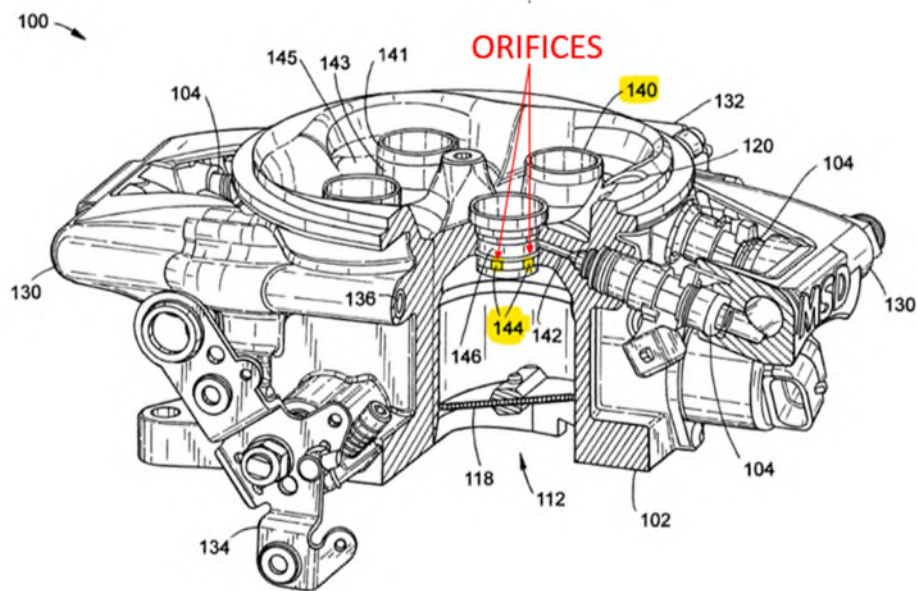
A POSA would have been motivated to incorporate Wittkopf's annular fuel distribution ring (with its circumferential groove functioning as a fuel channel) into each of Farrell's four air intakes, as both references are directed to multi-barrel throttle body fuel injection systems designed to replace carburetors, and Wittkopf's ring structure directly solves the fuel distribution problem present in each barrel of a multi-barrel TBI system.

[7.5] a plurality of orifices disposed in an annular ring allowing said fuel to flow from said fuel channel into said air intake; wherein said fuel passes through said plurality of orifices and mixes with said airflow moving between said upper end and said lower end;

Wittkopf teaches that fuel is "injected through downward facing outlets at or near the bottom end of ring 140," and that "[i]nset 141 includes axial grooves 144

intervaled about the exterior circumference of insert 141," with fuel flowing "from injector 104 through conduit 142, through circumferential groove 146, and through axial grooves 144 to discharge downwardly at or near the bottom end of ring 140."

(Ex. 1004, 5:62-5:63; See FIG. 3) According to a preferred embodiment, "each injection ring 140 includes six axial outlets 144." (Ex. 1004, 6:23-6:24) These downward-facing outlets, six per ring and disposed about the circumference of the annular ring (140), constitute "a plurality of orifices disposed in an annular ring allowing said fuel to flow from said fuel channel into said air intake." A POSA would understand that these downward-facing outlets are orifices in the annular ring that allow fuel to pass from the circumferential fuel channel (146) into the air intake bore (112), exactly as claimed.



Wittkopf further states: "Each injector 104 feeds fuel into a circular fuel distribution ring 140 via a fuel injection conduit 142. Fuel distribution ring 140 introduces pressurized fuel into the air stream." (Ex. 1004, 5:51-5:54) The fuel passing through the axial grooves 144 mixes with the airflow, as taught by Wittkopf's description of "superior mixing for even distribution to the cylinders." (Ex. 1004, 6:18-6:20)

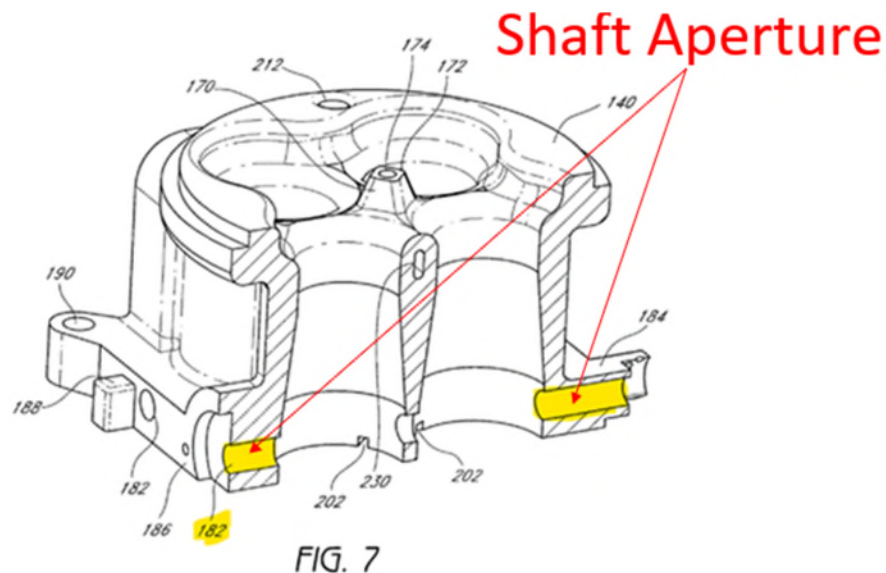
Benoit teaches that "each of the exemplary inserts 26 includes a plurality of apertures 40 which extend from the grooves 34 [i.e., the high pressure cavities] to the narrow areas of the Venturi-shaped barrels 30." (Ex. 1005, 3:48-3:51) These apertures (40) are "circumferentially spaced from one another" around the annular insert (26) and extend between the high pressure cavity (36) and the air bore (30). (Ex. 1005, Claim 1) Benoit's Claim 1 expressly recites "a plurality of apertures circumferentially spaced from one another for conveying the fuel from said high-pressure cavities into said low pressure region of the flow of air." (Ex. 1005, Claim 1) These circumferentially spaced apertures disposed in the annular insert (26) constitute "a plurality of orifices disposed in an annular ring allowing said fuel to flow from said fuel channel into said air intake" as recited in limitation [7.5].

Benoit further teaches that "the fuel from the annularly-shaped high pressure cavities 36 is generally uniformly delivered into the flow of air around the

perimeter of the Venturi-shaped barrel 30 to create a more uniform air and fuel mixture." (Ex. 1005, 4:1-4:4) This demonstrates that fuel passes through the orifices and mixes with the airflow as claimed.

[7.6] a throttle shaft having a throttle plate thereon, said throttle plate rotatably disposed within said air intake; and,

This limitation corresponds to limitation [1.5] from Claim 1. As discussed above in Claim 1, Farrell discloses throttle shaft apertures (182) and associated throttle plates that are rotatably disposed within the air intakes via the throttle shafts. (Ex. 1003, 3:65-4:4; See FIG. 7). Petitioner's analysis of [1.5] from Claim 1 is incorporated herein by reference.

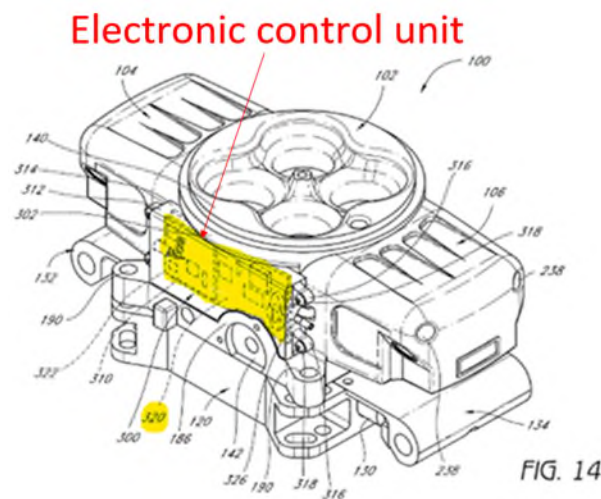


Wittkopf expressly confirms this limitation, disclosing "a throttle body assembly with four main bores, each with a throttle plate and an associated fuel injector,"

with throttle plates (118) disposed within bores (112) that are "shut when the engine is idling," directly controlling airflow by rotation. (Ex. 1004, 4:14-4:17; 6:36-6:39; Claim 1) Benoit likewise expressly recites "a throttle valve disposed in each of said bores adjacent said outlet ends and pivotably connected to said housing for selectively controlling the flow of air through each of said bores." (Ex. 1005, Claim 1) Petitioner's analysis of [1.5] from Claim 1 is incorporated herein by reference.

[7.7] an electronic control unit to control said fuel from each said electronic fuel injector.

This limitation corresponds to limitation [1.6] from Claim 1. As discussed above in Claim 1, Farrell teaches an ECU that "can control the injection timing and amount." (Ex. 1003, 8:53-8:54; See FIG. 14). Petitioner's analysis of [1.6] from Claim 1 is incorporated herein by reference.



Wittkopf further confirms an ECU (controller 132) operatively coupled to the fuel injectors with driver circuitry (188) for creating a periodic pulse signal to actuate them. (Ex. 1004, Claims 12 and 13) Petitioner's analysis of [1.6] from Claim 1 is incorporated herein by reference.

Accordingly, each and every limitation of independent Claim 7 is taught by the combination of Farrell and Wittkopf, or alternatively, by the combination of Farrell and Benoit.

B. Dependent Claims

1. Dependent Claim 2

The fuel injection throttle body of claim 1, said air intake comprising at least two air intakes.

Farrell discloses a fuel injection throttle body with multiple air passages. Farrell discloses four passages (146, 148, 150, 152) extending through the main throttle body from the top surface to the lower flange. (Ex. 1003, 3:14-3:16) Each passage defines an air intake through which airflow moves from an upper end to a lower end. Because Farrell discloses four such passages, it necessarily discloses "at least two air intakes" as claimed. A POSA would understand that the four-passage embodiment of Farrell meets the claim limitation of "at least two air intakes," and

would have been motivated to select an appropriate number of passages (two, three, four, or more) based on the specific engine configuration and performance requirements.

2. Dependent Claim 3

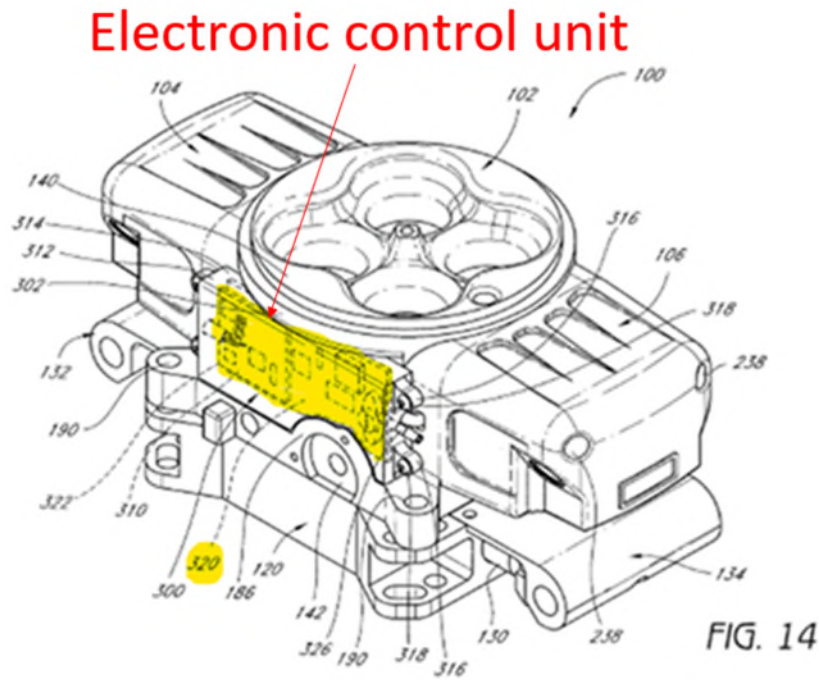
The fuel injection throttle body of claim 1, said air intake comprising four air intakes.

As discussed above in claim 2, Farrell discloses four passages (146, 148, 150, 152) extending through the main throttle body. (Ex. 1003, 3:14-3:16) Each passage defines an air intake. Therefore, Farrell discloses "four air intakes" as claimed.

3. Dependent Claim 4

The fuel injection throttle body of claim 1, said electronic controller disposed on a side of said fuel injection throttle body.

Farrell teaches that a "small housing 300" containing the ECU can be mounted to a side of the throttle body. Specifically, "The circuitry 310 can comprise a main board 320 ... the main board 320, and particularly an ECU that is defined by the main board 320, can control the injection timing and amount." (Ex. 1003, 8:48-8:54; See FIG. 14)



4. Dependent Claim 5

The fuel injection throttle body of claim 1, said plurality of orifices comprising one or more sizes.

Wittkopf teaches that "each injection ring 140 includes six axial outlets 144, although a greater or lesser number can be used as desired." (Ex. 1004, 6:18-6:21)

Wittkopf further teaches that it is desirable that "the total cross-sectional area of axial grooves 144 within each injection ring 140 be larger than the total cross-sectional area exiting the corresponding fuel injector 104 so as to lower the kinetic energy of the fuel droplets entering the air stream." (Ex. 1004, 6:23-6:28)

This disclosure in Wittkopf establishes that orifice size is a result-effective variable, i.e., a parameter that a POSA would recognize affects the performance characteristics of the fuel distribution system. Specifically, Wittkopf teaches that changing the cross-sectional area of the outlets affects the kinetic energy of fuel droplets, which in turn affects atomization and mixing.

"Where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." *In re Applied Materials, Inc.*, 692 F.3d 1289, 1295 (Fed. Cir. 2012) (quoting *In re Aller*, 220 F.2d 456, 456 (CCPA 1955)). Because Wittkopf discloses that orifice size affects fuel distribution characteristics, a POSA would have been motivated to optimize orifice sizes (uniform or varying) through routine experimentation.

Because the claim requires only "one or more sizes," even a single uniform size satisfies this limitation. Thus, Wittkopf's six axial outlets 144 teach this limitation.

Benoit similarly teaches that apertures (40) can be varied in size. Benoit teaches that "the apertures 40 could also be either generally uniformly sized or could have varying sizes." (Ex. 1005, 4:10-4:13) This expressly contemplates orifices of one or more sizes.

5. Dependent Claim 6

The fuel injection throttle body of claim 1, further comprising a fuel ring disposed within said air intake, wherein said fuel channel is formed in said fuel injection throttle body, or said fuel ring, or both.

Wittkopf teaches a fuel ring (140) disposed within the air intake (bore 112).

Specifically, "ring 140 is a two-piece ring formed of a ring-shaped insert 141 pressed into a ring-shaped outer housing 143. Outer housing 143 is ideally integrally formed with the throttle body casting." (Ex. 1004, 5:64-6:5)

Wittkopf further teaches that the fuel channel may be formed in the fuel ring, the throttle body, or both: "[a]lthough axial grooves 144 and circumferential groove 146 are shown formed in insert 141, in an alternative embodiment either the axial grooves, the circumferential groove, or both, may be formed within the interior of outer housing 143." (Ex. 1004, 6:12-6:17) This expressly teaches that the fuel channel (circumferential groove 146) may be formed in the fuel ring (insert 141), in the throttle body (outer housing 143), or both.

Benoit teaches that the high pressure cavity (fuel channel) is formed by a groove on the outer surface of the insert that cooperates with the housing. Specifically, "each of the inserts 26 includes an outer surface with a groove 34 positioned axially between the ends... [t]he grooves 34 of the inserts 26 cooperate with the

housing 22 to present a plurality of generally annularly-shaped cavities 36." (Ex. 1005, 3:29-3:36) The groove "extend[s] around the perimeter of the insert," giving the high pressure cavity a generally annular shape. (Ex. 1005, 3:32-3:33)

Benoit further teaches that "at least one of the inner surface of the body portion and the outer surface of the insert presents a groove, and the high pressure cavity is defined by the gap between the body portion and the insert at the location of the groove." (Ex. 1005, 2:20-2:24)

This teaches that the fuel channel can be formed in the insert (annular ring), the housing (throttle body), or both, exactly matching the alternative recitations of Claim 6.

6. Dependent Claim 8

The fuel injection throttle body of claim 7, said plurality of air intakes comprising two air intakes.

As discussed above for Claim 2, Farrell discloses multiple air intakes. Farrell expressly teaches that "[f]our passages 146, 148, 150, 152 extend through at least a majority of the main portion 144 from the top surface 140 through the lower flange 142." (Ex. 1003, 3:14-3:16)

Farrell also expressly contemplates embodiments having two air passages: the Summary describes "a first air passage" and "a second air passage," each extending

between the top surface and the bottom surface. (Ex. 1003, 2:33-2:36) Thus, Farrell teaches (at minimum) a throttle body configuration in which the plurality of air intakes comprises two air intakes.

Because Claim 8 requires only that the plurality "compris[e] two air intakes," Farrell's disclosure of either two or four air intakes satisfies this limitation.

7. Dependent Claim 9

The fuel injection throttle body of claim 7, said plurality of air intakes comprising four air intakes.

As discussed above in Claim 3, Farrell discloses four passages (146, 148, 150, 152) extending through the main throttle body. (Ex. 1003, 3:14-3:16) Each passage defines an air intake. Therefore, Farrell discloses "four air intakes" as claimed.

8. Dependent Claim 10

The fuel injection throttle body of claim 7, said plurality of orifices being one or more sizes.

As discussed above with respect to Claim 5, both Wittkopf and Benoit teach a plurality of orifices that can be uniform or varying in size. Because the claim requires only "one or more sizes," even a single uniform size satisfies this limitation. Thus, the claim is taught by the prior art.

9. Dependent Claim 11

The fuel injection throttle body of claim 7, further comprising an annular ring disposed within each said air intake.

Wittkopf teaches that "ring 140 is a two-piece ring formed of a ring-shaped insert 141 pressed into a ring-shaped outer housing 143" and "outer housing 143 is ideally integrally formed with the throttle body casting." (Ex. 1004, 5:64-6:5) This annular ring (140) is disposed within the air intake (bore). Because Farrell discloses four air intakes, a POSA would understand that each could incorporate Wittkopf's annular ring structure.

Benoit teaches that each insert (26) is disposed within a bore of the housing. (Ex. 1005, 3:10-3:11) ("the inserts 26 are disposed in the cylindrical bores 28.") The insert presents a Venturi-shaped bore for conveying air and includes an outer surface with a groove that cooperates with the housing to present an annularly-shaped cavity around its outer surface. (Ex. 1005, 3:28-3:37) ("each of the inserts 26 includes an outer surface with a groove 34 positioned axially between the ends... The grooves 34 of the inserts 26 cooperate with the housing 22 to present a plurality of generally annularly-shaped cavities 36.") This insert constitutes an annular ring disposed within the air intake. Because Farrell discloses multiple air

intakes, a POSA would understand that each could incorporate Benoit's insert structure.

10. Dependent Claim 12

The fuel injection throttle body of claim 11, said fuel channel formed in said fuel injection throttle body, or said annular ring, or both.

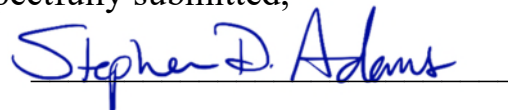
As discussed above with respect to Claim 6, Wittkopf teaches that the fuel channel "may be formed within the interior of outer housing 143" (i.e., the throttle body) and teaches that "outer housing 143 is ideally integrally formed with the throttle body casting." (Ex. 1004, 5:66-5:67, 6:14-6:15) Because the outer housing is part of the throttle body casting, the fuel channel can be formed in either the throttle body, the annular ring, or both. Petitioner's analysis of Claim 6 is incorporated herein by reference.

XI. CONCLUSION

For the foregoing reasons, Petitioner respectfully requests that the Board institute IPR and cancel claims 1-12 of the '434 Patent as unpatentable under Section 103 over Farrell in view of Wittkopf or, alternatively, over Farrell in view of Benoit.

Dated: July 23, 2026

Respectfully submitted,



Stephen D. Adams

Petition for *Inter Partes* Review of
Patent No. 12,203,434
Case IPR2026-00434

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Petition for *Inter Partes* Review of
Patent No. 12,203,434
Case IPR2026-00434

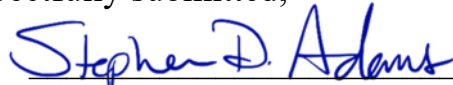
CERTIFICATE OF SERVICE

The undersigned hereby certifies that the foregoing PETITION FOR INTER PARTES REVIEW OF U.S. PATENT NO. 12,203,434, including all exhibits and supporting evidence, was served in its entirety on July 23, 2026, upon the following parties by courier and electronic mail:

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Dated: July 23, 2026

Respectfully submitted,



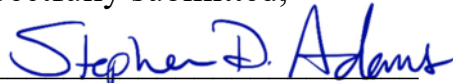
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CERTIFICATE OF COMPLIANCE PURSUANT TO 37 C.F.R. § 42.24

This paper complies with the type-volume limitation of 37 C.F.R. § 42.24. The paper contains approximately 12,493 words, excluding the parts of the paper exempted by § 42.24(a). This paper also complies with the typeface requirement of § 42.6(a)(ii) and the type style requirements of § 42.6(a)(iii) & (iv).

Dated: July 23, 2026

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