

Exhibit 2017

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

CHAMPION LABORATORIES, INC.,
FIRST BRANDS GROUP, LLC

Petitioners

v.

HENGST SE

Patent Owner

Case No. IPR2024-00603
Patent No. 9,023,203

DECLARATION OF
DR. Mehdi Basirat, Ph.D.

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I, Mehdi Basirat, declare as follows:

I. ENGAGEMENT

1. I have been retained by counsel for Patent Owner (Hengst SE) as an expert witness in the above-captioned proceeding. I have been asked to provide my opinion about certain issues related to the state of the art of the technology described in U.S. Patent No. 9,023,203 B2 (“the ’203 patent”) and the patentability of claims 1, 3, 5, 8-11, 15-17, 19, 23-25, and 28-30 of the ’203 patent as challenged in IPR2024-00603. The following is my written testimony on these topics.

2. My employer, Patexia, is being compensated by Patent Owner at the rate of \$320 per hour, which is Patexia’s standard hourly consulting rate for my time spent on this matter. This compensation is not contingent on my performance, my opinions, the outcome of this matter, or any other issues involved in or related to this matter. Neither Patexia nor I have a conflict of interest with respect to the Patent Owner or Petitioner.

3. I am over 18 years of age, I have personal knowledge of the facts stated in this declaration, and I could testify competently to them if asked to do so.

II. QUALIFICATIONS

4. A copy of my curriculum vitae is included in Appendix A, along with publications I have authored over the past ten years. I am a trained mechanical

engineer with over 20 years of professional experience and the Founder of Electro Drive Mobility, an engineering consulting company based in Los Angeles, CA. Throughout my career, I have held diverse mechanical engineering roles across the automotive, oil and gas, and general engineering industries. I earned a B.Sc. in Mechanical Engineering, with a minor in Fluid Dynamics, Heat Transfer, and Energy Conversion, from Persian Gulf University in Iran; a M.Sc. degree in Engineering Mechanics from the Royal Institute of Technology (KTH) in Sweden; and a Ph.D. in Mechanical Engineering from the University of Idaho. My expertise encompasses a wide range of mechanical and automotive engineering disciplines, including machine design, finite element analysis, product development, failure analysis, piping and flow analysis, crash analysis and reconstruction, computer simulations, electric vehicle systems, and experimental mechanics. I have extensive experience in engine design and the application of engine-powered equipment across various sectors, including marine, locomotive, agriculture, and transportation. My work includes designing, analyzing, and overseeing engineering projects for both internal combustion engines (ICE) and battery electric vehicles (BEV). My technical expertise covers off-road and passenger vehicle components such as intake and exhaust manifolds, oil pans, engine covers, cylinder blocks and heads, hydraulic brake systems, suspension systems, battery pack, battery cooling systems, body-in-

white (BIW), and safety systems like airbags and restraints. Currently, much of my work focuses on resolving commercial and individual disputes, accident reconstruction, failure analysis, and product design improvements. My comprehensive background and hands-on experience in mechanical and automotive engineering enable me to provide expert insights and practical solutions in these areas.

III. INFORMATION CONSIDERED

5. My opinions are based on my years of education, research, and experience, as well as my investigation and study of relevant materials. I have reviewed the '203 patent, including the claims of the patent in view of the specification. I have also reviewed the petition for *inter partes* review, the documents cited in the petition, and the materials cited in this declaration, which are listed below:

IPR2024-00603 EXHIBIT NO.	DESCRIPTION
1003	Declaration of Mr. Michael Nranian
1006	U.S. Patent Pub. No. 20100044295 A1 (“Honermann”)
1008	Certified Translation of JP Application 2002-303171 (“Yokoyama”)
1009	U.S. Patent Pub. No. 20040232063 (“Cline”)
1010	U.S. Patent Pub. No. 20120261326 (“Deschamps”)
1012	Plaintiff’s Final Infringement Contentions, Hengst SE v. Champion Laboratories, Inc., No. 23-cv-00794 (Jan. 16, 2024)

IV. LEGAL PRINCIPLES

6. I understand that the petition alleges that certain claims are unpatentable because they were “obvious” under 35 U.S.C. §103.

7. I understand that a patent claim is invalid if the claimed invention would have been obvious to a person of ordinary skill at the time the invention was made. I understand that “obvious” (in this context) means that even if all the requirements of a claim cannot be found in a single prior art reference, a person of ordinary skill who knew about certain prior art would have come up with the claimed invention. I understand that an obviousness analysis takes into account: (1) the level of skill possessed by a person of ordinary skill at the time the claimed invention was made; (2) the scope and content of the prior art; (3) what difference, if any, existed between the claimed invention and the prior art; and (4) secondary considerations of non-obviousness, to the extent such considerations exist.

8. I understand that, in determining the level of ordinary skill, the following factors may be considered: (a) the levels of education and experience of persons working in the field; (b) the types of problems encountered in the field; and (c) the sophistication of the technology.

9. I understand that, for a reference to be considered prior art, it must be reasonably related to the claimed invention of the patent. I further understand that a

reference is reasonably related if it is in the same field as the claimed invention or is from another field to which a person of ordinary skill in the field would look to solve a known problem.

10. To assess the differences between prior art and the claimed subject matter, I understand that the claimed invention should be considered as a whole.

11. I have been advised that a patent claim composed of several elements is not proved obvious merely by demonstrating that each of its elements was independently known in the prior art. In evaluating whether such a claim would have been obvious, I understand that I may consider whether there is a reason that would have prompted a person of ordinary skill in the art (POSITA) to combine the elements or concepts from the prior art in the same way as in the claimed invention.

12. I understand the rationales which may support a conclusion of obvious include:

- Combining prior art elements according to known methods to yield predictable results;
- Simple substitution of one known element for another to obtain predictable results;
- Use of known technique to improve similar devices (methods, or products) in the same way;

- Applying a known technique to a known device (method, or product) ready for improvement to yield predictable results;
- “Obvious to try” – choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success;
- Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces if the variations are predictable to one of ordinary skill in the art; and
- Some teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill to modify the prior art reference or to combine prior art reference teachings to arrive at the claimed invention.

13. I understand that, for an “obviousness” argument based on a combination of prior art references, a person of ordinary skill in the art must be shown to have a motivation to combine or modify a reference with a reasonable expectation of success.

14. I understand that I must be careful not to determine obviousness using the benefit of hindsight; many true inventions might seem obvious after the fact. I understand that when conducting an obvious analysis, I should put myself in the position of a person of ordinary skill in the field at the time the claimed invention

was made. Using this perspective, I should not consider what is known today or what is learned from the teaching of the challenged patent.

15. I understand that secondary considerations of non-obviousness include, but are not limited to:

- commercial success of a product due to the merits of the claimed invention.
- a long-felt need for the solution provided by the claimed invention.
- unsuccessful attempts by others to find the solution provided by the claimed invention.
- copying of the claimed invention by others.
- unexpected and superior results from the claimed invention
- acceptance by others of the claimed invention as shown by praise from others in the field or from the licensing of the claimed invention.
- other evidence tending to show non-obviousness (or obviousness); and
- independent invention of the claimed invention by others before or at about the same time as the named inventor thought of it.

16. I am also informed and understand that secondary considerations of non-obviousness must have a “nexus” to the asserted patent claims, and the patentee bears the burden of showing that such a nexus exists.

V. THE RELEVANT TIMEFRAME FOR ANALYSIS

17. I understand that Petitioner’s witness, Mr. Nranian, states that the earliest claimed priority date of the ‘203 patent is December 10, 2009. EX. 1003, ¶ 49. Similarly, I understand that Mr. Nranian uses December 10, 2009, as the relevant timeframe for his analysis, so I make the same assumption here. EX. 1003, ¶ 49.

VI. PERSON OF ORDINARY SKILL IN THE ART

18. I have reviewed Mr. Narnian’s description of the person of ordinary skill in the art. He states that:

“Based on the materials and information I have reviewed and based on my experience in the technical areas relevant to the ‘203 patent, a person of ordinary skill in the art at the time of the alleged invention of the ‘203 patent would have at least a master’s degree in chemical, electrical, mechanical, or automotive engineering, and at least two or more years of experience in the automotive industry designing, developing, testing, and engineering automotive components or practical experience servicing, assembling, repairing, and/or developing internal combustion engines and/or engine oil filters (or equivalent experience). More education can supplement practical experience and vice versa. Based on my knowledge and experience,

including as discussed above in Section II, I was a person of ordinary skill in the art at the time of the alleged invention of the '203 patent and can provide opinions regarding the knowledge of a person of ordinary skill in the art as of that time” EX. 1003, ¶49.

19. While I do not opine on the correctness of his description, I apply his description of a person of ordinary skill in the art for the purposes of my declaration. I have therefore conducted my analysis from the perspective of a person of ordinary skill in the art, as described by Mr. Nranian, as of December 10, 2009. As noted above, Mr. Nranian describes two ways a person of ordinary skill in the art may have obtained the requisite level of skill. EX. 1003, ¶¶ 49-50. As can be seen from my CV (Appendix A), I satisfy each of those.

VII. CLAIM CONSTRUCTION

20. I understand that, in this proceeding, the claims are construed according to their ordinary and customary meaning, in light of the specification and prosecution history, as understood by a person of ordinary skill in the art at the time of the invention. I understand that this is the same claim construction approach used in district court litigation.

VIII. SUMMARY OF APPLIED REFERENCES

21. I understand that the petitioner’s attempt to challenge the validity of ‘203 patent by introducing three references aimed at rendering its claims

unpatentable. The petitioner has structured their argument across three distinct references, each proposing that the limitations of '203 patent are either rendered or made obvious by the cited references:

In Ground 1: The petitioner relies on the Yokoyama patent as allegedly rendering claims 15-17, 19, 23, 25, and 30 of '203 patent were obvious over rendering in Yokoyam.

In Ground 2: A proposed combination of Yokoyama and Cline is presented, claiming that this combination is obvious.

In Ground 3: The petitioner asserts that a combination of Honermann and Cline is obvious.

22. In the following sections, I address several misunderstandings by the expert witness regarding the vehicle oil filtration system and the oil filter assembly. These misunderstandings formed the basis of his opinions. For instance, the expert incorrectly interpreted the meaning of 'eccentric,' leading to flawed conclusions. Although the expert testified that he would consider the plain meaning of words (EX. 1003, ¶56) while he translated seals as “blocking element” which and tried to create some relevance based on misinterpretations. The expert repeatedly concluded that the first and second positioning do not recite a function and only provide sufficient structure. He claimed that the claims 1 & 15 simply state that the means are

“arranged to bring the blocking element into engagement with the eccentric opening when the ring filter insert is inserted into the filter housing.” (EX. 1003 ¶¶ 62-64).

This is not true because in both claims 1 and 15, it is mentioned that the rotation of the insert against the filter housing facilitated by the inclined surfaces and in combination with the protruded nose align the “blocking element (24)” with the “third outlet (13)” *the eccentric opening being an outlet for emptying the filter housing when the filter insert is removed.*” (Patent, ‘203, lines 21-22, and lines 45-47). It is necessary to understand that the eccentric outlet on the bottom of filter housing is designed to drain the filter housing during filter replacement. If for any reason during installation the outlet won’t be blocked properly the oil will drain unintentionally and it will cause significant engine damage.

23. Furthermore, Mr. Nranian asserted that Yokoyama’s filter device would operate identically when inverted, basing this on the notion that liquid pressure assures functionality irrespective of orientation ignores the orientation-specific nature of Yokoyama filtering mechanism. This is explained in detail below.

24. Combining Yokoyama’s filter design with Cline’s eccentric drain valve is obvious is critically flawed. A detailed analysis reveals fundamental incompatibilities between the two systems, making such a combination impractical and non-obvious to a POSITA.

25. Yokoyama focuses on ease of assembly, seal protection, and simplicity, while Cline's design addresses fluid drainage and adds complexity. These objectives are distinct and unrelated. Moreover, Yokoyama uses top-mounted inflow and outflow routes, whereas Cline relies on bottom-mounted openings for drainage. These contrasting designs cannot be integrated without extensive reconfiguration. Yokoyama's filter relies on a specific configuration for proper alignment and sealing. Adding Cline's valve disrupts these features, leading to misalignment, leakage, and reduced filtration efficiency. Yokoyama's flow would be compromised by Cline's design, causing inefficiencies, sediment buildup, and contamination. Cline's valve introduces additional components, contradicting Yokoyama's goal of simplicity and reliability.

26. Moreover, neither patent suggests or teaches the asserted combination of references. Implementing such a design would require substantial redesigns, testing, and validation. Integrating the two systems would demand significant resources, time, and multidisciplinary expertise, far beyond a straightforward modification.

27. The proposed combination of Yokoyama and Cline's designs is a **complex engineering undertaking** that a POSITA would recognize as impractical, rendering the petitioner's claim non-obvious and untenable. A combining

Honermann's filter design with Cline's eccentric blocking element is critically flawed due to significant functional, structural, and engineering incompatibilities. Honermann's design relies on rotational motion of the "basket (304)" caused by the filter cartridge for locking and unlocking. Integrating Cline's eccentric blocking element, which prevents rotation, would obstruct this essential functionality. Moreover, Honermann's filter features a centrally located auto-lock drain mechanism aligned with the "core piece (222)" to ensure proper sealing and functionality. Introducing eccentric elements would disrupt this alignment, causing misalignment of guiding features, improper sealing, and compromised system integrity.

28. Combining Honermann's filter design with Cline's eccentric blocking element is critically flawed due to significant functional, structural, and engineering incompatibilities. Honermann's design relies on rotational motion of the "basket (304)" caused by the filter cartridge for locking and unlocking. Integrating Cline's eccentric blocking element, which prevents rotation, would obstruct this essential functionality. Moreover, Honermann's filter features a centrally located auto-lock drain mechanism aligned with the "core piece (222)" to ensure proper sealing and functionality. Introducing eccentric elements would disrupt this alignment, causing

misalignment of guiding features, improper sealing, and compromised system integrity.

29. Honermann's inflow and outflow routes are top-mounted, while Cline's design relies on bottom-centric openings for gravity-based drainage. This fundamental difference in configuration creates an incompatibility in fluid routing, requiring extensive redesigns. Furthermore, the combination does not yield any functional or operational advantage. Instead, it introduces unnecessary complexity, disrupts Honermann's design objectives, and undermines reliability. Moreover, Combining the designs would necessitate significant redesigning of the filter housing, cartridge, and seals, along with rigorous testing and validation. The process would demand substantial time, manpower, and budget, far beyond a simple or intuitive modification. Neither Honermann nor Cline suggests or teaches such a combination. Honermann's design improvements focus on functionality and simplicity, while Cline addresses unrelated drainage issues. The proposed combination of Honermann's filter design and Cline's eccentric blocking element is **not obvious**. It introduces functional conflicts, structural misalignments, and extensive engineering challenges without providing any clear advantage. A POSITA would recognize the significant effort, redesign, and validation required for such a combination. Thus, this combination is non-obvious.

IX. GROUND 1: YOKOYAMA CLAIMS

30. I understand that Ground 1 alleges that claims 15-17, 19, 23, 25, and 30 were obvious over rendering in Yokoyama. For the reasons below, it is my opinion that the petition does not show that these claims were obvious.

31. The interpretation of the Yokoyama patent and its technical disclosures by Mr. Nranian exhibits critical misunderstandings and misapplications of fundamental engineering principles that a POSITA would know. Central to this dispute are the concepts of eccentric, concentric, and the precise meanings of engineering terms such as "**sealing member**", "**blocking element**", and "**sealing valve**". These terms have distinct and widely recognized definitions within the engineering domain that is clear to a POSITA, and their misinterpretation leads to a flawed analysis of the Yokoyama patent. This argument systematically addresses the erroneous claims made about the functionality and design of the Yokoyama filter insert assembly, specifically concerning its rotational limitations, alignment properties, and sealing mechanisms. Furthermore, it highlights the distinct design objectives of the Yokoyama patent, which stand in stark contrast to the interpretations and assumptions presented.

32. To address these misunderstandings, I will clarify the concept of eccentric as it would be understood by a POSITA.

1. Eccentric Meaning

A. Eccentric “Sealing member”

33. A POSITA would understand that “eccentric” in the context of ‘203 patent, means that central axis is located elsewhere than at the geometric center (not placed centrally or not having its axis or other part placed centrally).

34. For example, as shown in Fig. 1:

In Fig. 1(a), the axis for all four circles (two white and two blue) are the same. Therefore, the four circles are concentric. In Fig. 1(b), the red axis shows the eccentric circles.

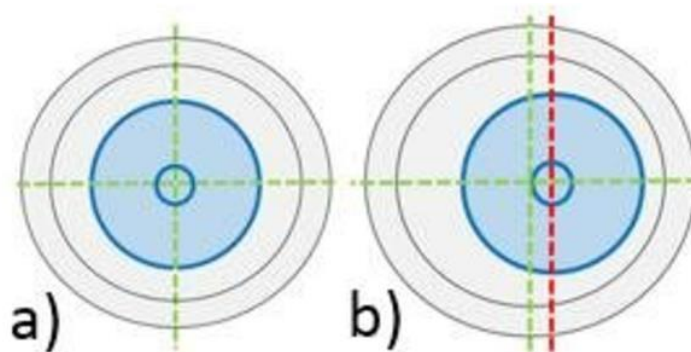


Fig 1. (a) Four Concentric Circles, (b) 2 Blue Eccentric Circles

B. Ringed-Shape “sealing member (47)“.

35. As stated in Claim 5 of the Yokoyama patent explicitly describes the “sealing member (47)” as “ring-shaped” (circular):

*"The filter device according to any one of Claims 1 to 4, characterized in that a ring-shaped **"sealing member (47)"** having a W-shape at three locations etc."*

36. This description establishes that the **"sealing member (47)"** has a clear, consistent axis (center of rotation) and cannot be arbitrarily called eccentric. A ring shape inherently defines symmetry around its center. Thus, the **"sealing member (47)"** of Yokoyama is not an eccentric element. Additionally, the eccentric and concentric axis are applicable to the whole object, not to a segment of a body. For example, W shaped portion (48) which is a small section of the **"sealing member (47)"** cannot be eccentric because the center axis of W shaped portion (48) still coincide with the center axis of **"sealing member (47)"**. A simple analysis of Fig.2 shows the concentric design of Yokoyama filter element (40). The highlighted square in Fig. 2 provides a top view of the following components:

- Filter element (40)
- Inner cylinder (41)
- Filter media (42)
- Upper plate (43)
- Lower plate (44)
- Opening (45)
- Locking protrusions (46)
- Sealing member (47)

- Ring-shaped protrusions (48)

37. A POSITA would recognize that in engineering drawings, if the central axes of cylindrical elements are not coincidence, this discrepancy would be explicitly depicted in either the drawings or schematics. In Fig.2 it is evident that an **axis passes through the center of all these components**, demonstrating their concentric arrangement. This alignment further supports the conclusion that the “**sealing member (47)**” is not eccentric.

38. The eccentric concept has been discussed in the context of the ‘203 patent several times which is consistent with a POSITA understanding of eccentric, and my conclusion that the “sealing member (47)” is not eccentric. *See* Ex. 1001 (“central pipe nozzle 15,” col. 7, ln 13-14; “central through hole,” col. 12, ln. 49; “inclined plane 3 with its two partial planes 3.1 and 3.2 is again visible in the center of the filter insert,” col. 8, ln. 12-14; “the bottom 18 of the housing 10, in the center of which the return 12 and, eccentrically thereto, the outlet 13,” col. 10., ln. 27-29; and “eccentric blocking element” col. 1, ln. 19-20).

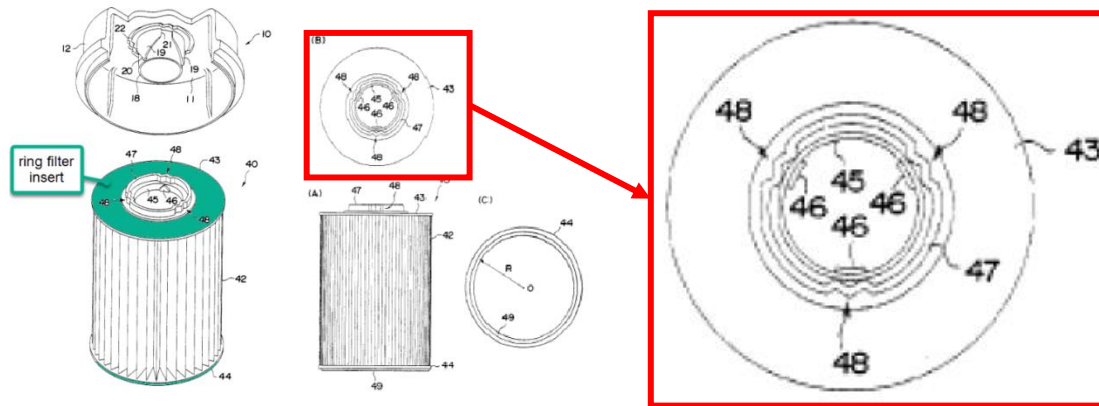


Fig. 2 Yokoyama insert shows the concentric position of Filter element (40), Filter media (42), Upper plate (43), Lower plate (44), Opening (45), Ring-shaped protrusions (46), and Sealing member (47). (Fig.4 JP 2004-136203 A 5.13.2004).

39. Therefore, considering the above-mentioned facts: (1) meaning of eccentric, (2) the ring-shaped “**sealing member (47)**”, it is clear that Mr. Nranian's opinion asserting that the “**sealing member (47)**” is eccentric is fundamentally flawed. Consequently, his opinions expressed in EX. 1003, ¶¶ 92-97, and ¶ 107, ¶ 110, and ¶ 123, which are based on this fundamentally flawed meaning of “eccentric” are wrong.

[FIG. 1]

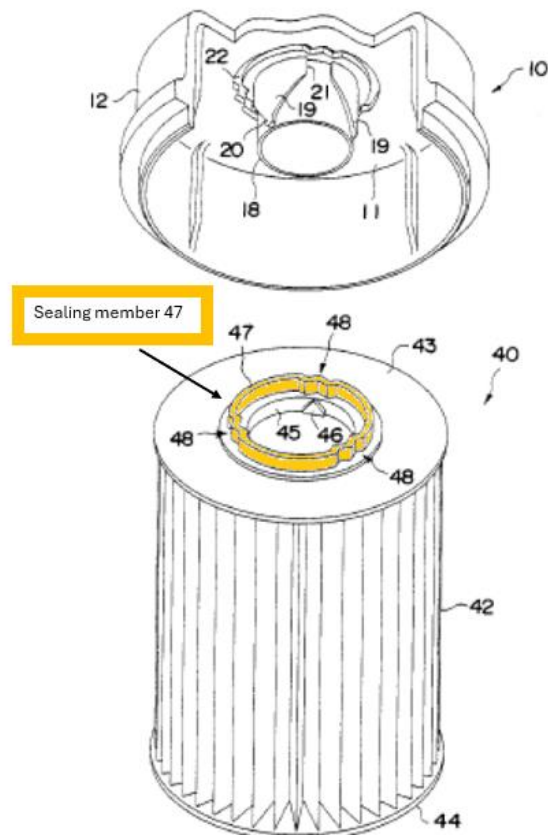


*Fig. 3 Yokoyam “Sealing member (47)” shows the concentric assembly with
the filter insert*

2. The Structural and Functional means

40. A POSITA would recognize that the **first and second positioning means** serve critical structural and functional roles; the first and second positioning means align and engage the “**blocking element (24)**” with the outlet, effectively closing the “**bottom outlet (13)**”, which is essential for the functionality of the filter.

41. The term “**blocking element**” is not inherently associated with fluid sealing unless explicitly stated. In Patent '203, this association is explicitly detailed multiple times, where the blocking element serves dual functions by integrating a sealing role. To successfully block the “outlet (13)”, both the **filter housing** and the “**blocking element (24)**” must perform complementary and distinct functions. Patent '203 explicitly incorporates a **sealing function** into the “blocking element (24)”, as described in the following excerpt:

"Depending on the embodiment of the outlet in the filter housing, the blocking element can be embodied differently in line therewith. For example, the blocking element can be a radially or axially sealing valve element, which is rigidly connected to the lower front panel, or a radially sealing plug, which is rigidly arranged on the lower front panel. These embodiments are particularly simple in view of production technology and are mechanically robust." (Patent '203, Column 4, lines 24–37)

42. This description demonstrates that the “blocking element (24)” performs **dual functions**, such as acting as a “**sealing valve element**” or a “**sealing plug**”, which is rigidly integrated into the lower front panel. These dual functions ensure both mechanical robustness and effective sealing. The patent also describes

the “**seat (14)**” in the outlet, designed to complement the blocking element, and perform functional sealing:

"The outlet is embodied with a seat, which is incorporated on the side of the filter housing or which is inserted as a separate part and which matches the blocking element." (Patent '203, Column 4, lines 39–43)

43. This highlights the **complementary design** of the outlet and the blocking element, which interact to ensure effective sealing and mechanical integrity. (See Fig. 4.)

44. A POSITA would understand the precise alignment and interaction of the first and second positioning means with the filter housing “outlet (13)” and the “blocking element (24)” are **crucial for the overall functionality of the filter**. Disputing the functional objectives of these features misunderstands the fundamental engineering principles. Thus, the opinions expressed in paragraphs 105-110 of EX. 1003 are flawed and incorrect. Therefore, it is not obvious that they render the claims unpatentable, as the conclusions fail to demonstrate a proper basis for combining the cited references or addressing the claimed

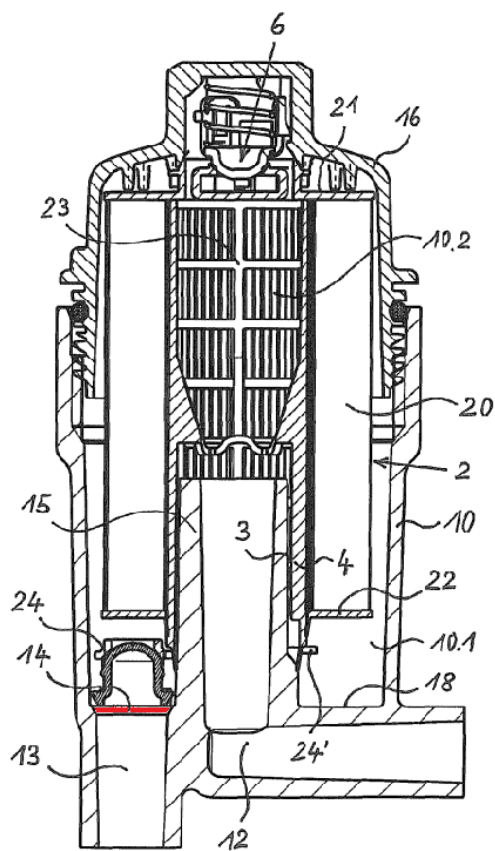


Fig. 2

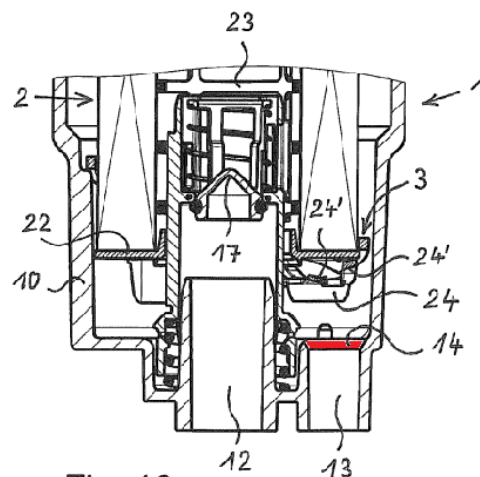


Fig. 16

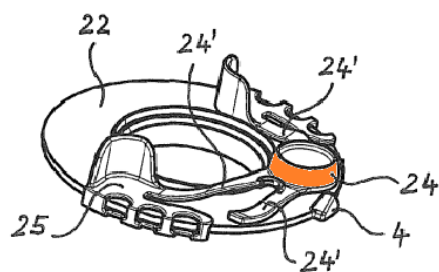


Fig. 18

Fig. 4. The “**Seat (14)**” highlighted in red explicitly designed to match “**blocking element (24)**” highlighted in orange and seal the filter outlet.

3. Inverting Yokoyama (Upside-Down)

45. In EX. 1003, ¶91, Mr. Nranian's assertion that Yokoyama's filter device would operate identically when inverted basing this on the notion that liquid pressure assures functionality irrespective of orientation ignores the orientation-specific nature of Yokoyama's filtering mechanism. Paragraph 18 of **JP 2004-136203 A**, stating:

“As shown in FIGS. 1, 3 and 4, the filter element 40 has a structure in which a filter medium 42 bent in a bellows shape is attached around a thin-walled cylindrical inner cylinder 41 configured in a lattice shape, and a disc-shaped upper plate 43 is attached to its upper end, and a disc-shaped lower plate 44 is attached to its lower end. A circular opening 45 is provided in the center of the upper plate 43, and when the filter element 40 is attached to the upper case half 10 (described later), the pipe portion 18 of the upper case half 10 is inserted through the opening 45. Furthermore, as shown in FIGS. 3 and 4, a ring-shaped protrusion 49 is provided on the bottom surface of the lower plate 44 and projects downward. “

46. The explicit description in the above-mentioned paragraph of Yokoyama's patent makes it clear that the filter device's operation is dependent on maintaining the correct orientation of the filter element. The solid lower plate with a protruded ring shape and the perforated upper plate with central hole are functional components that align with the inflow and outflow routes, respectively. (See Fig. 5).

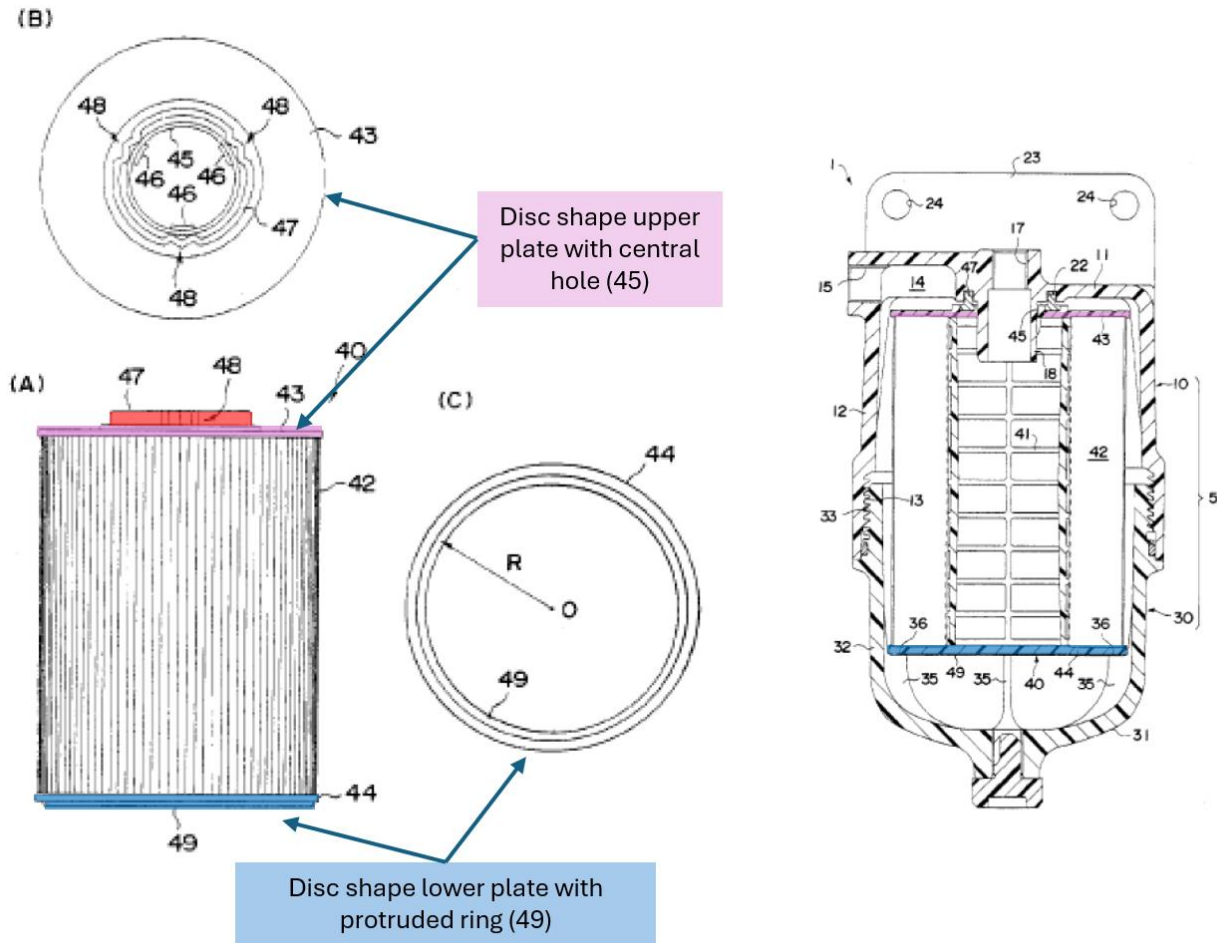


Fig. 5 Disc-shaped upper plate 43 is attached to its upper end and a circular opening 45. and a disc-shaped lower plate 44 is attached to its lower end, and a ring-shaped protrusion 49.

47. Moreover, a POSITA would understand that inverting the filter would cause significant operational issues:

A. Misalignment of Plates:

- The solid lower plate would obstruct the outflow route, preventing filtered fluid from exiting.

- The perforated upper plate would no longer align with the inflow route, disrupting the filtration process.

B. Bypassing of the Filter Medium:

- Inverted orientation would allow unfiltered fluid to bypass the filter medium entirely, rendering the filtration ineffective.

C. Conflict with Described Flow Path:

- Yokoyama explicitly describes a flow path that depends on the orientation of the filter element. Fluid enters through the inflow route, passes through the filter medium, and exits through the outflow route. This described functionality is inherently tied to the asymmetric design of the filter plates.

The claim that the device could function identically in either orientation directly contradicts this disclosure. Furthermore, a POSITA would have carefully reviewed the following aspects, before concluding that Yokoyama's filter device is invertible.

D. Position of Inlet and Outlet Connections

Yokoyama places the inlet and outlet connections on the top of the filter housing, further emphasizing the orientation-specific design. These connections dictate the flow path of oil through the filter and ensure proper filtration. Inverting the filter would disrupt this flow path, potentially causing backflow, leaks, or

incomplete filtration. Furthermore, Yokoyama's design already incorporates a central drain plug. Although the patent does not explicitly mention this, the drain and drain plug are designed at the lowest point of the filter system. This placement aligns with standard practices in liquid systems, where a drain at the lowest point is essential for effectively removing debris and dirt. (See Fig 6).

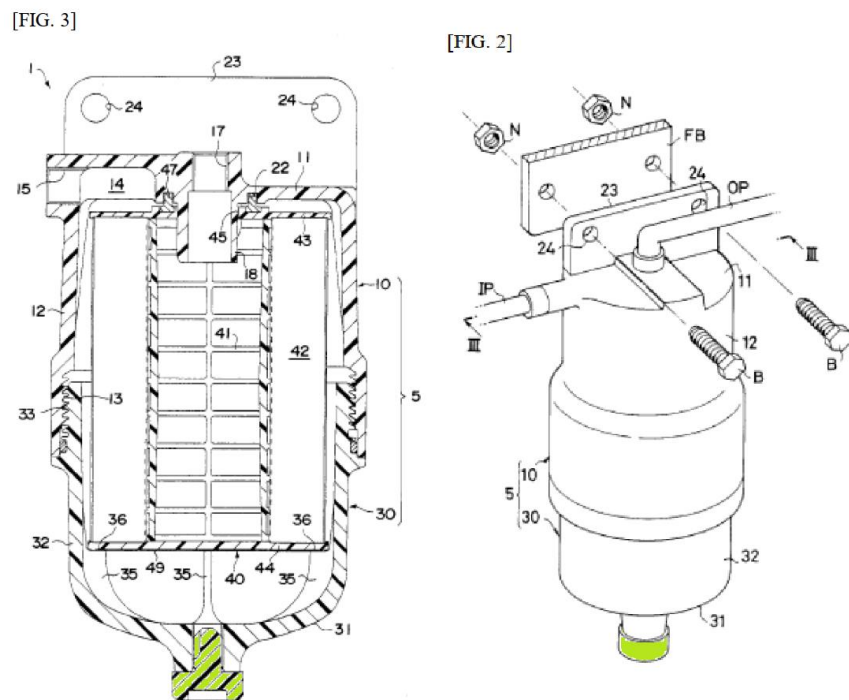


Fig. 6 Drain plug highlighted in green at the lowest point of the housing

E. Impact on Fluid Dynamics and Separation

The filter's design relies on gravity and pressure to direct oil flow properly. Inverting the filter would alter the intended flow dynamics, causing issues such as sediment buildup in unintended areas or oil bypassing the filter medium. A POSITA

would understand that these disruptions directly contradict the intended operation of the device.

F. Engineering Intent and Practical Implications

The deliberate asymmetry in the design of Yokoyama's filter insert and housing reflects an engineering intent to maximize filtration efficiency and prevent contamination. Designing the filter to operate identically in either orientation would require significant modifications, such as: symmetrical end plates, and repositioned connections. These features are absent in Yokoyama, confirming that the device is not intended for invertible operation. A POSITA would recognize that the design has been tailored for a specific orientation to meet practical and functional requirements.

G. Lack of Teaching for Inverted Operation

Yokoyama provides no suggestion or teaching that this flow path would remain effective in an inverted orientation. Nor does the patent describe any design features, such as symmetrical plates or dual-function ports, that would enable such functionality.

4. Conclusion

48. A POSITA would recognize that the non-identical design of the top and bottom plates, along with the specific placement of the inlet and outlet connections, clearly indicates that Yokoyama's filter device is orientation specific. Furthermore, a POSITA would understand that inverting the filter would compromise its

functionality, including the proper flow of oil and the effective separation of filtered and unfiltered oil. Given these constraints, a POSITA would not conclude that Yokoyama's device could operate identically in both orientations without significant modifications. Therefore, the claim of identical operation in either orientation is unsupported, and it is Non-obvious.

X. GROUND 2 COMBINING YOKOYAMA WITH CLINE

49. In EX. 1003, ¶¶ 128-129, Mr. Nranian asserted that that it was obvious to a POSITA to combine Yokoyama design with Cline. In addition to the petition's lack of an identified logical reason for arriving the recited configuration of combination Yokoyama's filter design with Cline's eccentric drain valve, Mr. Nranian also does not appear to consider the incompatibility between two systems that were engineered for distinct purposes and environments. However, a closer examination by a POSITA reveals significant differences in their designs, intended benefits, and operational constraints of Yokoyama's filter and Cline's eccentric drain valve. These differences highlight the impracticality and complexity of such a combination. Below, outline the critical discrepancies that demonstrate why integrating these systems is not straightforward and would not be obvious to a POSITA

1. Functional Mismatch Between Yokoyama and Cline

50. Yokoyama's Objectives: Yokoyama focuses on ease of assembly, prevention of wobble, and protection against seal damage during replacement (Ex. 1008, ¶26). These goals do not align with the inclusion of an eccentric drain valve, which adds complexity and does not address any problem explicitly identified in Yokoyama. Furthermore, Yokoyama's design already incorporates a central drain plug. Although the patent does not explicitly mention this, the drain and drain plug

are designed at the lowest point of the filter system. This placement aligns with standard practices in liquid systems, where a drain at the lowest point is essential for effectively removing debris and dirt. (See Fig 7).

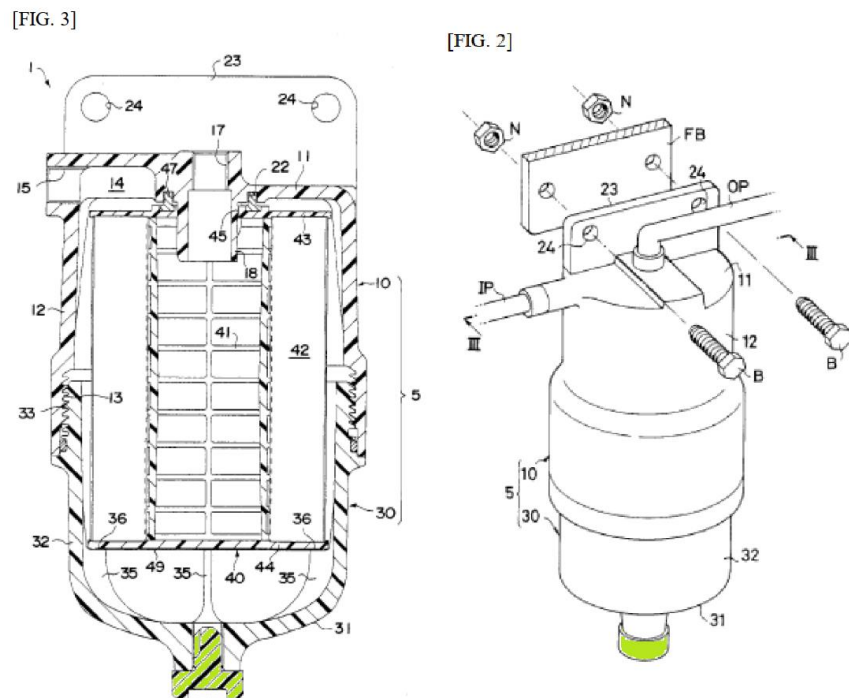


Fig. 7 Drain plug highlighted in green at the lowest point of the housing

51. Cline's Objectives: Cline's eccentric drain valve addresses drainage and fluid disposal issues, which Yokoyama does not identify as problems needing resolution. A POSITA would see these goals as distinct and unrelated, reducing the likelihood of combining the two systems.

2. Distinct Opening locations Creates Fundamental Conflict

52. Cline's Design: All four openings in Cline's filter—used for fluid inflow, outflow, and drainage—are located at the **bottom** of the filter housing. This placement is critical for Cline's gravity-based drainage mechanism, which collects fluid at the bottom for easy disposal.

53. Yokoyama's Design: Yokoyama positions its **inflow and outflow routes at the top** of the filter housing (Ex. 1008, Fig. 3). This top-mounted configuration is designed for efficient flow management, alignment, and sealing, consistent with Yokoyama's goals of ease of assembly and prevention of seal damage (Ex. 1008, ¶26).

54. The contrasting placement of openings creates a **fundamental incompatibility** in fluid routing, making it impractical to integrate Cline's bottom-centric design with Yokoyama's top-mounted configuration without extensive redesigns.

3. Conflict with Yokoyama's Orientation-Specific Design

55. Yokoyama's filter is designed with different upper plate (43) and lower plate (44). The upper plate (43) has a central perforation to align with the outflow route at the top. The lower plate (44) features a protruded disc-ring shape that supports the seal, ensuring proper alignment and preventing leakage of filtered liquid.

56. Introducing Cline's eccentric drain valve near or on the lower plate would disrupt the **critical support provided by the protruded disc-ring shape**, leading to; **Seal instability** and potential leakage.

57. Misalignment of the filter element, compromising filtration efficiency and increasing wear. These issues contradict Yokoyama's explicit design objectives of preventing seal damage and ensuring alignment during assembly and replacement.

4. Fluid Dynamics and gravity and pressure-Driven Design

58. Yokoyama relies on **gravity and pressure** to guide fluid through the filter medium efficiently. The top-mounted inflow and outflow routes ensure smooth flow and separation between unfiltered and filtered fluid.

59. Incorporating Cline's design would require fluid to travel against the intended flow path, causing inefficiencies and potential blockages.

60. Increase the risk of sediment buildup and unfiltered fluid bypassing the filter medium, leading to contamination.

5. Cline's Complexity Contradicts Yokoyama's Simplicity

61. Cline's eccentric drain valve introduces additional components, such as a flow blocker and quick-drain outlet, that increase system complexity.

62. Yokoyama's design prioritizes **simplicity and reliability**, as demonstrated by its focus on preventing wobble and seal wear. Adding Cline's drain mechanism:

- Increases the risk of misalignment or failure.
- Complicates assembly and disassembly, contradicting Yokoyama's goal of ease of replacement.

6. No Suggestion or Teaching of Combination

63. Neither Yokoyama nor Cline provides any teaching or suggestion that their systems could or should be combined.

64. A POSITA would recognize that:

- Yokoyama's design is optimized for a top-mounted flow system with asymmetric plates.
- Modifying it to incorporate Cline's bottom-drain mechanism would necessitate extensive and impractical changes, including repositioning openings and redesigning the filter housing and lower plate.

7. Unpredictable Results and Potential Failures

65. The combination would introduce significant uncertainties:

- Misalignment of the seal and filter element.
- Leakage due to disruption of the lower plate's support.
- Inefficient filtration due to altered flow paths.

66. These risks far outweigh any potential benefits of adding Cline's eccentric drain valve.

8. Packaging Space and Accessibility

67. The available space within the engine compartment must accommodate components while ensuring **accessibility for hands and tools** during installation and maintenance. Yokoyama's top-mounted inflow and outflow routes and Cline's bottom-centric design present a significant spatial conflict.

68. Adjusting the design to merge these systems would require major reconfiguration of the filter housing and surrounding components.

9. Affecting other Engine Systems:

69. The **cooling system, oil pan location, and oil heat exchanger** all interact with the filter design. Any modification to incorporate Cline's eccentric drain valve into Yokoyama's system would need to consider the impact on these critical subsystems to avoid overheating, reduced oil flow, or operational inefficiencies.

10. Complexity of Engineering Integration:

70. Combining Yokoyama and Cline requires more than simply joining their components. It involves a **comprehensive redesign** of:

- The **filter housing**, to address the mismatch in the placement of inflow/outflow routes and drain mechanisms.
- The **lower plate** in Yokoyama, whose protruded ring shape ensures seal stability, would need to accommodate Cline's flow blocker, risking seal misalignment and leakage.

71. These changes create a cascade of engineering challenges that extend to testing and validation.

11. Testing, Validation, and Resource Investment:

72. Engineering a new design is not a casual process; it requires **rigorous testing and validation** to meet performance, reliability, and safety standards. This process demands:

- Significant **time** to design, prototype, and validation.
- Substantial **manpower** from multidisciplinary teams to address thermal, structural, and fluid dynamics challenges.
- A considerable **budget** for iterative development and certification.

73. The claim that a POSITA would simply combine these designs overlooks the extensive effort and investment required for such a project.

12. Infeasibility of Spontaneous Combination:

74. No POSITA could "walk around an engine" and instantly decide to combine these two designs without a detailed understanding of the engine, engine compartment, and connected systems and a comprehensive plan. Developing such a solution would likely take **several months if not years** of coordinated effort, making the notion of an obvious combination unrealistic.

13. Conclusion:

75. The incompatibility between Yokoyama top-mounted configuration and Cline's bottom-eccentric drain mechanism, combined with the extensive engineering resources required, demonstrates that such a combination is Non-obvious. Instead, it represents a **complicated engineering process** that would require a significant commitment of time, manpower, and budget.

76. A POSITA would have understood that the proposed combination of Yokoyama and Cline's designs is a complex engineering undertaking that cannot be achieved without substantial redesigning, investment, and validation. A POSITA would recognize these challenges and understand that this process goes **far beyond an obvious modification**, rendering the argument for an obvious motivation to combine these systems **untenable**.

XI. GROUND 3 COMBINATION OF HONERMANN WITH CLINE

77. Mr. Nranian concluded that, because Honermann proposed a protruded nose and inclined surfaces, it would have been obvious to a POSITA to combine Honermann with Cline's eccentric blocking element or eccentric opening. However, this opinion has significant flaws, which I will outline below.

1. The Rotation and locking mechanism

78. As it stated in Honermann, ¶140, *“The embodiment of the Basket 304 depicted further includes a grooved wall 310. The groove wall 310 forms, generally, a cylinder and extends axially in a direction toward the open mouth 154 of the bowl 36. In general, the grooved wall 310 is constructed and arranged to engage a portion of the filter cartridge 38 such that the engagement with the filter cartridge 38 will rotate the basket 304 from a first locked position to an unlocked position. The first locked position is a position in which the at least one leg 306 axially abuts the projection 218 on the filter support 200 (FIG. 19). The unlocked position is a position in which the at least one leg 306 is free of the axial abutment with the projection 218 and permits the basket 304 to move in a direction toward the end 156 of the bowl 36 (FIG. 21).”* (See Fig. 6.)

79. As explained in Honermann the “filter cartridge (38)” rotates the “basket (304)”. Furthermore, “basket (304)” rotates from a first locked position to an unlocked position. Given that Honermann does not teach rotating the filter insert

relative to filter housing, even if an eccentric blocking element were integrated into Honermann, it would need to engage with the eccentric opening in the housing when “Basket (304)” is in the locked position. In order to unlock the “basket (304)” from locked position, the “basket (304)” has to rotate, however it won’t be possible. Because the eccentric blocking element would inherently prevent any further rotation due to its functional purpose.

80. Thus, a POSITA would understand that placing a blocking element anywhere other than the center of the filter housing would render the design non-functional, as the eccentric nature of the blocking element would obstruct the intended rotational motion. This fundamental incompatibility highlights the flawed reasoning in attempting to combine Honermann with Cline’s eccentric blocking element or opening.

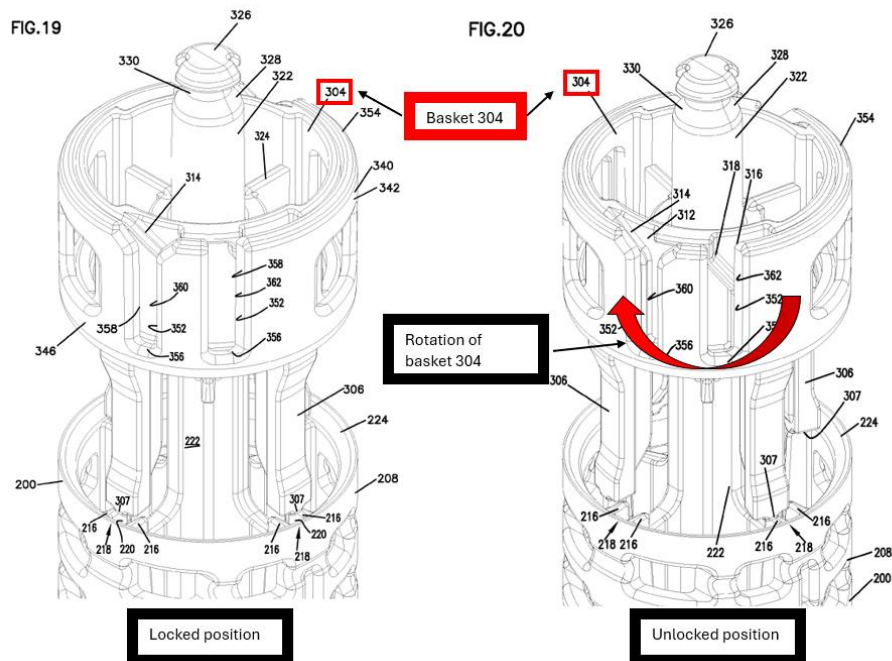


Fig. 6. The "basket (304)" in locked and unlocked positions

2. The Eccentric Outlet

81. Mr. Nranian asserted that while Honermann discloses a replaceable “**filter cartridge (38)**” with a guiding mechanism (protruding noses and inclined planes), the absence of any eccentric blocking element or eccentric opening is a deliberate design choice rather than a limitation to be supplemented. The central auto-lock drain mechanism in Honermann’s filter system is integrated into the filter and directly interacts with the “**filter cartridge (38)**”. When the “**filter cartridge (38)**” is installed or removed, the “**core piece (222)**” movement automatically engages or disengages the drain mechanism, ensuring a seamless and efficient process for fluid drainage during maintenance:

“With the filter cartridge 38 operably positioned in the bowl 36 and the head 32 fully engaged and connected to the bowl 36, the adaptor 64 presses against the first endcap 41, which pushes the cartridge 38 and the core piece 222 holding the basket 304 and legs 306 downward axially relative to the porous inner filter support 200. As the core piece 222 moves in a direction toward the closed end 156 of the bowl 36, the head 302 of the core piece 222 is moved away from the inwardly extending support 226 and engages the receiver 298 of the plug 244. This axial force presses the plug 244 against the valve spring 288 to move the plug into the sealed position of FIG. 12.” Honermann, ¶188. (See Fig. 7.)

82. The design ensures that the above structure serves as the actuator for the drain mechanism. This eliminates the need for additional manual steps or components to control the drainage process.

83. A POSITA would understand that the cartridge engages the centrally located drain mechanism and cannot be shifted off-center without redesigning the system. This central alignment is a crucial structural limitation that directly impacts the functionality and compatibility of the system with other components.

84. **Specifically, “core piece (222)”** is centrally located within the **“filter cartridge (38)”** and is designed to engage directly with the drain mechanism.

85. A POSITA will understand that during installation, screwing filter housing in the filter head causes **“core piece (222)”** to **push against the drain**

mechanism, activating it to seal or open the fluid outlet depending on the cartridge's position.

86. This direct engagement ensures a reliable and consistent operation of the auto-lock drain mechanism. Furthermore, it is to a POSITA that the “**core piece (222)**” is positioned along the **central axis** of the cartridge and housing. This alignment is crucial for maintaining the functionality of the drain mechanism. The design ensures that all forces applied by the “**core piece (222)**” during engagement are evenly distributed, preventing misalignment or mechanical stress that could compromise the system's integrity. A POSITA understand that the **central placement of core piece 222** is fixed and cannot be transferred off-center without redesigning the entire system. Moreover, A POSITA would understand that offsetting the drain mechanism or the “**core piece (222)**” from the center would disrupt their symmetrical alignment, leading to one or more of the following issues:

- Misalignment of the guiding features, such as the inclined planes and protruding noses.
- Improper sealing of the lower opening, resulting in potential contamination of the filtered oil with unfiltered oil, or leakage.
- Compromised functional integrity of the auto-lock drain mechanism.

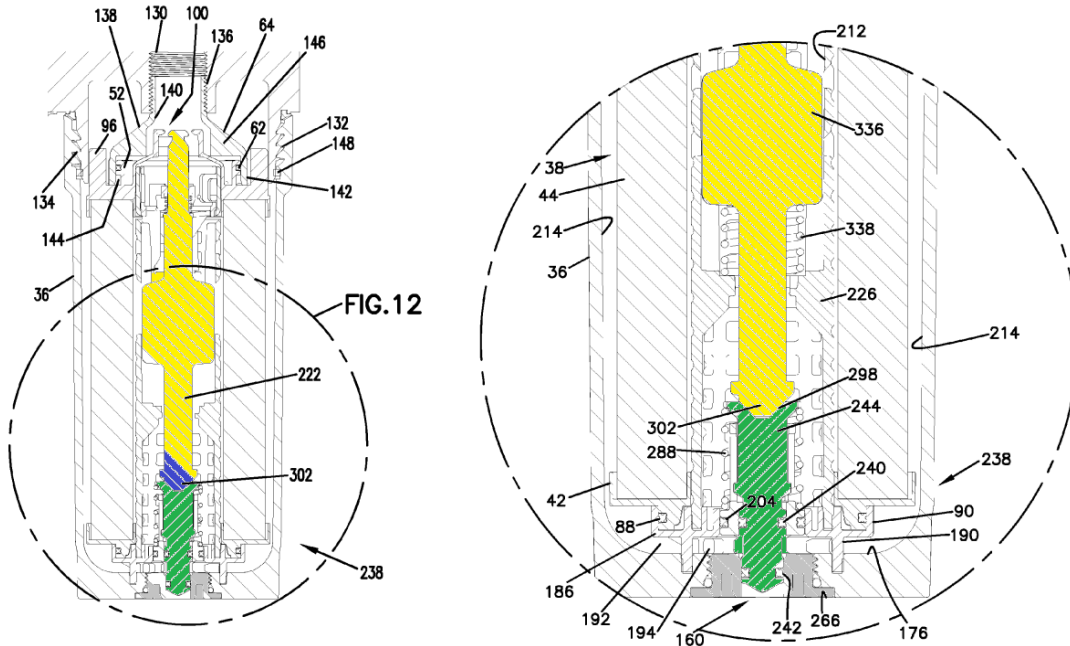


Fig. 7. The head 302 (highlighted in blue) of the “core piece (222)” (highlighted in yellow) is moved away from the inwardly extending support (226) (highlighted in gray) and engages the receiver (298) (highlighted in Green) of the plug 244 (highlighted in Green). See Honermann, Fig. 11 & Fig. 12.

87. Furthermore, a POSITA would consider the following aspects and conclude that the combination of the Honermann’s design with Cline’s design is non-obvious.

3. Impacts on Compatibility with Eccentric Systems

88. Honermann’s design is inherently **concentric**, relying on “**core piece (222)**”, internal basket, central outlet to maintain a central interaction with the drain mechanism. This is incompatible with systems requiring **eccentric (off-center) engagement like Cline**.

89. Attempting to integrate an eccentric blocking element or opening into Honermann's design would necessitate:

- Relocating the drain mechanism and the “**core piece (222)**”.
- Redesigning the cartridge and housing for off-center alignment.
- Addressing significant engineering challenges introduced by misalignment.
- Causing the filtered oil contamination with unfiltered oil, therefore a new sealing member would be needed
- The inclusion of “**core piece (222)**” and its downward engagement with the drain mechanism reflects Honermann's focus on precision and simplicity.
- By centralizing the interaction, the design achieves a robust and efficient operation without introducing unnecessary complexity.
- This intent contrasts with eccentric designs, which prioritize offset engagement for specific functional needs.

4. Fundamental Functional Incompatibility

90. Honermann's design relies on rotational motion between the "basket (304)" by the “filter cartridge (38)” to achieve locked and unlocked positions. The filter's functionality is specifically tied to this rotational mechanism, as described in Honermann, where the basket engages with and disengages from projections to lock or unlock.

91. Cline’s eccentric blocking element, by its nature, is designed to prevent movement (such as rotation) when engaged. Integrating an eccentric blocking element into Honermann’s design would contradict the fundamental purpose of Honermann’s rotational mechanism, as it would obstruct the intended motion.

5. Structural Constraints

92. Honermann’s basket rotation is facilitated by specific geometric relationships, such as the engagement of protrusions, inclined surfaces, and grooves. These elements are carefully aligned and positioned to allow smooth rotational transitions between locked and unlocked states.

93. An eccentric blocking element, which is off-center, would require structural modifications to the basket and housing that could disrupt these relationships. This could lead to design inconsistencies, misalignments, or mechanical interference.

6. Distinct Placement of Openings Creates Fundamental Conflict

94. **Cline’s Design:** All four openings in Cline’s filter—used for fluid inflow, outflow, and drainage—are located at the **bottom** of the filter housing. This placement is critical for Cline’s gravity-based drainage mechanism, which collects fluid at the bottom for easy disposal.

95. **Honermann’s Design:** Honermann positions its **inflow and outflow routes at the top** of the filter housing. (See Fig. 8.) “*Specifically, Honermann*

discloses that after the unfiltered liquid flows through the filter media, it then flows “into the filtered liquid volume” (i.e. clean side) then “through the first open aperture” (i.e. return) then “through the open aperture ... of the adaptor and then through the outlet conduit ... of the filter head.” Ex. 1006, ¶282;”. (Ex. 1003, ¶ 187).

Top-mounted configuration is designed for efficient flow management, alignment, and sealing. The contrasting placement of openings creates a **fundamental incompatibility** in fluid routing, making it impractical to integrate Cline’s bottom-centric design with Honermann’s top-mounted configuration without extensive redesigns.

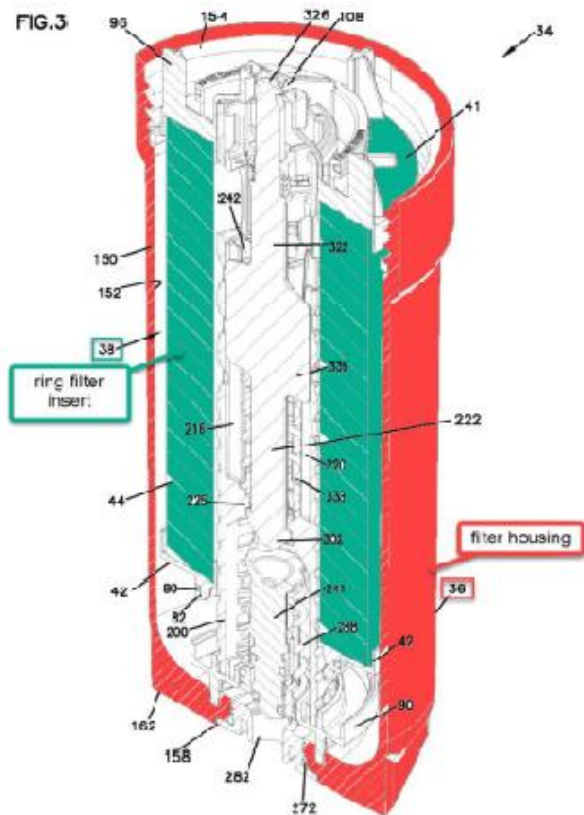
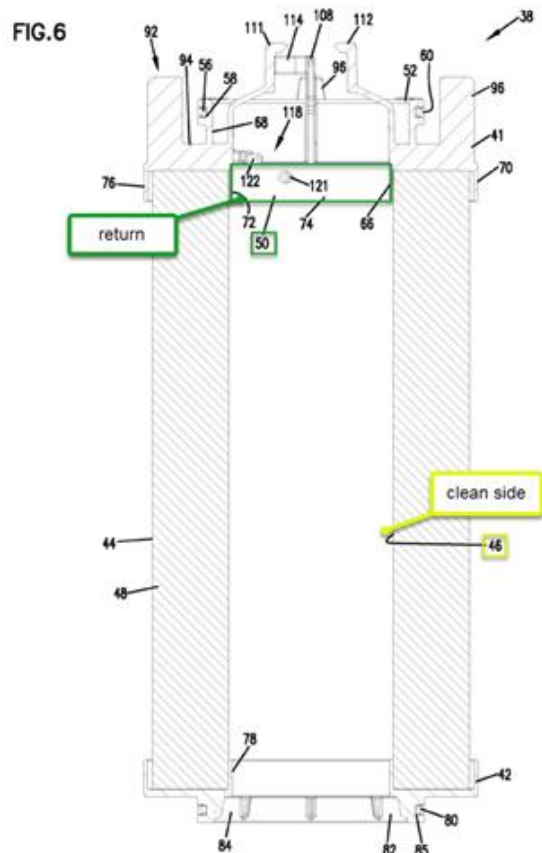


Fig. 8. Honermann filter inlet flow and outlet flow through the “**cartridge filter (38)**” both inlet and outlet located on top side (Ex. 1003, pages 106, & 107)

7. Design Philosophy and Purpose

96. Honermann’s design is intended to simplify locking and unlocking operations through rotational engagement and disengagement. The axial movement of the “**core piece (222)**” tip and transferring blocking pressure on the “**plug (244)**”

97. Cline’s eccentric blocking element serves a different purpose, typically aimed at securing a component in a fixed position. Combining these two concepts

would not only fail to enhance the filter's functionality but could introduce unnecessary complexity and reduce reliability.

98. A POSITA would recognize the incompatibility between Honermann's reliance on rotational motion for the rotational locking mechanism and Cline's reliance on preventing rotation. The technical requirements of each system are distinct, and their combination does not yield any obvious improvement or predictable benefit. Furthermore, the effort required to modify Honermann's design to accommodate Cline's eccentric blocking element would involve significant redesigning, signaling that the combination is not a straightforward or intuitive solution.

8. No Synergistic Effect

99. Combination of the two designs must offer some advantages or synergistic effects to be considered obvious. In this case, integrating Cline's eccentric blocking element into Honermann's filter design does not provide any clear functional or operational benefit. Instead, it undermines the core functionality of Honermann's rotational locking mechanism.

9. Unpredictable Results and Potential Failures

100. The combination would introduce significant uncertainties:

- Misalignment of the drain valve and “**core piece (222)**”.

- Possible leakage due to disruption of seals around drain valve. Seals 204, 242 and 244 has to be redesigned. See Fig. 9.
- Inefficient filtration due to altered flow paths.

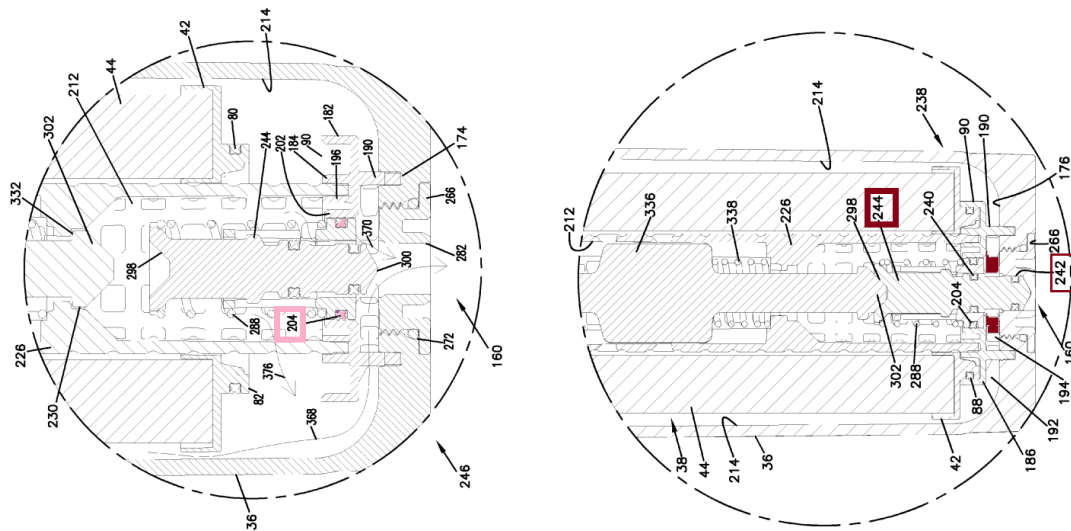


Fig. 9 The first plug seal 240 seals off liquid located on the clean side in the filtered liquid volume 212 (FIG. 12), from allowing unfiltered liquid in the unfiltered. See Honermann, 187, and Figs. 10 & 12. ¶

101. These risks far outweigh any potential benefits of adding Cline's eccentric drain valve.

10. Packaging Space and Accessibility

102. The available space within the engine compartment must accommodate components while ensuring **accessibility for hands and tools** during installation and maintenance. Honermann's top-mounted inflow and outflow routes and Cline's bottom-centric design present a significant spatial conflict. Adjusting the design to

merge these systems would require major reconfiguration of the filter housing and surrounding components.

11.Affecting other Engine Systems:

103. The **cooling system, oil pan location, and oil heat exchanger** all interact with the filter design. Any modification to incorporate Cline's eccentric drain valve into Honermann's system would need to consider the impact on these critical subsystems to avoid overheating, reduced oil flow, or operational inefficiencies.

12.Complexity of Engineering Integration:

104. Combining Honermann and Cline requires more than simply joining their components. It involves a **comprehensive redesign** of the **filter cartridge and housing components**, to address the mismatch in the placement of inflow/outflow routes, seals and drain valve, and opening offset. These changes create a cascade of engineering challenges that extend to testing and validation.

13.Testing, Validation, and Resource Investment:

105. Engineering a new design is not a casual process; it requires **rigorous testing and validation** to meet performance, reliability, and safety standards. This process demands:

- Significant **time** to design, prototype, and validation.
- Substantial **manpower** from multidisciplinary teams to address thermal, structural, and fluid dynamics challenges.

- A considerable **budget** for iterative development and certification.

107. The claim that a POSITA would simply combine these designs overlooks the extensive effort and investment required for such a project.

14. Infeasibility of Spontaneous Combination

108. No POSITA would decide to combine these two designs without a detailed understanding of the engine, engine compartment, and connected systems and a comprehensive plan. Developing such a solution would likely take **several months if not years** of coordinated effort, making the notion of an obvious combination unrealistic.

15. No Suggestion or Teaching of Combination

109. Neither Honermann nor Cline provides any teaching or suggestion that their systems could or should be combined. Honermann's design is specifically optimized for a top-mounted flow system with an automatic drain valve, addressing key issues including a) Mess during servicing, b) Forgotten filter replacement, and c) Incorrect filter assembly installation. (*Honermann*, ¶¶ 3-6.)

110. Honermann's design improvements focus on enhancing the functionality, reliability, and user-friendliness of bowl-cartridge filter systems. Modifying Honermann's system to incorporate Cline's eccentric drain mechanism is not supported by any teaching or suggestion in either reference. Furthermore, such a

modification would likely undermine Honermann's design objectives and introduce incompatibilities, rather than providing any predictable benefit or improvement.

16. Conclusion

111. The combination of Honermann's filter design and Cline's eccentric blocking element introduces functional conflicts, disrupts structural integrity, and fails to provide any clear advantage. Thus, it is Non-obvious.

112. A POSITA would recognize these issues and avoid such a combination, as it would result in a non-functional or overly complex design. The incompatibility between Honermann's top-mounted configuration and Cline's bottom-eccentric drain mechanism, combined with the extensive engineering resources required, demonstrates that such a combination is not straightforward or obvious. Instead, it represents a **complicated engineering process** that would require a significant commitment of time, manpower, and budget.

113. A POSITA would have understood that the proposed combination of Honermann and Cline's designs is a complex engineering undertaking that cannot be achieved without substantial redesigning, investment, and validation. A POSITA would recognize these challenges and understand that this process goes far beyond a simple or obvious modification, rendering the argument for an obvious motivation to combine these systems untenable.

CONCLUDING STATEMENTS

114. In signing this declaration, I understand that the declaration will be filed as evidence in a contested case before the Patent Trial and Appeal Board of the United States Patent and Trademark Office. I acknowledge that I may be subject to cross-examination in this case and that cross-examination will take place within the United States. If cross-examination is required of me, I will appear for cross-examination within the United States during the time allotted for cross-examination.

115. I declare that all statements made herein of my knowledge are true, and that all statements made on information and belief are believed to be true, and that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

Dated: December 18, 2024,

By:

A handwritten signature in black ink that reads "Basirat". The signature is written in a cursive, flowing style.

Mehdi Basirat, Ph.D.

Mehdi Basirat, Ph.D. (U.S. Citizen)

Phone: +1 (424) 666-8707 | Email: me.basirat@gmail.com | Los Angeles, CA

Summary

As a proven engineering leader with over 20 years of experience in vehicle design and development, I successfully led the engineering team at INDI EV to bring a new electric vehicle from concept to production. I demonstrated my ability to drive innovation,

Professional Experience

Head of Engineering | INDI EV | Los Angeles, CA | 2021 – 2024

▪ **Responsibilities:**

- *Lead engineering excellence, meeting design, performance, quality, and cost goals.*
- *Set priorities, assign resources, and ensure compliance with safety, regulations.*
- *Lead vehicle design from concept to launch and ensure product robustness.*
- *Drive R&D and integrate new technologies into products and manufacturing processes.*
- *Manage project timelines, budgets, team development, and manufacturing plannings.*

▪ **Key Achievements:**

- *Brought the Vehicle from a bare BIW into a complete running car in 7 months.*
- *Defined the EE architecture and communication system.*
- *Released the vehicle for manufacturing by resolving all packaging, manufacturing, assembly and quality issues.*
- *Developed all Specs, DVP&Rs, RFQs, PPAPs, PPEQs by employing creative methods.*
- *Successfully led discussions with Foxconn for mass production and HITO to develop assembly lines.*
- *Led high-level supplier negotiations and sourcing activities, ensuring optimal partnerships and cost-effective solutions.*

Head of Advanced Tech | INDI EV | Los Angeles, CA | 2020 – 2021

▪ **Responsibilities:**

- *Lead Chassis, ADAS and Infotainment teams.*
- *Design the chassis and suspension, build prototypes, and design for mass production.*

▪ **Key Achievements:**

- *Restructured, hired, and expanded the chassis and ADAS teams.*
- *successfully designing and producing the chassis and suspension 1st prototypes within 8 months.*
- *Led the IVI team and developed the head unit, and digital (both hardware and software).*
- *Designed a new fully automated testing system for IVI system.*
- *Orchestrated the development of over 25,000 test cases for IVI testing.*
- *Sourced a level 2+ system with a reasonable budget.*

Mehdi Basirat, Ph.D. (U.S. Citizen)

Phone: +1 (424) 666-8707 | Email: me.basirat@gmail.com | Los Angeles, CA

CAE & Passive Safety Manager | INDI EV | Los Angeles, CA | 2018 – 2020

- **Responsibilities:**

- *To build CAE teams and procedures from scratch to deliver a new EV*

- **Key Achievements:**

- *Established and led crash/safety, durability, NVH, Aerodynamics and CFD teams.*
 - *Reduced development costs by creating vehicle digital twin, performing subsystem physical tests for CAE correlation, and reducing physical samples.*
 - *Optimized the CAE resources/cost by allocating people to different projects at different phases of the projects and utilizing cloud-based licenses and computational power and expert external contractors.*
 - *Established the electric vehicle target books for crash safety, NVH and durability to meet regulatory and quality requirements.*
-

Sr. Battery Engineer | Faraday Future | Los Angeles, CA | 2017 – 2018

- **Responsibilities:**

- *Design and validation of the battery pack enclosure for FF-91*
- *Reduce the cost and weight of the pack and Module*

- **Key Achievements:**

- *Optimized the battery pack enclosure through CAE and reduced 20% of the welds.*
 - *Developed procedure to determine battery life expectancy under random vibration.*
 - *Redesigned the battery pack inner beams to increase the bending stiffness of the pack*
-

Sr. Durability Engineer | Ford Motor Co| Dearborn, MI | 2014 – 2017

- **Responsibilities:**

- *Durability testing and analysis of Engine products*

- **Key Achievements:**

- *Optimized the mass of NASCAR engine blocks through iterative CAE and CAD loops, achieving a 6.5% weight reduction while maintaining durability.*
 - *Conducted thermo-mechanical fatigue (TMF) analysis to optimize the shape of exhaust manifolds, increasing their lifespan from 110 hours to 600 hours.*
 - *Performed shape optimization on a 3L engine and AC compressor mounting bracket, achieving a 10% mass reduction while increasing stiffness by 4%*
-

Sr. Validation Engineer | Caterpillar | Los Angeles, CA | 2013 – 2014

Mehdi Basirat, Ph.D. (U.S. Citizen)

Phone: +1 (424) 666-8707 | Email: me.basirat@gmail.com | Los Angeles, CA

▪ Responsibilities:

- validate the durability of off-road trucks and sub-systems

▪ Key Achievements:

- Performed physical testing and CAE simulations on off-road trucks to validate durability.
- Measured and calculated the required G-load to simulate the actual loads acting on construction vehicles during operation.

Research Engineer | University of Idaho | Moscow, ID | 2010-2013

- FEA and Stress analysis of pressure vessels for the next generation of nuclear reactors utilizing Abaqus. Creep-Fracture analysis of welded joints and fittings of reactors in Abaqus.

Lead Mechanical Engineer | ANEDCO of Idaho | Shiraz, Iran | 2005-2008

- Designed the temporary sea water intake system pump station for Morvarid Petrochemical facility
- Designed the chlorine unit for sea water intake pump station

Senior Mechanical Engineer | ANEDCO of Idaho | Shiraz, Iran | 2005-2008

- Oversaw the CAD team and draftsmen preparing detailed and general drawings for sea water intake facilities.

Mechanical Engineer | Paysaz | Ahwaz, Iran | 2003-2005

- Designed and manufactured several different pressure vessels and storage tanks for Oil and Gas. Designed the Vessels based on ASME BPVC using AutoCAD and PVElite.

Education

Ph.D., Mechanical Engineering, University of Idaho 2014

M.Sc., Mechanical Engineering, KTH (Royal Institute of Technology), 2010

B.Sc., Mechanical Engineering, Persian Gulf University. 2003

Skills

SKILLS AND QUALIFICATIONS

- **Structural analysis** Stress Analysis, Plasticity, Viscoplasticity, Modal Analysis and User Material Sub.
- **Finite element** Linear and Non-Linear FEA, ANSYS, Abaqus, HyperMesh and LSDYNA
- **Failure analysis** Creep, Fracture Mechanics, LC and HC Fatigue and damage analysis
- **Mechanical standards** ASME Section VIII, ASME B31.3, API 620-650, B31.3, ASME B16.34
- **Fluid Mechanics** CFD, Hydraulic analysis, Fluid Flow, Heat Transfer, HVAC

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COMPUTER SKILLS

- | | |
|----------------------------------|--|
| ■ Finite Elements | ANSYS, ABAQUS, NASTRAN, Hypermesh, LSDYNA |
| ■ Computer Languages | FORTRAN, C/C++, MATLAB, ANSYS APDL |
| ■ Scientific Applications | MATLAB, Maple, MATHEMATICA, MathCAD |
| ■ Technical Drawing | AutoCAD, Pro/ENGINEER, Solid Works, Solid Edge, CATIA V5 |
| ■ Office Applications | Excel, Word, Microsoft PowerPoint, Access |

Leadership and Achievements

- *Built and managed multidisciplinary teams of 80+ engineers, and up to 300 contractors, fostering an inclusive, collaborative environment.*
- *Mentored engineers at all levels, resulting in accelerated professional growth and project success.*
- *Defined organizational deliverables, RASlc matrices, and KPIs, ensuring projects were completed on time and within budget.*

Awards and Certifications

- *2021 Outstanding Engineering Leadership Award, INDI EV.*
- *2016 Ford innovation recognition award, 2016*
- *2016 Six Sigma Green Belt Certification*

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Publications:

A study of the creep behavior of modified 9Cr–1Mo steel using continuum-damage modeling

International Journal of Plasticity, 2012.

This paper investigates the creep behavior of modified 9Cr–1Mo steel through continuum-damage modeling, providing insights into its deformation mechanisms.

Creep deformation mechanisms in modified 9Cr–1Mo steel

Journal of Nuclear Materials, 2012.

This study explores the various creep deformation mechanisms present in modified 9Cr–1Mo steel, contributing to the understanding of its high-temperature performance.

Creep rupture behavior of Grade 91 steel

Materials Science and Engineering: A, 2013.

This research examines the creep rupture characteristics of Grade 91 steel, highlighting its suitability for high-temperature applications.

Creep rupture behavior of welded Grade 91 steel

Materials Science and Engineering: A, 2016.

This paper analyzes the creep rupture properties of welded Grade 91 steel, emphasizing the effects of welding on its long-term performance.

A creep damage model for high-temperature deformation and failure of 9Cr-1Mo steel weldments

Metals, 2015.

This work presents a creep damage model tailored for predicting high-temperature deformation and failure in 9Cr-1Mo steel weldments.

Dislocation-Based Modeling of Creep Deformation and Fracture in Modified 9Cr-1Mo Steels

University of Idaho, 2018.

This dissertation offers a dislocation-based model to describe creep deformation and fracture in modified 9Cr-1Mo steels.

Relationship Between Microstructural Evolution, Order-Disorder Transformation and Plastic Inhomogeneities during Deformation of Beta Brass

TMS 2014: 143rd Annual Meeting & Exhibition: Annual Meeting Supplemental Proceedings, 2016.

This study investigates the interplay between microstructural evolution, order-disorder transformations, and plastic inhomogeneities during the deformation of beta brass.

Creep Deformation Mechanisms in Grade 91 Steel

AIP Conference Proceedings, 2012.

This conference paper delves into the creep deformation mechanisms specific to Grade 91 steel.

Finite Element Creep Behavior Analysis in Welded Joints of Modified 9Cr-1Mo Steel

AIP Conference Proceedings, 2012.

This work utilizes finite element analysis to study the creep behavior in welded joints of modified 9Cr-1Mo steel.

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Strip-Yield Modeling of Creep Crack Incubation and Growth in Cr-Mo Steels for Nuclear Reactor Applications

AIP Conference Proceedings, 2012.

This paper presents a strip-yield model to predict creep crack initiation and growth in Cr-Mo steels, relevant to nuclear reactor applications.