UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

American Axle & Manufacturing, Inc.

Petitioner

v.

Neapco Components, LLC,
Patent Owner

Case IPR2025-00090

U.S. Patent No. 11,434,958

DECLARATION OF GREGORY W. DAVIS, Ph.D., P.E.

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I, Gregory W. Davis, Ph.D., P.E., of Frankenmuth, Michigan, declare as follows:

I. INTRODUCTION

1. I have been asked to investigate the validity/patentability of certain claims of U.S. Patent No. 11,434,958 ("'958 patent") (Ex. 1001) for American Axle & Manufacturing, Inc. ("AAM") for the above captioned *inter partes* review ("IPR"). The '958 patent is generally directed to joint assemblies with retaining rings that are accessible through an access window for servicing. (Ex. 1001, '958 patent at Abstract, claims).

2. I understand that AAM petitions for IPR of Claims 1–18 of the '958 patent and requests that the United States Patent and Trademark Office ("USPTO") cancel Claims 1–18 of the '958 patent. I further understand that Neapco Components, LLC ("Neapco") purports to own the '958 patent.

3. In preparing this Declaration, I have reviewed the '958 patent and its prosecution history and considered the documents identified in Section IV and other documents identified in this Declaration in light of the general knowledge in the relevant art. In forming my opinions, I relied upon my education, knowledge, and experience in the field of mechanical and automotive engineering, and considered the level of ordinary skill in the art as discussed below.

II. BACKGROUND AND QUALIFICATIONS

4. I am a licensed Professional Engineer and currently a Professor of Mechanical Engineering at Kettering University—formerly known as "General Motors Institute," a position I have held since 1997. My qualifications for formulating my analysis on this matter are summarized here and are addressed more fully in my resume, which is attached to this Declaration as Appendix A. Among other things, my resume provides a full list of my past positions and publications.

5. I earned a B.S. in Mechanical Engineering in 1982 from the University of Michigan, Ann Arbor. In 1986, I earned a M.S. in Mechanical Engineering from Oakland University, and in 1991 completed my Ph.D. in Mechanical Engineering at the University of Michigan, Ann Arbor. My Ph.D. thesis is entitled "Comprehensive Diagnostic Software for Engine Cycle Analysis" and focused on the combustion process in engines.

6. While I was earning my Ph.D., I worked at General Motors Co. ("GM"). During my time at GM, I was involved in all aspects of the vehicle design process, from advanced research and development to manufacturing. I also worked on several different technologies while at GM, including powertrain technology.

7. Presently, as Professor of Mechanical Engineering at Kettering University, I lead and coordinate the automotive engineering curriculum and teach a wide array of graduate and undergraduate courses in mechanical engineering. I have a particular focus in automotive engineering and energy systems. At Kettering

University, I develop curriculum and teach courses in mechanical and automotive engineering to both undergraduate and graduate students. For example, I teach a graduate/senior-level undergraduate class entitled "Introduction to Automotive Powertrains." In this class, I cover all aspects of the design and development of vehicular powertrains. This includes a discussion of development and transfer of engine torque and power through the drivetrain to propel the vehicle. This material also includes discussion of driveshafts/halfshafts, universal joints, constant velocity joints, and slip joints.

8. I am also the Director of the Advanced Engine Research Laboratory ("AERL"), which specializes in the design, development, and testing of both on-road and off-road vehicle systems including both laboratory and on-road data acquisition & control. Projects have included the design and development of fuel injection systems for off-road vehicles, fuel compatibility studies of vehicle storage and delivery systems, modification of fuel delivery systems to accommodate alternative fuels, and other extensive modifications and development of vehicular powertrains. Additionally, chassis projects have included design of complete vehicle frames and body panels for off-road and racing vehicles to provide better fuel economy through lowered wind resistance. Testing services include both laboratory and on-road data acquisition & control of vehicles and systems.

9. I also serve as lead faculty advisor to the Society of Automotive

Engineers' ("SAE") Student Branch where we annually design and compete in the Formula, Baja, AeroDesign, and Clean snowmobile challenges (I directly advise the Clean Snowmobile and AeroDesign Challenge teams) where we have developed alternative vehicles, including designing extensive modifications of the Powertrain and Body/Chassis systems.

10. During my experience as a Professor at Kettering University, I have advised over 90 undergraduate and graduate theses in automotive engineering. Further, I actively pursue research and development activities within automotive engineering. This activity requires constant involvement with my students and their sponsoring automotive companies which have included companies such as Walbro Corp., Nissan Motor Co., BorgWarner Inc., FEV North America, Inc., U.S. Army Automotive Command, Denso Corp., Honda Motor Co., Inc., Dana Corp., TRW Automotive Corp., Tenneco Inc., Navistar International Corp., and Meritor, Inc.

11. Prior to my experience at Kettering University, I was the Director of the Masters of Automotive Engineering Program and Associate Professor of Mechanical Engineering at Lawrence Technological University, where I coordinated and taught both graduate and undergraduate engineering courses—again, with a focus on automotive engineering. The master's program in automotive engineering is a professionally oriented program aimed at attracting and educating practicing engineers in the automotive industry. In addition to teaching and designing the

curriculum for undergraduate and graduate students, I also worked in the automotive industry closely with Ford Motor Co. on the development of a hybrid electric vehicle. I served as project director on a cooperative research project to develop and design all aspects of a hybrid electric vehicle. While in many instances we used standard Ford components, we custom designed many automotive subsystems. As part of this project, we completely redesigned and replaced the existing powertrain including extensive modifications to the body and chassis of the vehicle. We also performed analytical and actual testing of the systems.

12. During my experience at Lawrence Technological University, I served as advisor for 145 automotive graduate and undergraduate students. Many of the graduate students whom I advised were employed as full-time engineers in the automotive industry. This service required constant interaction with the students and their automotive companies which included the major automotive manufacturers (Ford Motor Co., Chrysler Group LLC, General Motors Co., Toyota Motor Co., etc.) along with many automotive suppliers.

13. From 1992–1995, I was a Lecturer at Johns Hopkins University, where I taught mechanical engineering courses in the undergraduate program.

14. From 1991–1995, I was an Assistant Professor in the Mechanical Engineering Department of the United States Naval Academy ("USNA"), where, in addition to teaching mechanical engineering courses, I was the manager of the

Internal Combustion Engines and Power Systems Laboratories. Additionally, I served as faculty advisor for the USNA Society of Automotive Engineers. During this time, I served as project director for the research and development of hybrid electric vehicles. This included extensive design and modifications of the powertrain, chassis, and body systems.

15. In addition to my academic work, I have consulted extensively in the automotive industry. For example, from 2003 through 2023 I was an instructor in SAE Continuing Professional Development Programs where I have worked to develop and teach professional development courses directed to automotive powertrain systems and controls, braking, handling, chassis, and exterior body systems for SAE at its headquarters and at company locations. In attendance at these courses have been engineers and managers from all major original equipment manufacturers and suppliers, governmental regulatory agencies, as well as other professionals involved in the automotive industry world-wide. I also continue to develop and teach continuing professional development courses, working directly with the sponsoring companies.

16. I have also held numerous leadership positions within SAE. In addition to serving and chairing many committees, I have served as an elected Director on the SAE International Board of Directors, as a member of, and the Chair of the SAE International Engineering Education Board, and as a Director of the SAE

International Publications Board.

17. I have published over 80 peer-reviewed technical articles and presentations involving topics in automotive engineering. Automotive and mechanical engineering topics covered in these articles include mechanical design and analysis of components and systems, development of alternative fueled vehicles and fuel systems, thermal and fluid system design and analysis, selection and design of components and subsystems for optimum system integration, and system calibration and control.

18. I have also organized and chaired, or co-chaired sessions in automotive engineering at many professional technical conferences. Additionally, I am a reviewer for the U. S. Department of Energy, Office of Vehicle Technologies, where I assist in the review of project funding proposals in the automotive sector. These proposals have included all aspects of vehicle technology.

19. For my work, I have received numerous awards. In 2002, for example, I was awarded the SAE International Award for Excellence in Oral Presentation and the Powertrain & Fluid Systems Conference. In 2006, I was awarded the SAE International Outstanding Section Member Award, in Recognition of Extraordinary Achievement by a Mid-Michigan Section Member.

20. Finally, I am an inventor on seven patents providing methods and systems for conserving energy used by energy-consuming devices, such as engines

in automobiles or generators. In certain embodiments, an energy conservation system can be configured to deliver energy to the energy-consuming device for a period, followed by a period in which energy delivery is dampened and/or cut. By cycling the delivery of energy in this fashion, the energy conservation can achieve a pulsed efficiency.

21. As an experienced mechanical and automotive engineer with personal experience in vehicle design, I understand the subject matter of the ’958 patent. And, based on my experience, including my study and work in mechanical and automotive engineering, I consider myself an expert in the field.

22. I am being compensated for my time in connection with this IPR at my standard consulting rate, which is $395.00 per hour. My compensation is not dependent in any way upon the outcome of this matter.

III. PATENT LAW STANDARDS

23. I am not an attorney. I offer no opinion of the law. But based on my discussions with counsel, I understand the legal principles underlying my opinions. I have applied these legal principles to form my opinions.

24. I have been asked to analyze the ’958 patent and the references discussed herein from the perspective of a person of ordinary skill in the art (sometimes referred to as a “person of ordinary skill”) at the time of the earliest effective filing date of the ’958 patent. I understand that, for purposes of this IPR,

the earliest effective filing date of the ’958 patent is May 3, 2017.

A. Person of Ordinary Skill in the Art

25. I understand that a person of ordinary skill in the art is a hypothetical person who is presumed to be aware of pertinent art including knowledge in the art, thinks along conventional wisdom in the art, and is a person of ordinary creativity. I understand that this hypothetical person of ordinary skill is considered to have the normal skills and knowledge of a person in the technical field.

26. A person of ordinary skill relating to the subject matter of the ’958 patent would have either (1) a graduate’s degree in mechanical or automotive engineering; or (2) a bachelor’s degree in mechanical or automotive engineering and experience relating to the design and operation of powertrain components and systems. This person would have been familiar with the fundamentals of the design and operation of driveline joint assemblies, the concept of retaining the shaft coupling of joint assemblies by way of retaining rings or other retaining means, and methods for servicing driveline joint assemblies, including the assembly and disassembly of driveline joint assemblies.

27. Based on my experience, I have a good understanding of the capabilities of a person of ordinary skill in the art in the time frame leading up to the priority date of the ’958 patent, which I understand is May 3, 2017. Indeed, I have personal and extensive experience working with, and training, persons of ordinary

skill in the art in 2017 and earlier, and I am knowledgeable as to what a person of ordinary skill in the art would have understood from the prior art references described below and from the state of the art at the time.

B. Claim Construction

28. I understand that "claim construction" is the interpretation of the meaning of patent claims.

29. I have been asked to review the claims and ascertain the meaning of the claims from the perspective of person of ordinary skill. Any opinions on claim construction expressed in this declaration are from the perspective of a person of ordinary skill as of May 3, 2017, and are consistent with my understanding as stated herein.

1. Ordinary Principles of Claim Construction

30. I understand that words of a claim are generally given their ordinary and customary meaning, which is the meaning the term or phrase would have to a person of ordinary skill in the art at the time of the earliest effective filing date. I understand that both intrinsic and extrinsic evidence can be used to assist in understanding the meaning of a claim. Intrinsic evidence includes the claim language, language in other claims of the patent, the specification, and the prosecution history. I further understand that, unless required by the claim language or specification, claims should generally not be limited to embodiments in the

specification, including preferred embodiments. I understand that extrinsic evidence, which consists of all evidence external to the patent and prosecution history including expert and inventor testimony, dictionaries, and technical publications, including those known and authoritative in a particular technical field, may also be relevant to claim construction. I further understand that a patent applicant may act as his or her own lexicographer and set forth a special definition of a claim term in the specification. I further understand that statements made during prosecution may also affect the scope of the claims. Specifically, I understand that a patent applicant may limit the meaning of a claim term by making a clear and unmistakable disavowal of scope during prosecution. For example, I understand that a patent applicant may do so by clearly characterizing the invention in a way to try to overcome rejections based on prior art.

2. Claim Construction of "Means-Plus-Function" Terms

31. I understand that limitations in a claim may be expressed as a means for performing a specified function without reciting the structure or material that are used to perform this function. I further understand that this claim must be construed to cover the corresponding structure or material described in the specification and equivalents thereof. I understand that claim terms expressed in this manner are referred to as "means-plus-function" terms.

32. I understand that the test to determine whether a claim limitation is a

means-plus-function limitation is whether or not the claim limitation recites, from the perspective of one of skill in the art, definite structure that performs the claimed function. In other words, the claim limitation must not recite definite structure which performs the described function to be considered a means-plus-function limitation. I understand that use of the term "means" in a claim limitation creates a presumption that the claim limitation is a means-plus-function limitation, which may be rebutted if the properly construed claim limitation itself recites sufficiently definite structure to perform the claimed function. Conversely, I understand that the absence of the word "means" in a claim limitation creates a presumption that the claim limitation is not a means-plus-function limitation, which may be rebutted if the claim limitation is determined not to recite sufficiently definite structure to perform the claimed function.

33. I further understand that there is a two-step process for construing means-plus-function claim limitations.

34. The first step in construing a means-plus-function limitation is to identify the function explicitly recited in the claim. For this first step, I understand that ordinary principles of claim construction should be used to identify the function of the means-plus-function element. I described my understanding of these ordinary principles of claim construction in the prior section.

35. The next step is to identify the corresponding structure set forth in the

written description that performs the particular function set forth in the claim. For this second step, I understand that structure disclosed in the specification is corresponding structure only if the specification or prosecution history clearly links or associates that structure to the function recited in the claim. I also understand that corresponding structure includes all embodiments disclosed as performing the claimed function, not only the preferred embodiment, but a disclosure that only suggests a possible alternative embodiment without sufficiently describing that embodiment should not be treated as corresponding structure.

C. Invalidity

36. I understand that a patent claim is unpatentable and invalid if the claim is "anticipated" by the prior art. I understand that a claimed invention is not novel and is anticipated if:

1) the claimed invention was patented, described in a printed publication, or in public use, on sale, or otherwise available to the public before the effective filing date of the claimed invention; or

2) the claimed invention was described in an issued patent, or in a published application for patent, in which the patent or published application, as the case may be, names another inventor and was effectively filed before the effective filing date of the claimed invention.

37. I understand that anticipation occurs when a single piece of prior art describes every element of the claimed invention, either expressly or inherently, arranged in the same way as in the claim. I understand that, for inherent anticipation, it is required that the missing descriptive material is necessarily present in the prior

art.

38. I further understand that a patent claim is unpatentable and invalid if the subject matter of the claim as a whole would have been obvious to a person of ordinary skill of the claimed subject matter as of the time of the earliest effective filing date. I understand that obviousness may be shown by considering more than one item of prior art. I understand that the following factors should be evaluated to determine whether the claimed subject matter is obvious: (1) the scope and content of the prior art; (2) the difference or differences, if any, between each claim of the patent and the prior art; and (3) the level of ordinary skill in the art at the time the patent was filed.

39. I understand that "objective indicia of non-obviousness," also known as "secondary considerations," are also to be considered when assessing obviousness, if present, including commercial success; long-felt but unresolved needs; failure of others to solve the problem that the inventor solved; unexpected results; copying of the invention by others; and industry recognition or expressions of disbelief by experts in the field of the claimed invention. I also understand that objective indicia of non-obviousness must be commensurate in scope with the claimed subject matter.

40. I understand that the test for obviousness is whether the claimed invention, as a whole, would have been obvious to a person of ordinary skill as of

the date of the invention in light of the prior art. I understand that the use of hindsight must be avoided when considering whether the alleged invention would have been obvious to the person of ordinary skill.

41. I understand that in determining obviousness, a person of ordinary skill is a person of ordinary creativity. I understand that, when there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill has good reason to pursue the known options within his or her technical grasp.

42. In my opinion, Claims 1–18 of the '958 patent are unpatentable and invalid as either anticipated or obvious over the prior art as set forth below.

IV. DOCUMENTS

43. I have referenced the following documents in this Declaration and other documents identified in this Declaration:

Exhibit	Description
1001	Certified U.S. Patent No. 11,434,958 ("'958 patent")
1002	Certified U.S. Patent No. 11,598,376 ("'376 patent")
1003	Certified prosecution history of U.S. Provisional Application 62/500,821 ("'821 application") (filed May 3, 2017) ("'821 Application PH")
1004	Certified prosecution history of U.S. Application 15/966,085 ("'085 application") (filed April 30, 2018) ("'085 Application PH")
1005	Certified prosecution history of U.S. Application 17/815,833 ("'833 application") (filed July 28, 2022) ("'833 Application PH")
1006	U.S. Publication No. 2009/0233723 ("Kofuji")
1007	U.S. Publication No. 2018/0003240 ("Sugiyama")

1008	U.S. Patent No. 6,739,422 ("Krude '422")
1009	U.S. Patent No. 7,722,089 ("Nauer")
1010	U.S. Patent Publication No. 2002/0070506 ("Krude '506")
1011	U.S. Patent No. 7,896,750 ("Brunetti")
1012	Wagner, E.R., et al., Advances in Engineering Series No. 7 (Society of Automotive Engineers, Inc.) (1979) ("SAE Manual")
1013	2016 Jeep Renegade Service Manual ("Renegade Manual")
1014	U.S. Patent No. 4,280,341 ("Krude")
1015	FR 2 257 042 ("Minel") and Certified French-to-English translation
1016	JP S58-152931 ("Yoshida") and Certified Japanese-to-English translation
1017	EP 1 681 477 ("Matsumoto")
1018	U.S. Patent No. 5,772,520 ("Nicholas")
1019	U.S. Patent No. 3,063,266 ("Rabson")
1020	U.S. Patent No. 5,772,520 ("Burton")
1026	U.S. Patent No. 9,221,225 ("Idies")
1027	U.S. Patent No. 9,863,464 ("Hosen")
1028	U.S. Publication No. 2009/0209353A1 ("Abels")
1029	https://web.archive.org/web/20150405104200/http:/www.fst.com/Products/Special-Sealing-Products/Boots ("Freudenberg")
1033	https://web.archive.org/web/20150617070918/https://www.autocarpro.in/news-international/gkn-tier-supplier-develop-integrated-awd-8187 ("Autocar Pro")
1034	https://web.archive.org/web/20150911145858/https://www.greencarcongress.com/2014/10/20141007-gkn.html ("Green Car Congress")
1035	Japanese Application No. JP2016-129514 (June 30, 2016) and Certified Japanese-to-English translation ("Sugiyama Priority Application")

V. SUMMARY OF OPINIONS

44. The following is a summary of my opinions regarding claim construction:

A. "engagement means" means "fasteners, keys and keyways, male-

female couplings, interlocking features, splines, and equivalents thereof."

B. "retaining means" means "retaining ring, snap ring, and equivalents thereof."

45. I have also applied the following claim constructions, which were defined during prosecution:

C. "perimeter of the window" means "positions around the window where an outer surface of the first member deviates radially inwardly to define the opening corresponding of the window."

D. "cylindrical portion of the seal" means "a closed annular portion of the seal that is extended in an axial direction thereof, and not to a conical, frustoconical, or otherwise tapered shape that is formed by the seal."

E. "corrugated portion of the seal" means "portion of the seal having the shape of a series of regular folds that look like waves."

46. The following is a summary of my opinions regarding invalidity/unpatentability:

A. Claims 1–18 of the '958 patent are anticipated by the Renegade Manual.

B. Claims 1–18 of the '958 patent are obvious over the Renegade Manual in view of Krude '422, Sugiyama and the knowledge of a person of ordinary skill in the art.

VI. BACKGROUND REGARDING STATE OF THE ART

A. Automotive Drivelines and Joint Assemblies

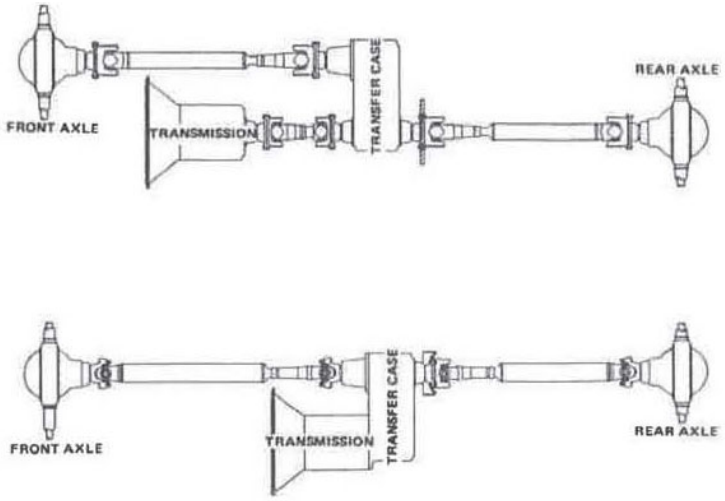
47. In a typical automotive vehicle, the "driveline"[1] comprises a transmission, driveshaft (or propshaft), axles, and wheels, and transmits rotary power from the engine to the wheels. According to the "Universal Joint and Driveshaft Design Manual" from the Society of Automotive Engineers:

> In a more practical sense, the driveline is an assembly of one or more universal jointed solid or tubular driveshafts. It provides for axial movement and transmits torque and rotational motion at a fixed or varying angular relationship from one shaft to another.

(Ex. 1012, Wagner, E.R., et al., Advances in Engineering Series No. 7 (Society of Automotive Engineers, Inc.) (1979) ("SAE Manual"), Ch. 1 at PET_AAM_1012-0011). Joint assemblies couple shafts of a driveline together. (Ex. 1012, SAE Manual, Ch. 1 at PET_AAM_1012-0012–0017). A typical joint assembly comprises a first, male shaft that is received by and coupled to a second, female shaft. (Ex. 1012, SAE Manual, Ch. 1 at PET_AAM_1012-0012–0017).

48. "[D]riveline constructions can assume numerous design configurations." (Ex. 1012, SAE Manual, Ch. 1 at PET_AAM_1012-0013). The SAE Manual illustrates several driveline arrangements, such as those for "typical 4 x 4 driveline arrangements":

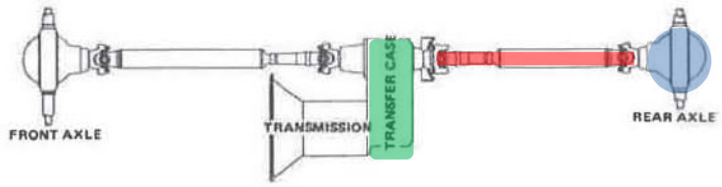
[1] "Driveline" and "drivetrain" are often used interchangeably. Sometimes these systems include the engine of the vehicle. However, a more formal definition which includes the engine is called the "powertrain."



(Ex. 1012, SAE Manual, Ch. 1 at PET_AAM_1012-0013; Ex. 1012, SAE Manual, Ch. 1 at PET_AAM_1012-0014–0017).

49. As shown below in the annotated 4x4 arrangement from the SAE Manual (Ex. 1012, SAE Manual, Ch. 1 at PET_AAM_1012-0013, color added), power will flow from the engine to the transmission. The transfer case (green), which is analogous to the Power Transfer Unit (PTU) of the Jeep Renegade, is used to direct power from the transmission to either the front or rear axles. For example, a person of ordinary skill would understand that the 4x4 vehicle could use front wheel drive (FWD) during typical on-road driving conditions, while the rear axle is not powered. This is done to improve fuel economy in situations where additional traction is not needed. When the vehicle encounters low traction conditions, the PTU can be used to drive both the front and rear axles. As shown in the figure, the rear axle includes a rear differential unit (blue), which is analogous to the rear drive module (RDU) of the Jeep Renegade. The rear differential unit is used to ensure

that the left and right rear wheels are able to rotate with different speeds (such as when the vehicle is turning). The modern RDU of the Jeep Renegade also includes the ability to disconnect the rear propshaft (red) during FWD operation in order to improve fuel economy.



(Ex. 1012, SAE Manual, Ch. 1 at PET_AAM_1012-0013, color added).

B. Splines and Splined Joint Assemblies

50. As described by the SAE manual, "[t]he primary purpose of the driveshaft in an application is to transmit torque through an angle between the power source and the driven member." (Ex. 1012, SAE Manual, Ch. 2.1 at PET_AAM_1012-0023). To achieve this purpose, the male and female shafts of a joint assembly often include "splines." A "spline" is "a machine element consisting of integral keys (spline teeth) or keyways (spaces) equally spaced around a circle or portion thereof." (Ex. 1012, SAE Manual, Ch. 5 at PET_AAM_1012-0193, Ch. 15 at PET_AAM_1012-0331). The splines associated with the male shaft of a joint assembly are often referred to as "male splines" or "external splines" and the splines associated with the female shaft of a joint assembly are often referred to as "female splines" or "internal splines."

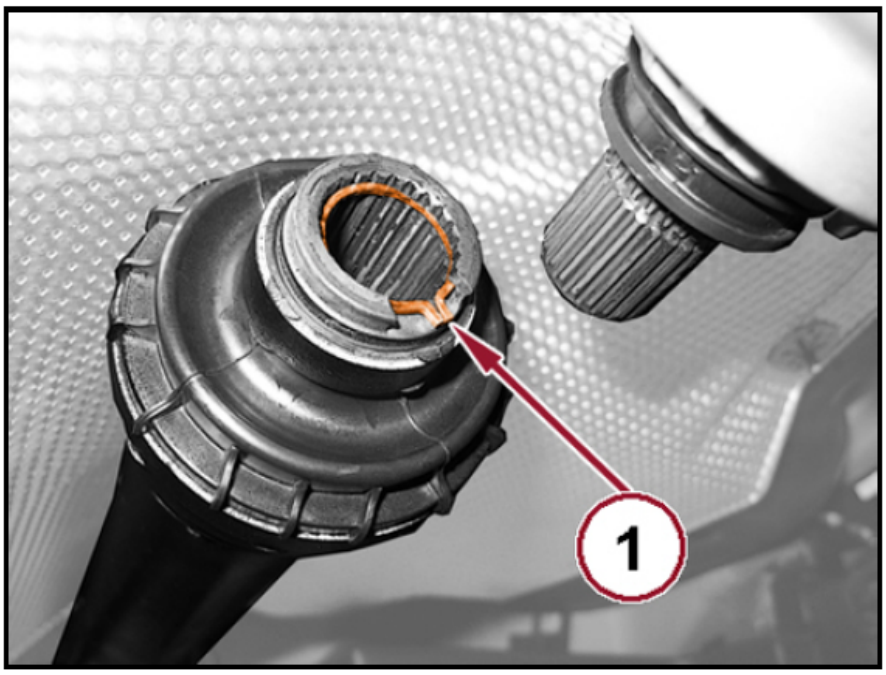
51. "The basic function of a spline is to transmit the torque requirements of the driveline installation from one drive member to another." (Ex. 1012, SAE Manual, Ch. 5 at PET_AAM_1012-0193). The keys or spline teeth of the external splines of the male shaft engage or mate with the keyways or spaces of the internal splines of the female shaft. The engaged splines of the male and female shafts of the joint assembly rotatably fix the shafts to allow for the transmission of torque between the shafts.

C. Retaining Rings for Joint Assemblies

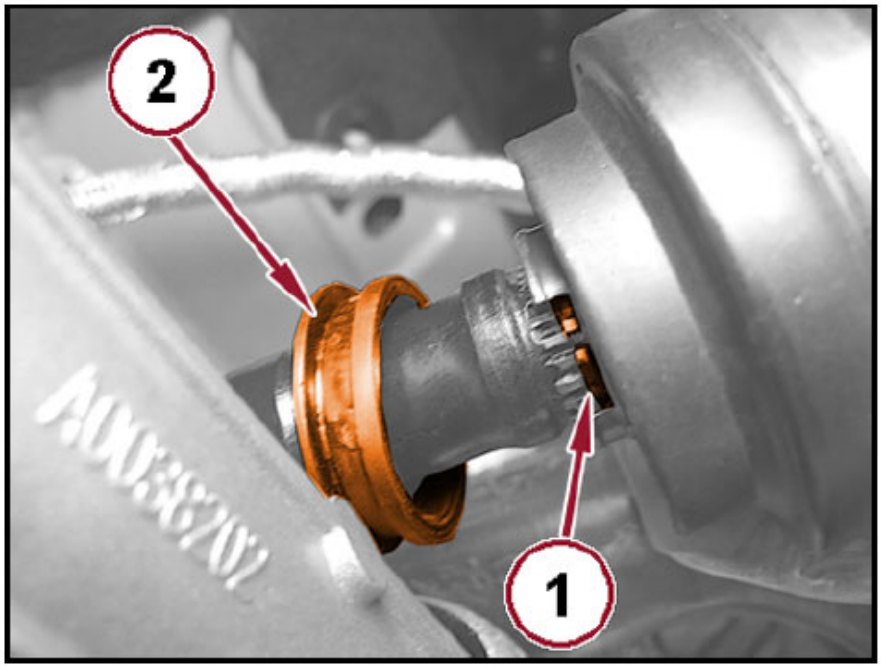
52. Joint assemblies of a driveline may either accommodate relative axial motion ("slip") between the shafts, or they may be fixed and not accommodate relative axial motion between the shafts. (Ex. 1012, SAE Manual, Ch. 1 at PET_AAM_1012-0011; Ex. 1012, SAE Manual, Ch. 5 at PET_AAM_1012-0194–0195).

53. "Retaining rings" (also referred to as "snap rings," "c-clips," "circlips," or "securing rings") are commonly used to axially retain the male and female shafts of a fixed, splined joint assembly. (Ex. 1012, SAE Manual, Ch. 14 at PET_AAM_1012-0323 ("When solid axle shafts are used, these joints other components are usually attached with splined torque-transmitting connections and held in position with retaining rings."). For example, the "2016 Jeep Renegade Service Information Manual" (Ex. 1013, "Renegade Manual") illustrates two fixed,

splined joint assemblies of a 2016 Jeep Renegade—one joint assembly between the propshaft and a rear differential unit ("RDU") and one joint assembly between the propshaft and a power transfer unit ("PTU").[2]



[2] Chapter 3 of the Renegade Manual generally relates to service information for the differential and driveline of the 2016 Jeep Renegade. Ex. 1013, Renegade Manual. Renegade Manual includes "Removal and Installation" information for the "Propeller Shaft" for four engine sizes of the 2016 Jeep Renegade, "1.4 Turbo Multiair," "2.0 Turbo Diesel – 120 / 140 HP," "2.0 Turbo Diesel – 170 HP," and "2.4 Multiair," as well as "Removal and Installation" relating to the "Rear Driveline Module." Ex. 1013, Renegade Manual. The disclosure of the Renegade Manual is similar for these different sections but, for purposes of this Declaration and for consistency, I will primarily rely on "Chapter 3 – Differential and Driveline / Propeller Shaft / Removal and Installation" for the "1.4 Turbo Multiair" engine size." Ex. 1013, Renegade Manual at PET_AAM_1013-0194–0204.



(Ex. 1013, Renegade Manual at PET_AAM_1013-0202–0203, Installation Steps 8 (RDU) and 11 (PTU)). The joint assemblies are fixed by way of an elastic "snap ring," numbered "1," which is a retaining ring. (Ex. 1013, Renegade Manual at PET_AAM_1013-0202–0203, Installation Steps 8 (RDU) and 11 (PTU); Ex. 1013, Renegade Manual at PET_AAM_1013-0197–00203, Removal Steps 16, 17, 24, 25, 27, Installation Steps 3 ("Install a NEW snap ring (1) in the drive shaft."), 4 ("Install a NEW snap ring (1) in the Power Transfer Unit (PTU)"), 8, 11; Ex. 1013, Renegade Manual at PET_AAM_1013-0193, Special Tools ("Elastic Ring Spreader")). In this regard, the retaining rings of the joint assemblies retain the coupling of the male and female splined shafts during operation. (Ex. 1013, Renegade Manual at PET_AAM_1013-0197–00203, Removal Steps 16, 17, 24, 25, 27, Installation Steps 3, 4, 8, 11).

54. The use of "retaining rings" to axially retain the male and female shafts of a fixed, splined joint assembly is taught by numerous other prior art references and is well known in the art. U.S. Publication No. 2009/0233723 (Ex. 1006, "Kofuji"), for example, describes a fixed, splined joint assembly comprising a female splined shaft (blue) coupled to a male splined shaft (red), where the female and male shafts are axially retained by a retaining ring, "circular clip 95" (purple), which "has the function of preventing shift of the universal joint 43 in an axial direction relative to the output shaft 42."

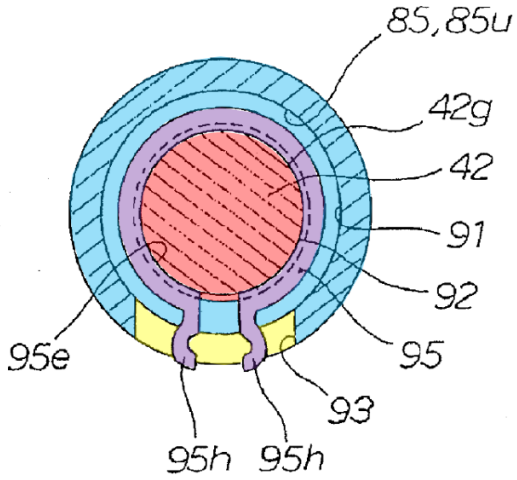


FIG. 5(a)

(Ex. 1006, Kofuji at [0048]–[0050], [0053], [0055], Figs. 4–6). Similarly, U.S. Patent 6,739,422 ("Krude '422") describes a fixed, splined joint assembly comprising a female splined shaft (blue) coupled to a male splined shaft (red), where the female and male shafts are axially retained by a retaining ring, "securing ring 57" (purple), for "connecting the wheel hub unit 41 and the constant velocity joint

71."

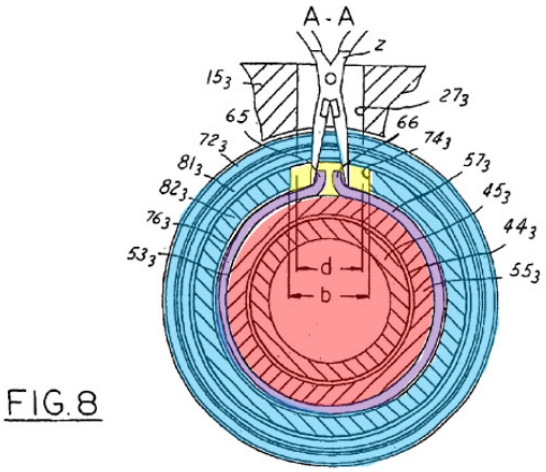


FIG. 8

(Ex. 1008, Krude '422 at Abstract, 5:28–30, 5:66–6:43, 7:26–34, Figs. 1–10; Ex. 1008, Krude '422 at 6:40–43 ("When the unit is assembled, the inner toothing 75 engages the outer toothing 52 at the wheel hub 41, with the annular groove 53 overlapping with the annular groove 76 and with both, jointly, accommodating a securing ring 57."), 7:6–7, 7:13–15, 7:60–62, 7:66–8:15; Ex. 1007, U.S. Publication No. 2018/0003240 ("Sugiyama") at [0035] ("circlip (retaining ring) 8" "serves as a retainer (or stopper) for input shaft 2 and output shaft 3 during linkages between input shaft 2 and output shaft 3 and first and second constant velocity (universal) joints"), [0059], Figs. 4, 7; Ex. 1009, U.S. Patent No. 7,722,089 ("Nauer") at 3:55–4:4 ("[T]he retaining member 28 is generally Ω-(omega)-shaped, including a generally arcuate body portion 32 and two circumferentially spaced end portions extending radially outwardly to define respective release lugs 34."); Ex. 1010, U.S.

Publication No. 2002/0070506 ("Krude '506") at [0021] ("FIG. 2 shows that the securing ring 36 includes radially outwardly opening bent ends 37, 38 which pass through a radial gap 39 in the cylindrical projection 29 to permit the securing ring to be widened radially from the outside."), [0022], [0025], Figs. 1–3; Ex. 1011, U.S. Patent No. 7,896,750 ("Brunetti") at 2:23–31 ("elastic open securing ring 25 which is received partly in an inner circular groove 25 of the bell 20, and partly in an outer circular groove 26 of the driving ring 18"), Fig. 6; Ex. 1017, EP 1 681 477 ("Matsumoto") at [0004], [0005], [0010], [0025]–[0026], Figs. 1–6).

55. Retaining rings are typically configured to be elastic and engage an exterior groove of the male shaft and interior groove of the female shaft. Generally speaking, retaining rings may either be biased radially outward toward an interior groove of the female shaft or biased radially inward toward an exterior groove of the male shaft.

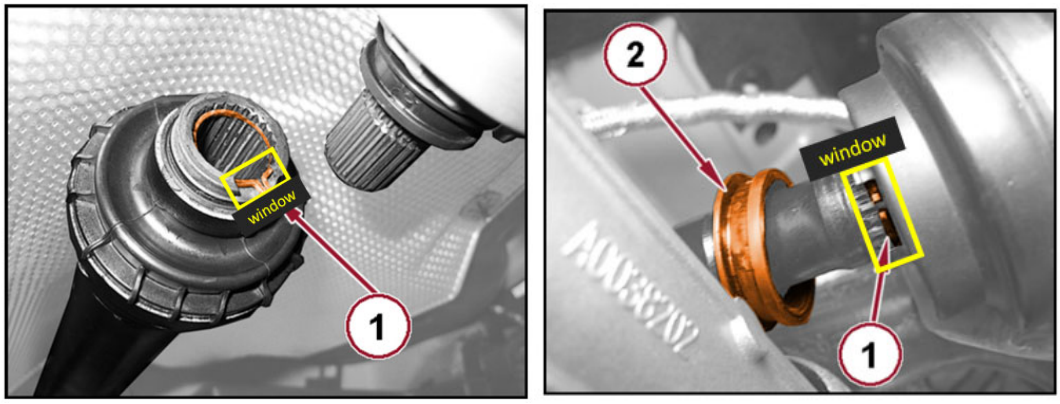
56. In the case of a retaining ring biased radially outward toward an interior groove of the female shaft, during assembly, as the male shaft is first inserted into the female shaft, the retaining ring compresses within the exterior groove of the male shaft to clear the inner diameter of the female shaft, and, once the male shaft is inserted far enough into the female shaft, the retaining ring expands into the interior groove of the female shaft. Once engaged with both the interior groove of the female shaft and exterior groove of the male shaft, the retaining ring prevents axial

movement between the male and female shafts, thereby axially fixing the joint assembly until the retaining ring is once again compressed within the exterior groove of the male shaft.

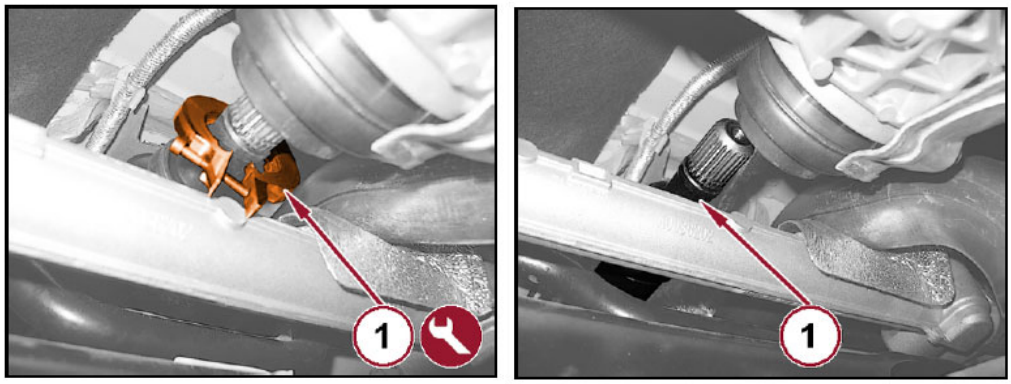
57. And, in the case of a retaining ring biased radially inward toward an exterior groove of the male shaft, during assembly, as the male shaft is first inserted into the female shaft, the retaining ring expands within the interior groove of the female shaft to clear the outer diameter of the male shaft, and, once the male shaft is inserted far enough into the female shaft, the retaining ring compresses into the exterior groove of the male shaft. Again, once engaged with the exterior groove of the male shaft and interior groove of the female shaft, the retaining ring prevents axial movement between the male and female shafts, thereby axially fixing the joint assembly until the retaining ring is once again expanded within the interior groove of the female shaft.

58. There are different techniques that may be used to disassemble a splined joint assembly fixed by a retaining ring. One technique is to apply opposing axial forces to the male and female shafts (e.g., pull the shafts apart), which, depending on the structure and design of the retaining ring, may cause the retaining ring to compress within the exterior groove of the male shaft or expand within the interior groove of the female shaft, allowing again for axial movement between the male and female shafts. A second technique involves incorporating a window in the female

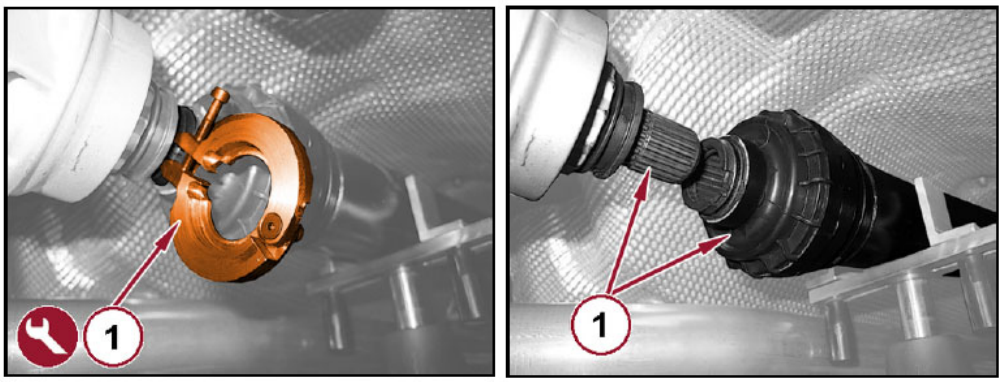
shaft that may be used to access the retaining ring to compress the retaining ring within the exterior groove of the male shaft or expand the retaining ring within the interior groove of the female shaft, typically using a tool such as snap ring pliers. This technique is also taught by numerous other prior art references and is well known in the art. The Renegade Manual, for example, teaches that each of the female shafts of the joint assemblies comprises a window used to access the retaining ring. For example, Installation Steps 8 (left) and 11 (right) illustrate windows formed in each first member of the joint assemblies between the propshaft and RDU and propshaft and PTU, respectively.



(Ex. 1013, Renegade Manual at PET_AAM_1013-0202–0203, Installation Steps 8 and 11; Ex. 1013, Renegade Manual at PET_AAM_1013-0198–0201, Removal Steps 17, 24, 25, 27, Installation Steps 3, 4). In regard to the joint assembly between the propshaft and PTU, Renegade Manual instructs to "Use tool 2019500030 (1)," an "Elastic Ring Spreader," "to open propeller shaft snap ring at the PTU" and to "Disconnect the propeller shaft (1) from the PTU."



(Ex. 1013, Renegade Manual at PET_AAM_1013-0197, Removal Steps 17 and 18). Similarly, in regard to the joint assembly between the propshaft and RDU, Renegade Manual instructs to "Use tool 2019500030 (1)," an "Elastic Ring Spreader," "to open propeller shaft snap ring at the Rear Driveline Unit (RDU)" and to "Disconnect the propeller shaft (1) from the pinion of the RDU (1)."



(Ex. 1013, Renegade Manual at PET_AAM_1013-0199, Removal Steps 24 and 25).

59. Numerous other prior art references teach incorporating a window in the female shaft to access the retaining ring for disassembly:

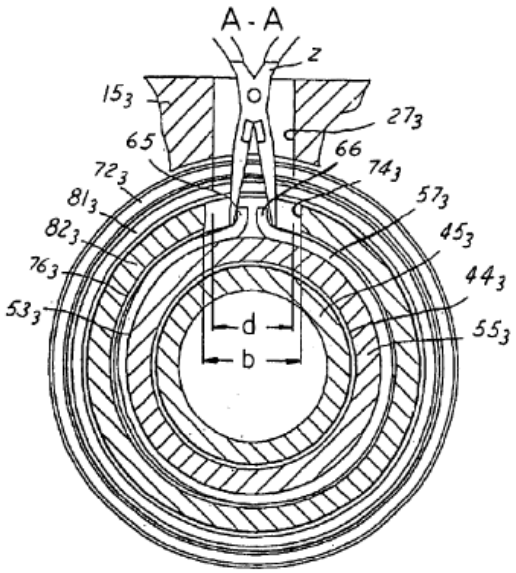


FIG. 8

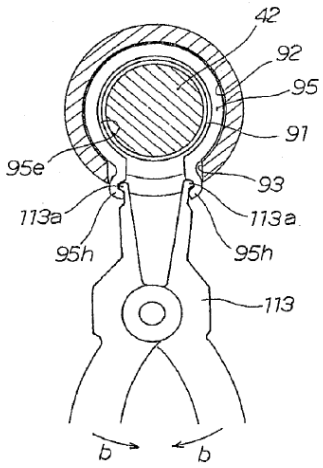


FIG. 5(b)

FIG.10(a)

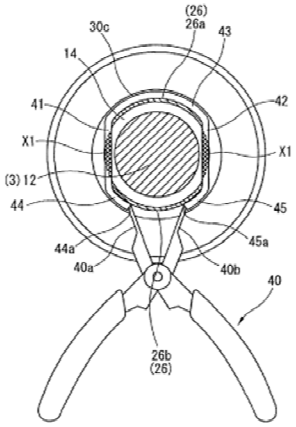
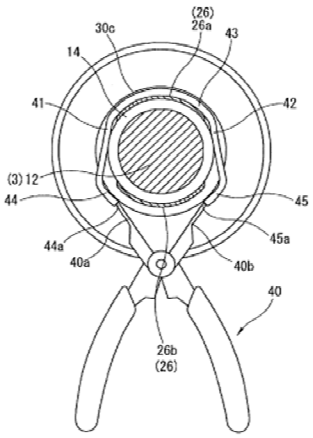


FIG.10(b)



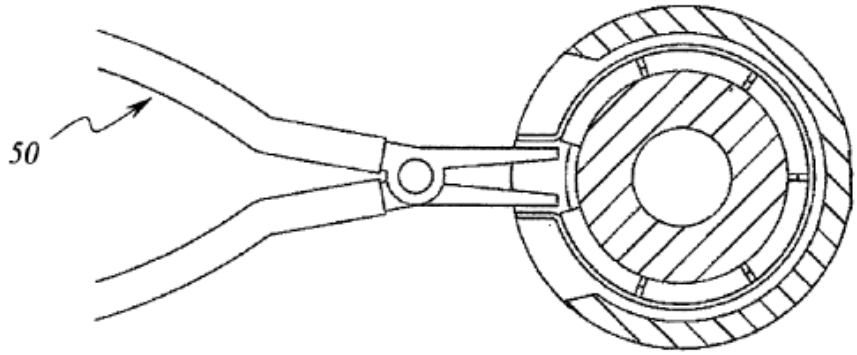


Fig. 5

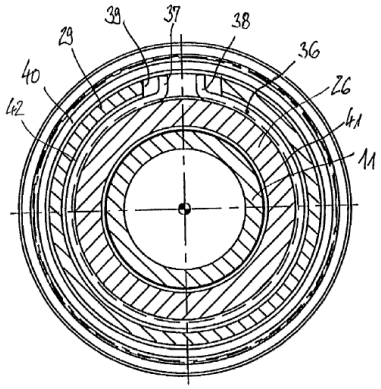
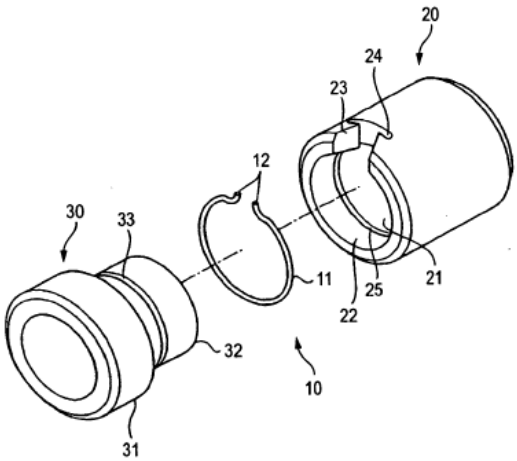


FIG. 1

FIG. 3B



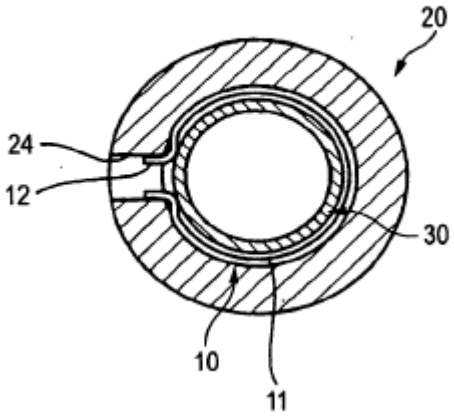


FIG. 4

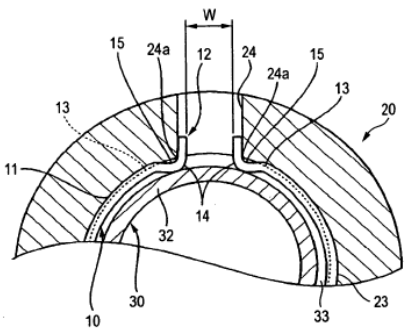


FIG. 6A

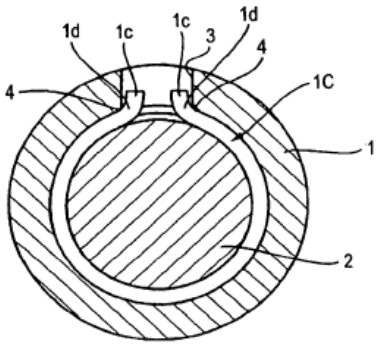
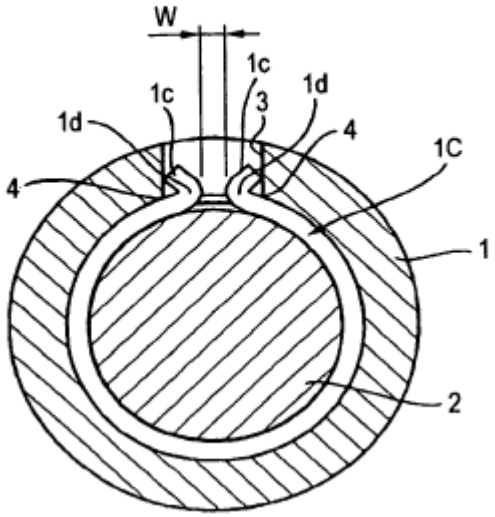


FIG. 6B



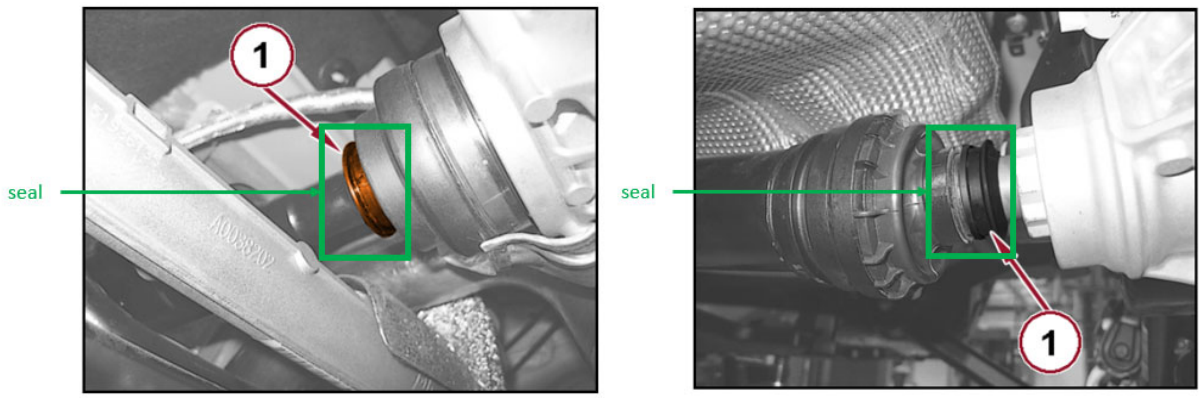
(Ex. 1008, Krude '422 at 7:19–25, 7:66–8:32, Figs. 7–9; Ex. 1006, Kofuji at [0053], [0055], [0057]–[0059], [0060], [0064] [0067]–[0071], Figs. 4–6; Ex. 1007, Sugiyama at Abstract, [0046], [0047], [0051]–[0056], [0059], [0064]–[0066], Figs. 4, 7, 10(a), 10(b); Ex. 1009, Nauer at 4:56–60, 5:22–48, 5:65–6:3, Figs. 3, 5; Ex. 1010, Krude '506 at [0021], [0022], [0025], Figs. 1–3; Ex. 1017, Matsumoto at [0004], [0005], [0010], [0025]–[0026], Figs. 1–6).

D. Seals for Joint Assemblies

60. Driveline joint assemblies are generally sealed to protect the male and female splined shafts from "the invasion of water or dust" or other contaminants from entering the splines and other sensitive portions of the joint assemblies. (Ex. 1007, Sugiyama at [0048], [0058], Fig. 7; Ex. 1011, U.S. Patent No. 7,896,750 ("Brunetti") at 1:30–36 (describing need for improved sealing because "A scarcely efficient sealing allows water to penetrate, especially through the slot formed at the end of the joint bell, into the splined interface zone. Rust formed at the interface of the splined coupling renders the disassembling operation of the hub-bearing unit from the constant velocity joint particularly difficult, besides shortening the life of this members."); Ex. 1014, U.S. Patent No. 4,280,341 ("Krude '341") at 3:12–16 ("To seal the hollow space 2 within the outer shaft member 1 from the atmosphere and also to prevent the penetration of dust and dirt, a sealing boot 14 is mounted on the outer shaft member 1 and on the inner shaft member 10."), Figs. 1, 3; Ex. 1015, FR 2 257 042 ("Minel") at 1:4–6 ("Universal joints used in the transmissions of automotive vehicles comprise a protective boot intended to prevent the impurities and abrasive foreign particles from entering into the sensitive portions of the joint."); Ex. 1016, JP S58-152931 ("Yoshida") at 151–52 (describing "boot 6" to protect universal joint from "muddy water and dust")).

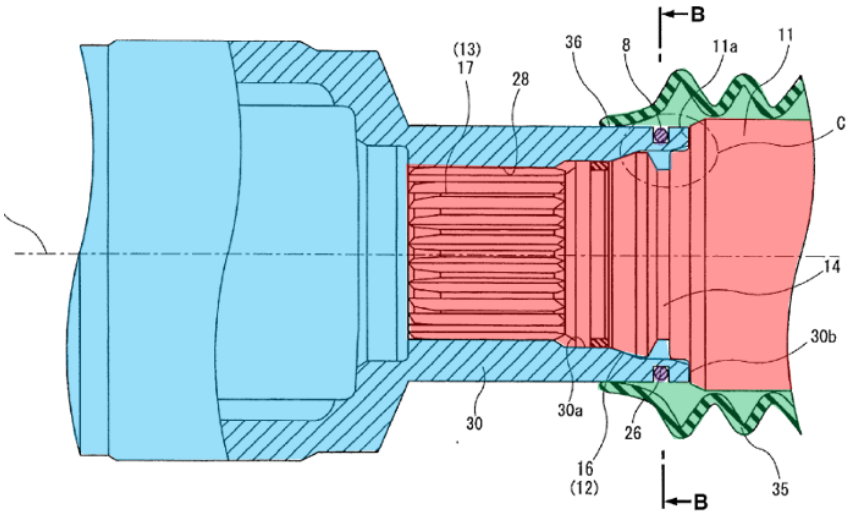
61. There are countless different designs, shapes, and sizes for seals of driveline joint assemblies, all known in the art. As described by the SAE Manual,

"[t]he method of sealing employed for a splined connection generally depends on its specific design as well as its application." (Ex. 1012, SAE Manual at PET_AAM_1012-0199; Ex. 1012, SAE Manual at PET_AAM_1012-0198–0200 (describing and illustrating several examples of joint assembly seals)). As just one example, the Renegade Manual, discloses the use of a seal that it refers to as "dust cover" or "dust seal," numbered "1" in the images reproduced below:



(Ex. 1013, Renegade Manual at PET_AAM_1013-0197–0198, Removal Steps 16 (PTU), 23 (RDU); Ex. 1013, Renegade Manual at PET_AAM_1013-0199–0203, Removal Steps 25, 27, Installation Steps 1, 2, 8, 9, 12). As another example, Sugiyama discloses the use a "water-proof boot 35" (green) to seal a fixed, splined joint assembly, "which serves to prevent an invasion of water or dust from first and second through holes 31, 32."

FIG.7



(Ex. 1007, Sugiyama at [0058], Fig. 7). As Sugiyama explains:

> A water-proof boot 35 which serves to prevent an invasion of water or dust from first and second through holes 31, 32 is mounted on cylindrical section 30 in a form of extending on and over cylindrical section 30 and output shaft 3 so as to enclose first and second through holes 31, 32. This water-proof boot 35 has a middle section structured in a substantially bellows shape so that water-proof boot 35 is formed to enable expansion and contraction (telescopically) in the axial direction. This water-proof boot 35 is attached and fixed to cylindrical section 30 via a boot attachment section 36 disposed at a basic end side of cylindrical section 30 which is opposite to an insertion inlet of output shaft 3. One end side of water-proof boot 35 in the axial direction is located at the outer peripheral side of cylindrical section 30.

Ex. 1007, Sugiyama at [0058].

62. As shown in regard to the seals of the Renegade Manual and Sugiyama, driveline joint assembly seals may be formed with corrugations, which may serve many different purposes. Corrugated seals are common for joint assemblies that accommodate slip or articulation between the male and female shaft members

because the corrugations allow the seal to expand and contract as the shaft members move and articulate. (Ex. 1012, SAE Manual, Ch. 5 at PET_AAM_1012-0199, -0201; Ex. 1014, Krude '341 at 3:12–16, Figs. 1, 3; Ex. 1015, Minel at 1:4–6; Ex. 1016, Yoshida at 151–152; Ex. 1007, Sugiyama at [0048], Figs. 1 and 3; Ex. 1018, U.S. Patent No. 5,772,520 ("Nicholas") at 2:28–38, Fig. 1; Ex. 1019, U.S. Patent No. 3,063,266 ("Rabson") at 1:45–71, 2:43–65, Figs. 1–5). Corrugated seals are also common for fixed joint assemblies, like those of the Renegade Manual and Sugiyama. For example, the seal of Sugiyama covering the fixed, splined joint assembly has corrugations "to enable expansion and contraction (telescopically) in the axial direction," which helps assembly and disassembly of the seal. (Ex. 1007, Sugiyama at [0058]). Corrugations may also serve to provide a better seal by increasing the number of sealing surfaces, and may also provide a useful gripping feature, which, again, helps assembly and disassembly of seal. Ultimately, whether to use a corrugated seal, as well as the number and dimensions of the corrugations, is a simple and obvious design choice well within the knowledge and skill of a person of ordinary skill in the art.

63. Joint assembly seals may also optionally be fixed to one or more of the shaft members, for example, by way of a clamp or band. In the embodiment of Figures 1–3 of the '958 patent, "seal 240" is shown not to be clamped, and the '958 patent describes that "seal 240 can work in conjunction with one or more O-rings or

compression devices, such as spring clamps, wire clamps, and ear clamps." (Ex. 1001, '958 patent at 6:63–7:3, Figs. 1–3). The "dust cover" or "dust seal" of Renegade Manual also happens not to be clamped to the shaft members of the joint assembly, which allows the seal to "slide" on and off. (Ex. 1013, Renegade Manual at PET_AAM_1013-0197–0198, Removal Steps 16 (PTU), 23 (RDU); Ex. 1013, Renegade Manual at PET_AAM_1013-0199–0203, Removal Steps 25, 27, Installation Steps 1, 2, 8, 9, 12). Sugiyama, on the other hand, teaches that "water-proof boot 35 is attached and fixed to a cylindrical section 30 via a boot attachment section 36." (Ex. 1007, Sugiyama at [0058], Fig. 7; Ex. 1007, Sugiyama at [0048], Figs. 1, 3). Sugiyama also teaches that boot seals, like "water-proof boot 35," may be fixed "in a tight binding manner via a well known boot band." (Ex. 1007, Sugiyama at [0048]; Ex. 1015, Minel at Fig. 1 ("collar 9"); Ex. 1016, Yoshida at 151 ("8 is a band that fastens boot 6 to outer race 1, and 9 is a band that fastens boot 6 to air breather 7"), Figs. 1 and 3; Ex. 1014, Krude '341 at Fig. 1; Ex. 1018, Nicholas at 2:28–38 ("The boot seal 50 engages the outer diameter 48 of the slipyoke 14 and is typically sealed by providing a clamp 52 on the outer portion of the boot 50 at a first end 56 of the boot 50 to clamp the boot seal 50 to the slipyoke 14. A second end 58 of the boot seal 50 is likewise clamped at the second end 58 using a second clamp 54 to clamp the boot 50 over the outer diameter 44 of the studyoke 20. A cavity 60 is therefore created between the outer diameter 44 of the studyoke 20 and the boot

50; the cavity bounded at either end by the clamped portions 56, 58 of the boot 50."), Fig. 1; Ex. 1019, Rabson at 2:43–65 (describing seal having "tubular cylindrical end sections 9 and 10 having inner diameters suitable respectively for sealing to outer surfaces" of the male and female shaft members by "clamping ring 7" or "collar 8"), Figs. 1–5). A clamped seal often provides better protection from water, dirt, dust, and other contaminants than a seal that is not clamped, but a seal that is not clamped is often easier to assemble and disassemble than a seal that is clamped. Again, whether and how to attach seals to the shaft members, including whether to use clamps, is a simple and obvious design choice well within the knowledge and skill of a person of ordinary skill in the art.

VII. THE '958 PATENT AND RELATED PATENTS

A. Background and Description of the '958 Patent

64. The '958 patent (Ex. 1001), entitled "High Retention Force Serviceable Plug-On Joint Assembly," issued on September 6, 2022, from U.S. Application No. 15/966,085 ("'085 application"), which was filed on April 30, 2018. Ex. 1001, '958 patent at (21), (22), (45). The '958 patent claims priority to U.S. Provisional Application No. 62/500,821 ("'821 application"), which was filed on May 3, 2017. (Ex. 1001, '958 patent at (60), 1:7–10; Ex. 1003, '821 application PH at PET_AAM_1003-0001). The '958 patent is generally directed to joint assemblies with retaining rings that are accessible through an access window for servicing the

joint assemblies. (Ex. 1001, '958 patent at Abstract, claims).

65. In the "FIELD" section, the '958 patent explains that it "relates to joint assemblies." (Ex. 1001, '958 patent at 1:14–17). "The joint assembly can include a joint designed to transmit rotary motion across a static or variable angle." (Ex. 1001, '958 patent at 4:56–57). Types of "joint assemblies" described by the '958 patent "joint assembl[ies] of any type having an inner joint member and an outer joint member, as desired," including constant velocity (CV) joints and "various universal joints, Cardan joints, double Cardan joints, Tracta joints, Rzeppa joints, Weiss joints, and Thompson couplings." (Ex. 1001, '958 patent at 4:63–5:2).

66. In the "INTRODUCTION" section, the '958 patent describes one type of joint assembly that it refers to as "plug-on CV joint":

> Plug-on CV joints are used for attachment of a drive or propeller shaft of the vehicle to the powertrain or to the final drive components without requiring the use of threaded fasteners or bolts to secure the joints. Typically, the plug-on CV joint includes an outer joint member and an inner joint member. Internal splines formed on either the inner joint member or the outer joint member couple with external splines formed on the powertrain or a final drive component shaft and secured with an expanding snap ring. The snap ring secures or locks the CV joint axially when corresponding grooves of the internal splines and the external splines are aligned.

(Ex. 1001, '958 patent at 1:33–45). The '958 patent describes a number of problems with conventional plug-on CV joints, similar to the problems that I described above. The '958 patent explains, for example:

> Disadvantageously, the snap rings used to axially retain or lock the CV

> joint to the powertrain or final drive components are entirely covered and not easily accessible after assembly. As a result, the snap ring is not easily accessible for disassembly or disengagement with tools during maintenance. To overcome this disadvantage, the snap ring and corresponding grooves are configured to permit forced disassembly with pry tools employing relatively minimal axial loads, generally less than about 500 pounds.
>
> However, these plug-on CV joints with the snap ring are unable to withstand higher thrust loads applied to the driveline on live beam axle applications, while still permitting easy access to the snap ring for maintenance.

(Ex. 1001, '958 patent at 1:50–63).

67. The '958 patent purports to improve upon and solve the problems with conventional, plug-on joint assemblies. (Ex. 1001, '958 patent at 2:3–55). The '958 patent states that "[i]t would be desirable to provide a robust plug-on CV joint configured for maximized axial retention of the CV joint to a powertrain or final drive components while maximizing an ease of maintenance thereof." (Ex. 1001, '958 patent at 1:64–67). And the '958 patent purports to satisfy that need by providing "a joint having splines formed therein and a shaft having splines formed thereon coupled to the joint, where the splines of the shaft engage the splines of the joint," where "[a]n access window is formed on the joint and a ring retains the shaft to the joint," and "where a portion of the ring is accessible through the access window." (Ex. 1001, '958 patent at 2:7–14).

68. One embodiment of the joint assembly of the '958 patent is illustrated by Figures 1–3. (Ex. 1001, '958 patent at Figs. 1–3). Figure 1 presents an exploded

view of the joint assembly:

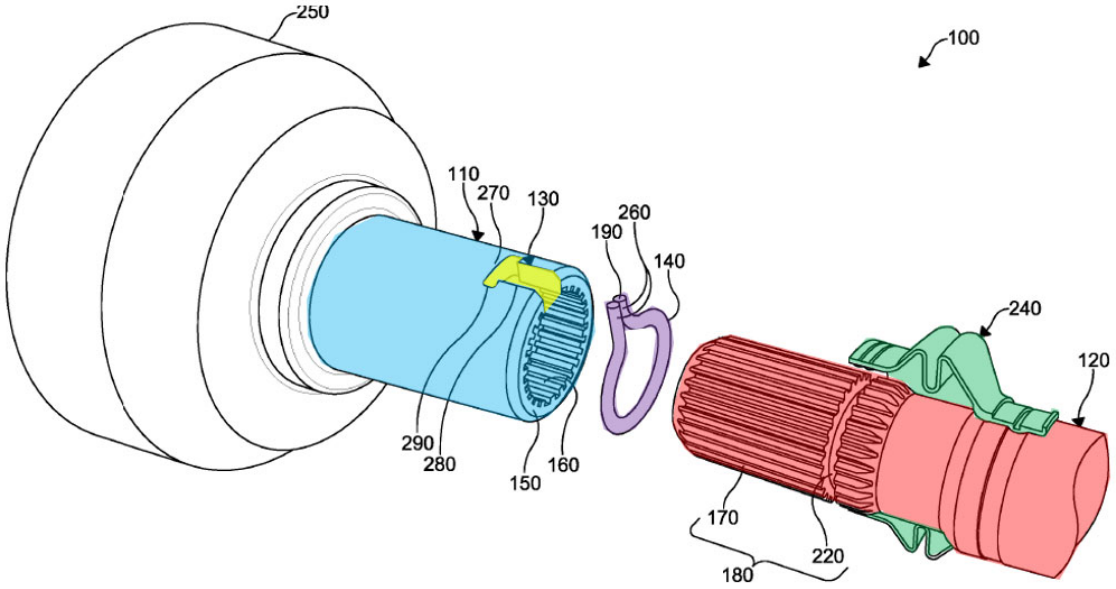


FIG. 1

(Ex. 1001, '958 patent at Fig. 1 (colors and annotations added unless otherwise noted), 3:1–2). Figure 2 presents an assembled perspective view of the joint assembly of Figure 1:

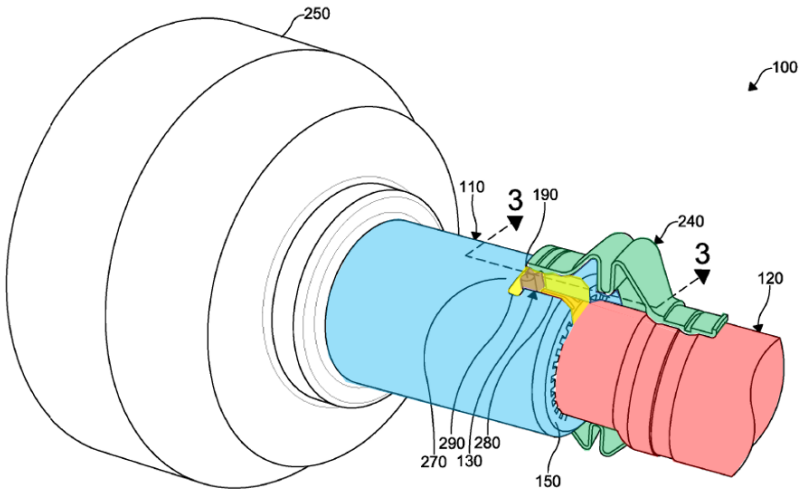


FIG. 2

(Ex. 1001, '958 patent at Fig. 2, 3:3–4). And Figure 3 presents a fragmentary, cross-sectional view of the joint assembly of Figures 1 and 2, taken along plane 3-3 of Figure 2:

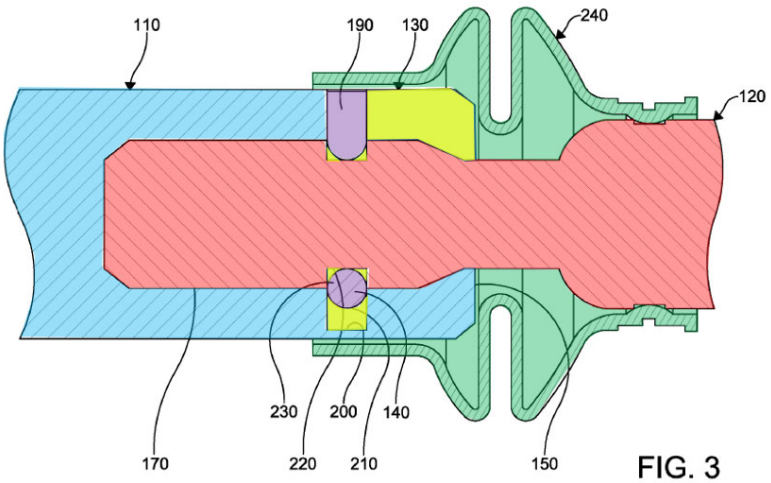


FIG. 3

(Ex. 1001, '958 patent at Fig. 3, 3:5–6).

69. In this embodiment, "joint assembly 100 includes a first member 110" (female shaft, blue), "a second member 120" (male shaft, red), "a window 130" (yellow), "and a retaining ring 140" (purple). (Ex. 1001, '958 patent at 6:1–3). "The first member 110 has an open end 150 and a first plurality of splines 160 formed within the open end 150." (Ex. 1001, '958 patent at 6:3–4). "The second member 120 has a second plurality of splines 170 formed thereon." (Ex. 1001, '958 patent at 6:4–6). As illustrated in Figure 2, the plurality of splines 160 of first member 110 engage the plurality of splines 170 second member 120 to couple the first member 110 and second member 120. (Ex. 1001, '958 patent at 6:6–10; Ex. 1001, '958

patent at 6:32–35 ("As shown, the first member 110 includes internal splines 160 and the second member 120 includes external splines 170, but other engagement means can be employed to couple the first member 110 and second member 120.")).

70. "[W]indow 130 is formed within the first member 110 where the portion 180 of the second member 120 is disposed within the first member 110." (Ex. 1001, '958 patent at 6:10–13; Ex. 1001, '958 patent at 6:46–55 (describing T-shaped window 130 of first member 110)). Window 130 provides access to "retaining ring 140" (Ex. 1001, '958 patent at 6:15–16), which is received by annular recesses of the first member 110 and second member 120:

> The first member 110 includes an interior surface annular recess 200 that receives a portion 210 of the retaining ring 140 and the second member 120 includes an exterior surface annular recess 220 that receives another portion 230 of the retaining ring 140.

(Ex. 1001, '958 patent at 6:16–20). "The retaining ring 140 is configured as a discontinuous annular expandable snap ring, where ends 260 of the retaining ring 140 form a portion 190 that is accessible through the window 130." (Ex. 1001, '958 patent at 6:35–38). "The ends 260 can be biased towards or away from each other to permit expansion of the retaining ring 140 within the interior surface annular recess 200 of the first member 110 when the second member 120 is received within the open end 150 of the first member 110 and contraction of the retaining ring 140 when positioned within the exterior surface annular recess 220 of the second member 120." (Ex. 1001, '958 patent at 6:38–45; Ex. 1001, '958 patent at 8:12–18). In this

regard, retaining ring 140 is "configured to retain the coupling of the second member 120 to the first member 110." (Ex. 1001, '958 patent at 6:13–14).

71. By permitting access to retaining ring 140 through window 130, the '958 patent explains that this joint assembly configuration "is more robust than other configurations, while being easily accessible and ergonomically configured for maintenance purposes." (Ex. 1001, '958 patent at 7:46–49; Ex. 1001, '958 patent at 5:44–54). The '958 patent explains, for example:

> The retaining ring 140 can be thicker and/or stronger than other retaining devices or rings known in the art. The retaining ring 140 have also be configured with abrupt or sharp corners formed thereon for enhanced engagement to the interior surface annular recess 200 and/or the exterior surface annular recess 220, which can facilitate maximized retention force. Additionally, the interior surface annular recess 200 and/or the exterior surface annular recess 220 can have a depth greater than other grooves used with retaining rings, which can further facilitate maximized retention force.

(Ex. 1001, '958 patent at 7:49–59; Ex. 1001, '958 patent at 7:60–8:3 (describing "alternate cross-sectional shapes" of retaining ring 140)).

72. The '958 patent also describes optionally sealing the joint assembly. (Ex. 1001, '958 patent at 6:63–7:3; Ex. 1001, '958 patent at 5:25–26 ("Where the joint assembly further includes a seal configured to cover the window, ...")). It explains, for example, that the "joint assembly can include a seal configured to cover the window" to "prevent unwanted material, such as dust or debris, from entering the window." (Ex. 1001, '958 patent at 4:51–55). The embodiment of Figures 1–3

includes "seal 240," which is "configured as a boot for sealing not only the window 130, but also the interface of the first member 110 with respect to the second member 120." (Ex. 1001, '958 patent at 6:63–65). Seal 240 of Figures 1–3 has corrugations, but the '958 patent does not otherwise mention or describe corrugations. (Ex. 1001, '958 patent at Figs. 1–3). The '958 patent explains that other types of seals may be used:

> Additional sealing means can be employed (not shown), where the seal 240 can work in conjunction with one or more O-rings or compression devices, such as spring clamps, wire clamps, and ear clamps. More than one seal 240 can be used, as well.

(Ex. 1001, '958 patent at 6:65–7:3).

73. The '958 patent also describes the assembling (Ex. 1001, '958 patent at 7:4–34, 8:4–12) and servicing and maintaining (Ex. 1001, '958 patent at 7:35–8:3) the joint assembly. It explains, for example, that "during servicing or maintenance of the joint assembly 100, the window 130 permits easy access to the retaining ring 140, where a tool can be employed to expand the retaining ring 140 for ease of separation of the first member 110 and the second member 120." (Ex. 1001, '958 patent at 7:35–39; Ex. 1001, '958 patent at 6:55–62 ("The ends 260 of the retaining ring 140 extend into the window 130 to permit manipulation thereof, including contraction of the retaining ring 140 to release the coupling of the first member 110 to the second member 120 and permit separation of the first member 110 and the second member 120 by disengaging the second plurality of splines 170 from the first

plurality of splines 160.")).

B. Prosecution History of the '958 Patent

1. The '085 Application – April 30, 2018

74. On April 30, 2018, the named inventors of the '958 patent, Michael Walter Hopson, Arvind Srinivasan, and Michael Kinsella (collectively, "Applicants"), filed the application from which the '958 patent later issued, U.S. Application No. 15/966,085 ("'085 application"). (Ex. 1004, '085 Application PH at PET_AAM_1004-0001–0038). The '085 application included 20 original claims, including independent Claims 1, 12, and 15. (Ex. 1004, '085 Application PH at PET_AAM_1004-0035–0037).

75. Original Claim 1 is reproduced below:

> A joint assembly comprising:
>
> a first member having a first engagement means;
>
> a second member having a second engagement means, a portion of the second member disposed within the first member, the second engagement means engaging the first engagement means to provide a coupling of the second member to the first member;
>
> a window formed within the first member where the portion of the second member is disposed within the first member; and
>
> a retaining means configured to retain the coupling of the second member to the first member, a portion of the retaining means accessible through the window.

(Ex. 1004, '085 Application PH at PET_AAM_1004-0035).

76. Original Claim 12 is reproduced below:

A joint assembly comprising:

a first member having an open end and a first plurality of splines formed within the open end;

a second member having a second plurality of splines formed thereon, a portion of the second member disposed within the first member, the second plurality of splines engaging the first plurality of splines to provide a coupling of the second member to the first member;

a window formed within the first member where the portion of the second member is disposed within the first member; and

a retaining ring configured to retain the coupling of the second member to the first member, a portion of the retaining ring accessible through the window, the first member including an interior surface annular recess receiving a portion of the retaining ring and the second member including an exterior surface annular recess receiving another portion of the retaining ring.

Ex. 1004, '085 Application PH at PET_AAM_1004-0036.

77. Original Claim 15 is reproduced below:

A method of servicing a joint assembly comprising:

providing a joint assembly, the joint assembly including:

a first member having a first engagement means;

a second member having a second engagement means, a portion of the second member disposed within the first member, the second engagement means engaging the first engagement means to provide a coupling of the second member to the first member;

a window formed within the first member where the portion of the second member is disposed within the first member; and

a retaining means configured to retain the coupling of the second member to the first member, a portion of the retaining means accessible through the window;

manipulating the retaining means through the window to release the

coupling of the second member to the first member; and

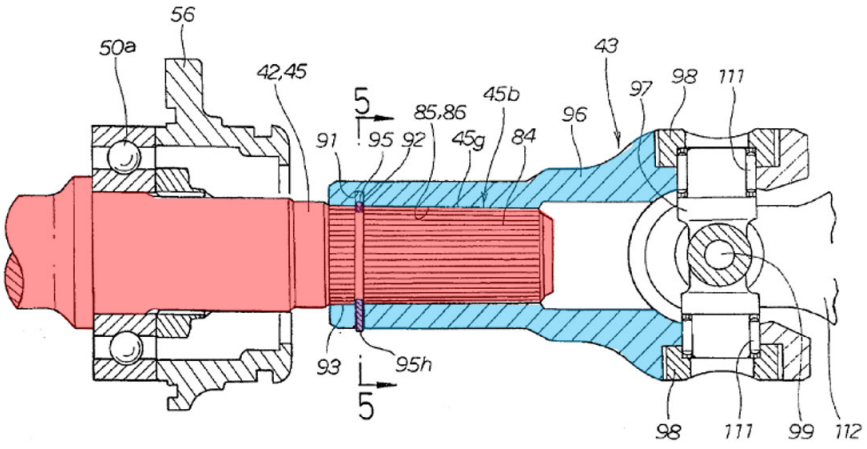
separating the first member and the second member by disengaging the second engagement means from the first engagement means.

Ex. 1004, '085 Application PH at PET_AAM_1004-0036–0037.

2. Non-Final Office Action – January 22, 2021

78. On January 22, 2021, the Examiner—Alexus Camero (Examiner) and Amber Anderson (Supervisory Patent Examiner)—issued an Office Action, rejecting all original Claims 1–20. (Ex. 1004, '085 Application PH at PET_AAM_1004-0052–0061). The Examiner rejected original Claims 1–7, 9–12, 14–16, and 18–20 as being anticipated by U.S. Publication No. 2009/0233723 (Ex. 1006, "Kofuji"). As illustrated by Figures 4–6 of Kofuji (including Figures 4 and 5(a) below), and as the Examiner concluded, Kofuji describes each and every limitation of original Claims 1–7, 9–12, 14–16, and 18–20 and anticipate those claims.

FIG. 4



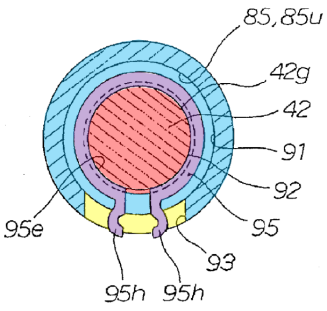


FIG. 5(a)

79. For example, Kofuji describes a joint assembly comprising a first,

female splined shaft member, "universal joint 43" "a tubular engaging section 85" (blue), and a second, male splined shaft member, "first drive shaft 45 acting as an output shaft 42." (Ex. 1006, Kofuji at [0048]–[0050], Figs. 4–6). The first member and the second member of Kofuji are coupled by way of a plurality of splines on each member: "In other words, the spline hole 86 provided on the inner periphery of the tubular engaging section 85 of the universal joint 43 is engaged with the spline section 84 provided on the outer periphery 45 g of the first drive shaft 45 acting as an output shaft 42." (Ex. 1006, Kofuji at [0050], Figs. 4–6). The joint assembly of Kofuji also includes a retaining ring, "circular clip 95" (purple), which "has the function of preventing shift of the universal joint 43 in an axial direction relative to the output shaft 42." (Ex. 1006, Kofuji at [0053]; Ex. 1006, Kofuji at [0055]). The "operating section 95 h" of circular clip 95 is accessible through a window, "notched section 93" (yellow), which "is provided on the tip 85 a of the tubular engaging section 85." (Ex. 1006, Kofuji at [0060]). "Thus a mounting or a removing operation of the clip 95 on the first annular groove 91 and the second annular groove 92 is facilitated by suitable selection of the shape and material of the clip 95." (Ex. 1006, Kofuji at [0060]; Ex. 1006, Kofuji at [0059], [0067]–[0071]).

80. The Examiner stated that Kofuji does not teach "that the joint assembly further comprises a seal to cover the window." (Ex. 1004, '085 application PH at PET_AAM_1004-0059). However, the Examiner rejected the remaining claims

reciting "seal" limitations, original Claims 8, 13, and 17, as being obvious over Kofuji in view of U.S. Publication No. 2018/0003240 (Ex. 1007, "Sugiyama").

81. As illustrated by Figures 4–7 of Sugiyama (including Figures 4 and 7 below), and as the Examiner concluded, like Kofuji, Sugiyama "teaches a joint assembly comprising a first member (30), a second member (12) coupled to the first member (30), and a retaining means (8) configured to retain the coupling of the second member (12) to the first member (30), wherein the retaining means (8) is inserted into through holes (31, 32) from an outer peripheral side of the first member (30) and being engaged with an engagement groove of the second member (12)." (Ex. 1004, '085 application PH at PET_AAM_1004-0059–0060).

FIG.4

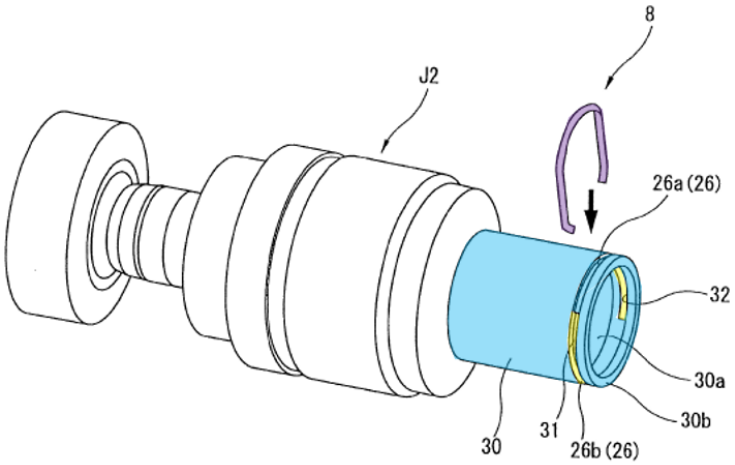
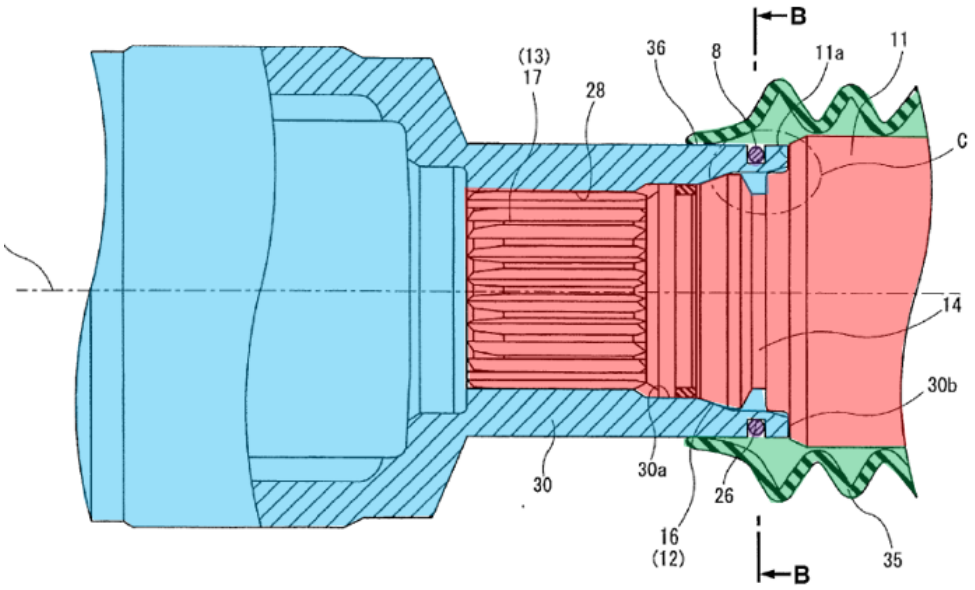


FIG.7



(Ex. 1007, Sugiyama at Figs. 4–7). The Examiner also found that "Sugiyama et al (FIG. 7) further teaches a seal (35, a water-proof boot)" (green), which is "configured to cover the through holes (31, 32)." (Ex. 1004, '085 application PH at PET_AAM_1004-0059). Specifically, Sugiyama teaches:

> A water-proof boot 35 which serves to prevent an invasion of water or dust from first and second through holes 31, 32 is mounted on cylindrical section 30 in a form of extending on and over cylindrical section 30 and output shaft 3 so as to enclose first and second through holes 31, 32. This water-proof boot 35 has a middle section structured in a substantially bellows shape so that water-proof boot 35 is formed to enable expansion and contraction (telescopically) in the axial direction. This water-proof boot 35 is attached and fixed to cylindrical section 30 via a boot attachment section 36 disposed at a basic end side of cylindrical section 30 which is opposite to an insertion inlet of output shaft 3. One end side of water-proof boot 35 in the axial direction is located at the outer peripheral side of cylindrical section 30.

(Ex. 1007, Sugiyama at [0058]; Ex. 1007, Sugiyama at [0048], [0094], [0146]). The

Examiner further found that it would have been obvious to a person of ordinary skill in the art to include the seal of Sugiyama in the joint assembly of Kofuji "for the purpose of preventing an invasion of water or dust from the window or openings." (Ex. 1004, '085 application PH at PET_AAM_1004-0060).

3. Amendments and Remarks After Non-Final – February 25, 2021

82. The Applicants submitted amendments and remarks in response to the Examiner's Non-final Office Action. (Ex. 1004, '085 application at PET_AAM_1004-0161–0172). Applicants amended each of pending Claims 1, 12, and 15 to further recite that the "distal ends of the retaining means [ring] extend in a direction radially outwardly into the window to a point at or radially inwardly from an outer wall of the first member." (Ex. 1004, '085 application at PET_AAM_1004-0164, PET_AAM_1004-0166, PET_AAM_1004-0167).

83. Amended Claim 1 is reproduced below:

> A joint assembly comprising:
>
> a first member having a first engagement means;
>
> a second member having a second engagement means, a portion of the second member disposed within the first member, the second engagement means engaging the first engagement means to provide a coupling of the second member to the first member;
>
> a window formed within the first member where the portion of the second member is disposed within the first member; and
>
> a retaining means configured to retain the coupling of the second member to the first member, a portion of the retaining means accessible

through the window, wherein distal ends of the retaining means extend in a direction radially outwardly into the window to a point at or radially inwardly from an outer wall of the first member.

Ex. 1004, '085 Application PH at PET_AAM_1004-0164.

84. Amended Claim 12 is reproduced below:

a first member having an open end and a first plurality of splines formed within the open end;

a second member having a second plurality of splines formed thereon, a portion of the second member disposed within the first member, the second plurality of splines engaging the first plurality of splines to provide a coupling of the second member to the first member;

a window formed within the first member where the portion of the second member is disposed within the first member; and

a retaining ring configured to retain the coupling of the second member to the first member, a portion of the retaining ring accessible through the window, the first member including an interior surface annular recess receiving a portion of the retaining ring and the second member including an exterior surface annular recess receiving another portion of the retaining ring, wherein distal ends of the retaining ring extend in a direction radially outwardly into the window to a point at or radially inwardly from an outer wall of the first member.

Ex. 1004, '085 Application PH at PET_AAM_1004-0166.

85. Amended Claim 15 is reproduced below:

A method of servicing a joint assembly comprising:

providing a joint assembly, the joint assembly including:

a first member having a first engagement means;

a second member having a second engagement means, a portion of the second member disposed within the first member, the second engagement means engaging the first engagement means to provide a coupling of the second member to the first member;

> a window formed within the first member where the portion of the second member is disposed within the first member; and
>
> a retaining means configured to retain the coupling of the second member to the first member, a portion of the retaining means accessible through the window, wherein distal ends of the retaining means extend in a direction radially outwardly into the window to a point at or radially inwardly from an outer wall of the first member;
>
> manipulating the retaining means through the window to release the coupling of the second member to the first member; and
>
> separating the first member and the second member by disengaging the second engagement means from the first engagement means.

Ex. 1004, '085 Application PH at PET_AAM_1004-0167.

86. In regard to amended Claims 1, 12, and 15, Applicants argued that, unlike the claimed retaining means (or retaining ring), which has "ends [that] do not protrude from a wall of the rotating first member," the retaining ring of Kofuji, circular clip 95, has distal ends that "extend beyond an outer wall." (Ex. 1004, '085 application PH at PET_AAM_1004-0171). Applicants also argued that, unlike the claimed retaining means (or retaining ring), which "facilitates interaction between extended portions of the ends with a tool," "[i]n Sugiyama, the ends of the retainer extend in a circumferential direction" and "only the tips of the ends interact with the tool which can result in slippage." (Ex. 1004, '085 application PH at PET_AAM_1004-0171–0172 (underlining by Applicants in original)).

87. Applicants cancelled original Claim 20. (Ex. 1004, '085 application PH at PET_AAM_1004-0168).

88. Applicants did not refute the Examiner's conclusion that the limitations of pending dependent Claims 2–11, 13, 14, and 16–19 did not make those claims patentable over the cited prior art. (Ex. 1004, '085 application at PET_AAM_1004-0161–0172).

89. Applicants also submitted a new claim, Claim 21, which is reproduced below:

> A joint assembly comprising:
>
> a first member having a first engagement means;
>
> a second member having a second engagement means, a portion of the second member disposed within the first member, the second engagement means engaging the first engagement means to provide a coupling of the second member to the first member;
>
> a window formed within the first member where the portion of the second member is disposed within the first member;
>
> a retaining means configured to retain the coupling of the second member to the first member, a portion of the retaining means accessible through the window; and
>
> a seal configured to cover the window, the seal coupled to the second member adjacent an end of the first member, the seal coupled to the first member adjacent the window.

(Ex. 1004, '085 Application PH at PET_AAM_1004-0168). Applicants argued that "[n]one of the cited references" disclose the claimed "seal coupled to a second member adjacent the end of a second member and coupled to a first member adjacent a window formed in the first member" and, "[s]pecifically, in Sugiyama, a boot is connected to a shaft at a point distal from an end of a cylindrical section." (Ex. 1004,

’085 Application PH at PET_AAM_1004-0172).

4. Final Office Action – March 16, 2021

90. On March 16, 2021, the Examiner—Alexus Camero (Examiner) and Amber Anderson (Supervisory Patent Examiner)—issued a Final Office Action, rejecting pending Claims 1–19 and 21. (Ex. 1004, ’085 application PH at PET_AAM_1004-0174–0190). The Examiner considered the Applicants’ arguments, but found the arguments to be “moot” because the Examiner relied on a new ground of rejection that “does not rely on any reference applied in the prior rejection of record for any teaching or matter specifically challenged in that argument.” (Ex. 1004, ’085 application PH at PET_AAM_1004-0176). The Examiner also remarked on Applicants’ arguments. “Regarding Applicant’s argument that Kofuji fails to disclose that distal ends of the retaining means extend in a direction radially outwardly into the window to a point at or radially inwardly from an outer wall of the first member,” the Examiner relied on a new reference, U.S. Patent No. 6,739,422 (Ex. 1008, Krude ’422) as a reference that teaches that claim limitation and “as a teaching reference to modify” circular clip 95 of Kofuji. (Ex. 1004, ’085 application PH at PET_AAM_1004-0176). And the Examiner disagreed with Applicants’ argument that none of the cited prior art references, including Sugiyama, disclose the seal limitation of pending Claim 21. The Examiner further stated: “Sugiyama is merely being used to teach the use of a boot as a seal to

prevent an invasion of water or dust from the window or openings and that, when added to the joint assembly of Kofuji, the boot of Sugiyama et al. is capable of being coupled to the second member adjacent the end of the first member and to the first member adjacent the window formed in the first member, such that the boot covers the window." (Ex. 1004, '085 application PH at PET_AAM_1004-0177).

91. The Examiner rejected pending Claims 1–7, 9–12, 14–16, and 18–19 as being anticipated by Krude '422. (Ex. 1004, '085 application PH at PET_AAM_1004-0177–0180). As illustrated by Figures 1–10 of Krude '422 (including Figures 5a and 8 below), and as the Examiner concluded, Krude '422 describes each and every limitation of pending Claims 1–7, 9–12, 14–16, and 18–19 and anticipates those claims.

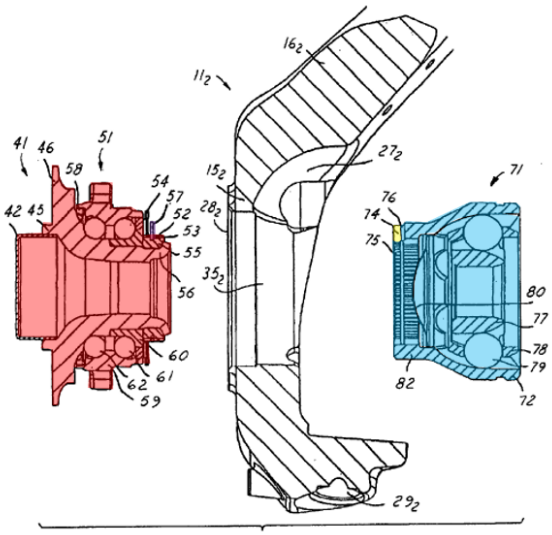


FIG. 5a

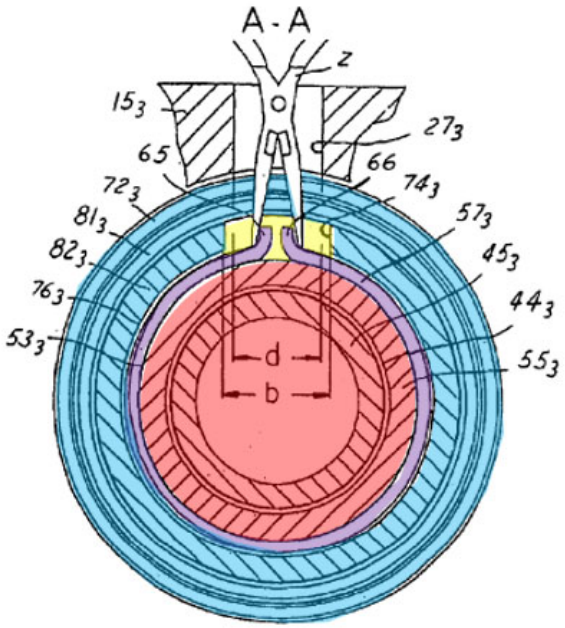


FIG. 8

92. For example, Krude '422 discloses a first, female splined shaft member, "constant velocity joint 71" with outer "an joint part 72 with a sleeve projection 82" and "inner toothing 75" (blue), and a second male splined shaft member, "wheel hub 41" with outer toothing 52" (red). (Ex. 1008, Krude '422 at 5:66–6:43, Figs. 1–10). The first member and the second member of Krude '422 are coupled by way of a plurality of splines on each member: "When the unit is assembled, the inner toothing 75 engages the outer toothing 52 at the wheel hub 41." (Ex. 1008, Krude '422 at 6:40–41, Figs. 1–10). The joint assembly of Krude '422 also includes a retaining ring, "securing ring 57" (purple) for "connecting the wheel hub unit 41 and the constant velocity joint 71." (Ex. 1008, Krude '422 at 7:26–34; Ex. 1008, Krude '422

at 6:40–43 ("When the unit is assembled, the inner toothing 75 engages the outer toothing 52 at the wheel hub 41, with the annular groove 53 overlapping with the annular groove 76 and with both, jointly, accommodating a securing ring 57."), 7:6–7, 7:13–15, 7:60–62, 7:66–8:15). As illustrated in Figure 8, for example, "outwardly bent portions" of securing ring 57 "at the ring ends 65, 66" are accessible through a window, "notch 74" (yellow), in the first member. (Ex. 1008, Krude '422 at 7:19–25, 7:66–8:32, Figs. 7–9).

> By gripping the ends 65, 66 of the securing ring 57_3 and compressing same by means of the pliers Z, it is possible to reduce the securing ring 57_3 in such a way that it enters the annular groove 53_3 in the driving ring 55_3 more deeply while at the same time sliding out of the inner annular groove 76_3 in the outer joint part 72_3, so that the constant velocity joint 71_3 can be removed from the hub unit 41_3 and especially from the driving ring 53_3 in a non-destructive way.

Ex. 1008, Krude '422 at 8:23–32.

93. The Examiner also rejected pending Claims 1–7, 9–12, 14–16, and 18–19 as being obvious over Kofuji in view of Krude '422. (Ex. 1004, '085 application PH at PET_AAM_1004-0180–0186). In this regard, the Examiner explained that "Krude et al. has also been used as a teaching reference to modify the retaining means of previously applied prior art Kofuji such that distal ends of the retaining means do not extend outside the window in order to prevent any interference with external parts located outside the window." (Ex. 1004, '085 application PH at PET_AAM_1004-0176). In other words, the Examiner found that Kofuji taught

every limitation of pending Claims 1–7, 9–12, 14–16 and 18–19, except that Kofuji "fails to disclose that the distal ends of the retaining means extend in a direction radially outwardly into the window to a point at or radially inwardly from an outer wall of the first member." (Ex. 1004, '085 application PH at PET_AAM_1004-0181, PET_AAM_1004-0183, PET_AAM_1004-0185). The Examiner found that Krude '422 teaches this missing limitation. (Ex. 1004, '085 application PH at PET_AAM_1004-0181–0182, PET_AAM_1004-0184, PET_AAM_1004-0185). The Examiner also concluded that it would have been obvious to a person of ordinary skill in the art to modify the retaining ring of Kofuji as taught by Krude '422:

> Therefore, it would have been obvious to one in ordinary skill in the art at the time of the effective filing date of the claimed invention to modify the retaining ring of Kofuji such that the distal ends extend in a direction radially outwardly into the window to a point as taught by Krude et al. for the purpose of providing a discrete means of uncoupling the first and second members and of preventing the distal ends to interfere with external parts located outside the window.

Ex. 1004, '085 application PH at PET_AAM_1004-0182, PET_AAM_1004-0184–0186.

94. The Examiner stated that, "[w]ith respect to Claims 8 and 13," Kofuji and Krude '422 disclose the limitations of independent Claims 1 and 12, but "fails to disclose that the joint assembly further comprises a seal configured to cover the window." (Ex. 1004, '085 application PH at PET_AAM_1004-0186). The Examiner further stated that, "[w]ith respect to Claim 17, Kofuji discloses the

limitations set forth in Claim 15 but fails to disclose[] that the joint assembly further comprises a seal configured to cover the window and the method further comprises uncovering the window from the seal prior to manipulating the retaining means through the window to release the coupling of the second member to the first member." (Ex. 1004, '085 application PH at PET_AAM_1004-0187). However, the Examiner rejected the pending Claims 8, 13, and 17 reciting as being obvious over Kofuji in view of Krude '422 and Sugiyama. The Examiner explained that "Sugiyama et al (Fig. 7) further teaches a seal (35, a water-proof boot) configured to cover the through holes (31, 32)," and that "it would have been obvious to one in ordinary skill in the art at the time of the effective filing date of the claimed invention to include the joint assembly of Kofuji in view of Krude et al. with a seal or a water-proof boot as taught by Sugiyama et al. for the purpose of preventing an invasion of water or dust from the window or openings." (Ex. 1004, '085 application PH at PET_AAM_1004-0186–0187).

95. As to new Claim 21, the Examiner also rejected that claim as being obvious over Kofuji in view of Sugiyama. The Examiner found that Kofuji teaches every limitation of new Claim 21 but "a seal configured to cover the window, the seal coupled to the second member adjacent an end of the first member, the seal coupled to the first member adjacent the window." (Ex. 1004, '085 application PH at PET_AAM_1004-0187–0188). The Examiner found that Sugiyama teaches that

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limitation, and concluded that "it would have been obvious to one in ordinary skill in the art at the time of the effective filing date of the claimed invention to include the joint assembly of Kofuji with a seal or a water-proof boot as taught by Sugiyama et al. such that it is coupled to the second member adjacent the end of the first member and to the first member adjacent the window for the purpose of preventing an invasion of water or dust from the window or openings." (Ex. 1004, '085 application PH at PET_AAM_1004-0188).

5. Amendments and Remarks After Final – May 13, 2021

96. The Applicants submitted amendments and remarks in response to the Examiner's Final Office Action. (Ex. 1004, '085 application PH at PET_AAM_1004-0224–0235). Applicants amended each of pending Claims 1, 12, and 15. (Ex. 1004, '085 application PH at PET_AAM_1004-0225–0230). According to Applicants, the amendments to Claims 1, 12, and 15 "now require[] that the window is an opening provided specifically for accessing the distal ends of the retaining means, which extend radially outwardly into the window, while a remaining portion of the retaining means is at least partially received within each of the interior surface recess of the first member and the exterior surface recess of the second member," and further require "that this window is covered by a seal spanning the first member and the second member." (Ex. 1004, '085 application at PET_AAM_1004-0232).

97. Amended Claim 1 is reproduced below:

A joint assembly comprising:

a first member having a first engagement means and an interior surface recess;

a second member having a second engagement means, a portion of the second member disposed within the first member, the second engagement means engaging the first engagement means to provide a coupling of the second member to the first member and an exterior surface recess;

a window formed within the first member where the portion of the second member is disposed within the first member; ~~and~~

a retaining means configured to retain the coupling of the second member to the first member, ~~a portion~~ wherein distal ends of the retaining means are accessible through the window, wherein distal ends of the retaining means extend in a direction radially outwardly into the window to a point at or radially inwardly from an outer wall of the first member, and wherein the retaining means is received partially into each of the interior surface recess of the first member and the exterior surface recess of the second member when the retaining means retains the coupling of the second member to the first member; and

a seal configured to cover the window, the seal coupled to the second member adjacent an end of the first member, the seal coupled to the first member adjacent the window.

Ex. 1004, '085 Application PH at PET_AAM_1004-0225.

98. Amended Claim 12 is reproduced below:

a first member having an open end and a first plurality of splines formed within the open end;

a second member having a second plurality of splines formed thereon, a portion of the second member disposed within the first member, the second plurality of splines engaging the first plurality of splines to provide a coupling of the second member to the first member;

a window formed within the first member where the portion of the second member is disposed within the first member; ~~and~~

a retaining ring configured to retain the coupling of the second member to the first member, ~~a portion~~ wherein distal ends of the retaining ring are accessible through the window, the first member including an interior surface annular recess ~~receiving a portion of the retaining ring~~ and the second member including an exterior surface annular recess ~~receiving another portion of the retaining ring~~, wherein the retaining means is received partially into each of the interior surface recess of the first member and the exterior surface recess of the second member when the retaining means retains the coupling of the second member to the first member, and wherein the distal ends of the retaining ring extend in a direction radially outwardly into the window to a point at or radially inwardly from an outer wall of the first member; and

a seal configured to cover the window, the seal coupled to the second member adjacent an end of the first member, the seal coupled to the first member adjacent the window.

Ex. 1004, '085 Application PH at PET_AAM_1004-0227.

99. Amended Claim 15 is reproduced below:

A method of servicing a joint assembly comprising:

providing a joint assembly, the joint assembly including:

a first member having a first engagement means and an interior surface recess;

a second member having a second engagement means and an exterior surface recess, a portion of the second member disposed within the first member, the second engagement means engaging the first engagement means to provide a coupling of the second member to the first member;

a window formed within the first member where the portion of the second member is disposed within the first member; ~~and~~

a retaining means configured to retain the coupling of the second member to the first member, ~~a portion~~ wherein distal ends of the

> retaining means are accessible through the window, wherein the distal ends of the retaining means extend in a direction radially outwardly into the window to a point at or radially inwardly from an outer wall of the first member, and wherein the retaining means is received partially into each of the interior surface recess of the first member and the exterior surface recess of the second member when the retaining means retains the coupling of the second member to the first member, and;
>
> a seal configured to cover the window, the seal coupled to the second member adjacent an end of the first member, the seal coupled to the first member adjacent the window;
>
> uncovering the window from the seal to provide access to the distal ends of the retaining means;
>
> manipulating the distal ends of the retaining means through the window to release the coupling of the second member to the first member; and
>
> separating the first member and the second member by disengaging the second engagement means from the first engagement means.

Ex. 1004, '085 Application PH at PET_AAM_1004-0228.

100. Applicants argued that these amendments overcame the Examiner's rejections because "the Sugiyama reference does not disclose a window for accessing the distal ends of a retaining means disposed between a first member and a second member" and "[t]here is accordingly no motivation for one skilled in the art to look to the Sugiyama reference for guidance in creating a joint assembly having a seal for covering a window used to access such retaining means, as the through holes (31, 32) are unrelated structures that play an entirely different structural role than the window of the present invention." (Ex. 1004, '085 Application PH at PET_AAM_1004-0233).

101. Applicants cancelled pending Claims 6, 8, 13, 17, and 21. (Ex. 1004, '085 application PH at PET_AAM_1004-0225–0230).

102. Applicants did not refute the Examiner's conclusion that the limitations of pending dependent Claims 2–5, 7, 9–11, 14, 16, 18, and 19 did not make those claims patentable over the cited prior art. (Ex. 1004, '085 application PH at PET_AAM_1004-0224–0235).

103. Applicants also presented new Claims 22–25. (Ex. 1004, '085 application PH at PET_AAM_1004-0230).

104. New Claim 22 depends from Claim 1 and further recites: "The joint assembly of Claim 1, wherein the window is covered by a cylindrical portion of the seal having an inner surface corresponding in shape to the outer wall of the first member." (Ex. 1004, '085 Application PH at PET_AAM_1004-0230).

105. New Claim 23 depends from Claim 22 and further recites: "The joint assembly of Claim 22, wherein the cylindrical portion of the seal engages the outer wall of the first member about at least a portion of a perimeter of the window." (Ex. 1004, '085 Application PH at PET_AAM_1004-0230).

106. New Claim 24 depends from Claim 22 and further recites: "The joint assembly of Claim 22, wherein the cylindrical portion of the seal is disposed at an end of the seal." (Ex. 1004, '085 Application PH at PET_AAM_1004-0230).

107. New Claim 25 depends from Claim 24 and further recites: "The joint

assembly of Claim 24, wherein the cylindrical portion of the seal is disposed adjacent a portion of the seal spaced radially outwardly from each of the first member and the second member." (Ex. 1004, '085 Application PH at PET_AAM_1004-0230).

108. Applicants argued that these limitations distinguished the claimed seal over the seal of Sugiyama. (Ex. 1004, '085 Application PH at PET_AAM_1004-0233–0234). For example, in regard to new Claim 22, Applicants argued that Claim 22 "establishes that the cylindrical portion has a close fit around the first member around the window as opposed to being spaced apart therefrom," and, "[i]n contrast, the seal (35) of Sugiyama is spaced radially outwardly from the position of each of the through holes (31, 32)." (Ex. 1004, '085 Application PH at PET_AAM_1004-0233–0234).

6. Examiner Interview – May 26, 2021

109. On May 26, 2021, Applicants and the Examiner—Alexus Camero (Examiner) and Amber Anderson (Supervisory Patent Examiner)—held an "Examiner-Initiated Interview." (Ex. 1004, '085 Application PH at PET_AAM_1004-0240). During the interview, the Examiner maintained the rejections of all pending claims and new Claims 22–25. (Ex. 1004, '085 Application PH at PET_AAM_1004-0240). For example, the Examiner explained that "Claims 22–25 are broadly written and that the previously applied references, i.e., the combination of Kofuji in view of Krude et al. and Sugiyama et al., would be able to

reject the amended Claim 1 and newly added Claims 22–25." (Ex. 1004, '085 Application PH at PET_AAM_1004-0240).

7. Advisory Action – June 3, 2021

110. On June 3, 2021, the Examiner—Alexus Camero (Examiner) and Amber Anderson (Supervisory Patent Examiner)—issued an Advisory Action Before Filing of an Appeal Brief. (Ex. 1004, '085 Application PH at PET_AAM_1004-0237–0239). Again, the Examiner maintained the rejections of all pending claims and new Claims 22–25. (Ex. 1004, '085 Application PH at PET_AAM_1004-0237–0239).

> Claim 1, upon being entered, would be rejected over the combination Kofuji in view of Krude et al. and Sugiyama as stated in the Final Office Action mailed on 16 March 2021 (see rejections of Claims 1, 6, 8, 12, 13, 15, and 17 on pages 7–13).
>
> Claims 22–25 would also be rejected over the combination Kofuji in view of Krude et al. and Sugiyama et al. Sugiyama et al. (Fig. 7) teaches a seal (35) having a cylindrical portion (36) having an inner surface corresponding in shape to the outer wall of the first member (30) and being disposed at an end of the seal outwardly from the first and second members (30, 11). See paragraph 0058, wherein the portion adjacent said cylindrical portion (36) is 'the middle section structured in a substantially bellows shape.' The seal (35) of Sugiyama et al., when combined to Kofuji in view of Krude et al., is capable of engaging the outer wall of the first member about at least a portion of a perimeter of the window of Kofuji, and is also capable of covering the window of Kofuji.

(Ex. 1004, '085 Application PH at PET_AAM_1004-0239). The Examiner noted, however, that the amendments would overcome the anticipation rejection based on Krude '422. (Ex. 1004, '085 Application PH at PET_AAM_1004-0239).

8. Amendments and Remarks After Final Accompanying Request for Continued Examination (RCE) – June 8, 2021

111. On June 8, 2021, Applicants filed amendments and remarks "after final accompanying a request for continued examination." (Ex. 1004, '085 Application PH at PET_AAM_1004-0251–0262). The claims and remarks submitted by Applicants are similar to those submitted by Applicants on May 13, 2021, in connection with Applicants' response to the Examiner's Final Office Action. (Ex. 1004, '085 application PH at PET_AAM_1004-0224–0235 and PET_AAM_1004-0251–0262).

112. Applicants further amended pending Claims 1, 12, and 15 to recite: "wherein the window is at least partially covered by a cylindrical portion of the seal having an inner surface engaging the outer wall of the first member, and wherein the cylindrical portion of the seal engages the outer wall of the first member along at least a portion of the perimeter of the window." (Ex. 1004, '085 application PH at PET_AAM_1004-0252, PET_AAM_1004-0254–0256.)

113. Amended Claim 1 is reproduced below:

> A joint assembly comprising:
>
> a first member having a first engagement means and an interior surface recess;
>
> a second member having a second engagement means, a portion of the second member disposed within the first member, the second engagement means engaging the first engagement means to provide a coupling of the second member to the first member and an exterior surface recess;

> a window formed within the first member where the portion of the second member is disposed within the first member;
>
> a retaining means configured to retain the coupling of the second member to the first member, wherein distal ends of the retaining means are accessible through the window, wherein distal ends of the retaining means extend in a direction radially outwardly into the window to a point at or radially inwardly from an outer wall of the first member, and wherein the retaining means is received partially into each of the interior surface recess of the first member and the exterior surface recess of the second member when the retaining means retains the coupling of the second member to the first member; and
>
> a seal configured to cover the window, the seal coupled to the second member adjacent an end of the first member, the seal coupled to the first member adjacent the window, <u>wherein the window is at least partially covered by a cylindrical portion of the seal having an inner surface engaging the outer wall of the first member, and wherein the cylindrical portion of the seal engages the outer wall of the first member along at least a portion of the perimeter of the window</u>.

Ex. 1004, '085 Application PH at PET_AAM_1004-0252 (strikethrough and underlining of prior amendments omitted to show newly-added claim language).

114. Amended Claim 12 is reproduced below:

> a first member having an open end and a first plurality of splines formed within the open end;
>
> a second member having a second plurality of splines formed thereon, a portion of the second member disposed within the first member, the second plurality of splines engaging the first plurality of splines to provide a coupling of the second member to the first member;
>
> a window formed within the first member where the portion of the second member is disposed within the first member;
>
> a retaining ring configured to retain the coupling of the second member to the first member, wherein distal ends of the retaining ring are accessible through the window, the first member including an interior

> surface annular recess and the second member including an exterior surface annular recess, wherein the retaining means is received partially into each of the interior surface recess of the first member and the exterior surface recess of the second member when the retaining means retains the coupling of the second member to the first member, and wherein the distal ends of the retaining ring extend in a direction radially outwardly into the window to a point at or radially inwardly from an outer wall of the first member; and
>
> a seal configured to cover the window, the seal coupled to the second member adjacent an end of the first member, the seal coupled to the first member adjacent the window, wherein the window is at least partially covered by a cylindrical portion of the seal having an inner surface engaging the outer wall of the first member, wherein the cylindrical portion of the seal engages the outer wall of the first member along at least a portion of the perimeter of the window.

Ex. 1004, '085 Application PH at PET_AAM_1004-0254 (strikethrough and underlining of prior amendments omitted to show newly-added claim language).

115. Amended Claim 15 is reproduced below:

> A method of servicing a joint assembly comprising:
>
> providing a joint assembly, the joint assembly including:
>
> a first member having a first engagement means and an interior surface recess;
>
> a second member having a second engagement means and an exterior surface recess, a portion of the second member disposed within the first member, the second engagement means engaging the first engagement means to provide a coupling of the second member to the first member;
>
> a window formed within the first member where the portion of the second member is disposed within the first member;
>
> a retaining means configured to retain the coupling of the second member to the first member, wherein distal ends of the retaining means are accessible through the window, wherein the distal ends

> of the retaining means extend in a direction radially outwardly into the window to a point at or radially inwardly from an outer wall of the first member, and wherein the retaining means is received partially into each of the interior surface recess of the first member and the exterior surface recess of the second member when the retaining means retains the coupling of the second member to the first member, and;
>
> a seal configured to cover the window, the seal coupled to the second member adjacent an end of the first member, the seal coupled to the first member adjacent the window, wherein the window is at least partially covered by a cylindrical portion of the seal having an inner surface engaging the outer wall of the first member, wherein the cylindrical portion of the seal engages the outer wall of the first member along at least a portion of the perimeter of the window;
>
> uncovering the window from the seal to provide access to the distal ends of the retaining means;
>
> manipulating the distal ends of the retaining means through the window to release the coupling of the second member to the first member; and
>
> separating the first member and the second member by disengaging the second engagement means from the first engagement means.

Ex. 1004, '085 Application PH at PET_AAM_1004-0255–0256 (strikethrough and underlining of prior amendments omitted to show newly-added claim language).

116. The Applicants argued that these amendments overcome the Examiner's rejections and, particularly, the Examiner's rejections based on the seal of Sugiyama. Applicants argued, for example, that the claimed seal "is utilized to prevent ingress of debris or other materials that could enter through the window, and especially in view of the manner in which the window leads to the connection formed between the recited retaining means as indicated by the limitation that the window

be formed 'within the first member where the portion of the second member is inserted into the first member, . . . hence the seal covers two independent points of ingress of materials into the joint present between the first member and the second member." (Ex. 1004, '085 Application PH at PET_AAM_1004-0259). According to Applicants, "the Sugiyama reference is devoid of what could reasonably be construed as the 'window'" and, accordingly, there is "no motivation for one skilled in the art to look to the Sugiyama reference for guidance in creating a joint assembly having a seal for covering a window used to access such a retaining means, as the through holes (31, 32) are unrelated structures that play an entirely different structural role than the window of the present invention." (Ex. 1004, '085 Application PH at PET_AAM_1004-0260).

117. Applicants further argued that the amendments to pending Claims 1, 12, and 15 "establish that the cylindrical portion of the seal does not merely surround the first member, but actually engages the outer wall of the first member where the opening defining the window is formed therein." (Ex. 1004, '085 Application PH at PET_AAM_1004-0260). "This direct engagement ensures that a fluid tight seal is established where the cylindrical portion contacts the first member along a boundary into the window, which ensures that debris cannot enter the seal between the cylindrical portion and the first member with respect to the axial direction before eventually reaching the perimeter of the window." (Ex. 1004, '085 Application PH

at PET_AAM_1004-0260). Applicants argued that the seal of Sugiyama, on the other hand, "is spaced outwardly from the position of each of the through holes (31, 32) formed through the shaft (3)." (Ex. 1004, '085 Application PH at PET_AAM_1004-0260–0261).

118. Applicants did not refute the Examiner's conclusion that the limitations of pending dependent Claims 2–5, 7, 9–11, 14, 16, 18, and 19 did not make those claims patentable over the cited prior art. (Ex. 1004, '085 application PH at PET_AAM_1004-0251–0262).

119. Applicants also presented new Claims 22–25. (Ex. 1004, '085 application PH at PET_AAM_1004-0257).

120. New Claim 22 depends from Claim 1 and further recites: "The joint assembly of Claim 1, wherein the window is covered by a cylindrical portion of the seal having an inner surface corresponding in shape to the outer wall of the first member." (Ex. 1004, '085 Application PH at PET_AAM_1004-0257).

121. New Claim 23 depends from Claim 22 and further recites: "The joint assembly of Claim 22, wherein the seal further includes a corrugated portion disposed adjacent the cylindrical portion, wherein the corrugated portion is spaced radially from each of the first member and the second member." (Ex. 1004, '085 Application PH at PET_AAM_1004-0257).

122. New Claim 24 depends from Claim 22 and further recites: "The joint

assembly of Claim 23, wherein the window is continuous with an open end of the first member, and wherein the corrugated portion of the seal is disposed directly radially outwardly of the open end of the first member." (Ex. 1004, '085 Application PH at PET_AAM_1004-0257).

123. New Claim 25 depends from Claim 24 and further recites: "The joint assembly of Claim 1, wherein the cylindrical portion of the seal is disposed at an end of the seal." (Ex. 1004, '085 Application PH at PET_AAM_1004-0257). Applicants argued that these limitations distinguished the claimed seal over the seal of Sugiyama. (Ex. 1004, '085 Application PH at PET_AAM_1004-0261–0262). For example, in regard to new Claim 22, Applicants argued that Claim 22 "establishes that the close contact between the cylindrical portion and the first member occurs at the axial position of the retaining means, whereas the perimeter of the through holes (31, 32) of Sugiyama are in all cases spaced from the seal (35) in the radial direction at the position of the circlip (8)." (Ex. 1004, '085 Application PH at PET_AAM_1004-0261).

9. Non-Final Office Action (After RCE) – June 23, 2021

124. On June 23, 2021, the Examiner—Alexus Camero (Examiner) and Amber Anderson (Supervisory Patent Examiner)—issued an Office Action, rejecting all pending claims 1–5, 7, 9–12, 14–16, 18–19, and 22–25. (Ex. 1004, '085 Application PH at PET_AAM_1004-0264–0278). The Examiner considered

Applicants' prior arguments, but rejected those arguments and maintained its rejection of the claims as being obvious over Kofuji in view of Krude '422 and Sugiyama. (Ex. 1004, '085 Application PH at PET_AAM_1004-0264–0278). The Examiner explained, for example, that Sugiyama "is merely be used to teach the use of a seal or a water-proof boot in a joint assembly to cover through holes or a window." (Ex. 1004, '085 Application PH at PET_AAM_1004-0266).

10. Applicants' Appeal Brief – August 4, 2021

125. On August 4, 2021, the Applicants filed an Appeal Brief. (Ex. 1004, '085 Application PH at PET_AAM_1004-0292–0310). Applicants argued that the Examiner erred in rejecting pending claims 1–5, 7, 9–12, 14–16, 18–19, and 22–25. (Ex. 1004, '085 Application PH at PET_AAM_1004-0292–0310).

126. In regard to pending Claims 1, 12, and 15, Applicants contended that certain limitations of those claims had particular meanings based, in part, on definitions from Merriam-Webster Dictionary.

- "Window": "a means of entrance or access" or "an opening (such as a shutter, slot, or valve) that resembles or suggests a window."
- "Cylindrical": "relating to or having the form or properties of a cylinder," wherein "cylinder" means "the surface traced by a straight line moving parallel to a fixed straight line and intersecting a fixed planar closed curve."
- "Cylindrical portion of the seal": "a closed annular portion of the seal that is extended in an axial direction thereof, and not to a conical, frustoconical, or otherwise tapered shape that is formed by the seal."

- "Perimeter": "the boundary of a closed plane figure" or "a line or strip bounding or protecting an area." "The boundary of the window as recited in Claims 1, 12, and 15 therefore refers to those positions around the window where an outer surface of the first member deviates radially inwardly to define the opening corresponding to the window."

Ex. 1004, '085 Application PH at PET_AAM_1004-0298–0302. Applicants argued:

> Considering each of the limitations discussed herein above in combination, each of Claims 1, 12, and 15 recites a configuration wherein the inner surface of the cylindrical portion of the seal must be contacting the outer wall of the first member along at least one position where the outer surface of the outer wall deviates radially inwardly to define the perimeter of the window. For example, if an edge is formed at the outer surface of the first member to define a boundary of the window, the inner surface of the cylindrical portion of the seal must engage the first member along such an edge at one or more positions to disclose the described relationship as recited in any of Claims 1, 12, and 15.

Ex. 1004, '085 Application PH at PET_AAM_1004-0299–0300.

127. Applicants then argued that the seal of Sugiyama does not satisfy the claim limitations of Claims 1, 12, and 15 as understood and described by Applicants. (Ex. 1004, '085 Application PH at PET_AAM_1004-0300–0302). For example, according to Applicants, unlike the seal of Claims 1, 12, and 15, "the boot attachment section (36), which forms the only portion of the boot (35) contacting or engaging the output shaft (3) adjacent the retaining groove (26) and the through holes (31, 32), is unambiguously spaced axially from a perimeter of any of the retaining groove (26), the through hole (31), or the through hole (32). An inner surface of the boot (35) is also spaced apart from the output shaft (3) along the cylindrical section (30)

having the retaining groove (36) formed therein, hence the boot (35) cannot contact or otherwise engage the retaining groove (26) or the through holes (31, 32) at any position where these features otherwise deviate from the parallel arrangement of the output shaft (3) along the cylindrical section (30)." (Ex. 1004, '085 Application PH at PET_AAM_1004-0301–0302).

128. Applicants did not refute the Examiner's conclusion that the limitations of pending dependent Claims 2–5, 7, 9–11, 14, 16, 18, and 19 did not make those claims patentable over the cited prior art. (Ex. 1004, '085 application PH at PET_AAM_1004-0298–0302).

129. In regard to pending dependent Claim 22, Applicants argued that, unlike in Claim 22, in Sugiyama, "[t]he retaining groove (26) and the corresponding circlip (8) are formed at an axial position corresponding to an axial position where a frustoconical portion of the boot (35) transitions to a corrugated portion of the boot (35) (which is also frustoconical in shape) immediately radially outwardly of the retaining groove (26) and the circlip (8)." (Ex. 1004, '085 application PH at PET_AAM_1004-0302). Thus, according to Applicants, Sugiyama "fails to disclose or otherwise suggest a seal having a cylindrical portion disposed radially outwardly of a retaining means." (Ex. 1004, '085 application PH at PET_AAM_1004-0302).

130. Applicants did not refute the Examiner's conclusion that the limitations

of pending dependent Claims 23 and 24 did not make those claims patentable over the cited prior art. (Ex. 1004, '085 application PH at PET_AAM_1004-0302–0303).

131. In regard to pending dependent Claim 25, Applicants argued that, unlike the seal configuration of Claim 25, "Sugiyama discloses the outward tapering of the boot (35) before reaching the axial position of the circlip (8) and the retaining groove (26)" and, therefore, "cannot provide guidance regarding each and every limitation of Claim 1 drawn towards the manner in which the recited cylindrical portion engages at least a portion of a perimeter of the recited window." (Ex. 1004, '085 application PH at PET_AAM_1004-0303). But Applicants did not refute the Examiner's conclusion that the limitation of pending dependent Claim 25 did not make that patentable over the cited prior art. (Ex. 1004, '085 application PH at PET_AAM_1004-0303).

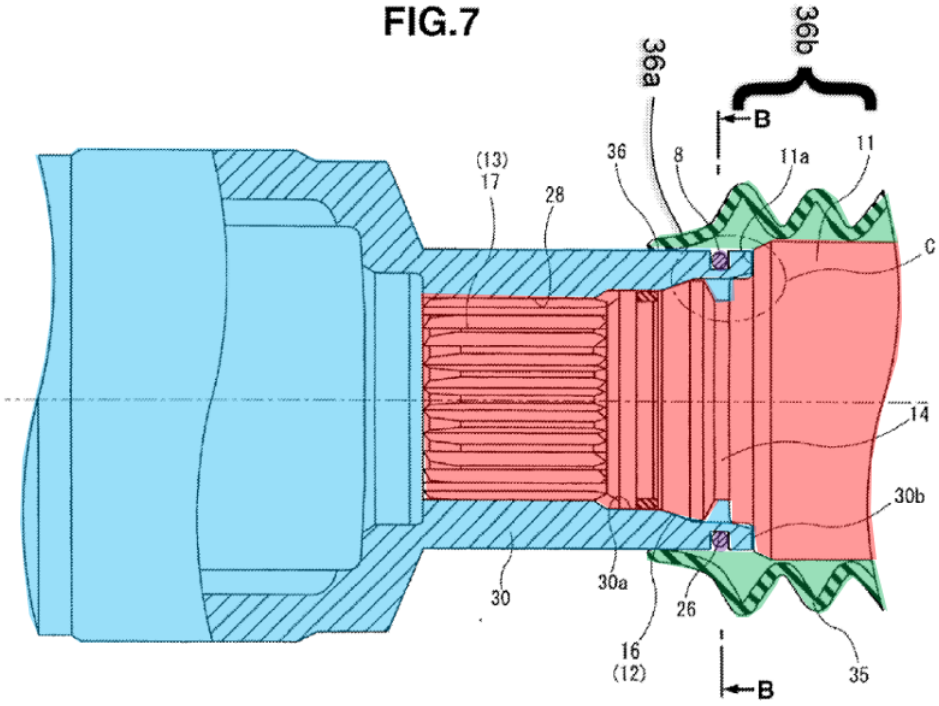
11. Non-Final Office Action (After Appeal Brief) – November 16, 2021

132. On November 16, 2021, the Examiner—Alexus Camero (Examiner) and Amber Anderson (Supervisory Patent Examiner)—reopened prosecution and entered "new ground(s) of rejection . . . in view of a different interpretation of the previously applied reference." (Ex. 1004, '085 application PH at PET_AAM_1004-0317–0333). Specifically, the Examiner rejected all pending Claims 1–5, 7, 9–112, 14–16, 18–19, and 22–25 as being unpatentable as obvious over Kofuji in view of Krude and Sugiyama. (Ex. 1004, '085 application PH at PET_AAM_1004-0317–

0333).

133. The Examiner applied much of the same reasoning as before in connection with the Examiner's prior rejections of the pending claims. (Ex. 1004, '085 application PH at PET_AAM_1004-0317–0333). As to the seal limitations of the pending claims and the seal of Sugiyama, the Examiner annotated Figure 7, and concluded that Sugiyama "further teaches a seal (35, a water-proof boot) configured to cover the through holes (31, 32, 26a, 26b), wherein the seal (35) can be coupled to the second member (11, 12, adjacent an end of the first member (30) such as how another seal (27) in Fig. 3 is coupled to two members (2 and 21), and wherein the seal (35) is coupled to the first member (30) adjacent the through holes (31, 32, 26a, 26b) via an attachment section (36)."

FIG.7



Ex. 1004, ’085 application PH at PET_AAM_1004-0322–0323 (coloring added).

134. According to the Examiner, Sugiyama “does not explicitly teach that an inner surface of a cylindrical portion (36a) of the seal (35) engages an outer wall of the first member (30) such that the through holes (31, 32, 26a, 26b) are at least partially covered by the cylindrical portion (36a) of the seal (35) and that the cylindrical portion (36a) of the seal engages the outer wall of the first member along at least a portion of a perimeter of the through holes (31, 32, 26a, 26b).” (Ex. 1004, ’085 application PH at PET_AAM_1004-0324). The Examiner noted, however, that seal of Sugiyama is “formed to enable expansion and contraction in the axial direction (Paragraph 0058),” which “suggests its capability of moving in an axial direction with respect to the first member (30) and to the second member (11, 12).” (Ex. 1004, ’085 application PH at PET_AAM_1004-0324). The Examiner concluded that “it would have been obvious to one in ordinary skill in the art at the time of the effective filing date of the claimed invention to include the joint assembly of Kofuji with a seal or water-proof boot as taught by Sugiyama et al. such that the cylindrical portion of the seal, having the capability of moving in an axial direction, is in parallel arrangement with respect to the outer wall of the first member along at least a portion of the perimeter of the window and at least partially covering the window of the first member, for the purpose of preventing an invasion of water or dust from the window or openings.” (Ex. 1004, ’085 application PH at

PET_AAM_1004-0324, PET_AAM_1004-0327, PET_AAM_1004-0330–0331).

12.Applicants' Appeal Brief – February 16, 2022

135. On February 16, 2022, Applicants filed an Appeal Brief. (Ex. 1004, '085 application PH at PET_AAM_1004-0348–0371). Applicants argued that the Examiner erred in rejecting pending claims 1–5, 7, 9–12, 14–16, 18–19, and 22–25. (Ex. 1004, '085 application PH at PET_AAM_1004-0348–0371).

136. As to pending Claims 1, 12, and 15, among other arguments, Applicants argued that there is "no justification for the adjustment of the disclosed structure of Sugiyama as proposed by the Examiner." (Ex. 1004, '085 application PH at PET_AAM_1004-0360). Applicants also argued that the Examiner's "adjustment" "is unreasonable because the resulting structure would be unsatisfactory for carrying out the intended purpose thereof" because, according to Applicants, (i) because of the "manner in which this frustoconical shape [of the Sugiyama seal] terminates at an axial end surface contacting the cylindrical section (30)," adjusting the axial position of the Sugiyama seal to cover the perimeter of the window "results in a minimized axial sealing surface being produced by the boot (35)" "maximiz[ing] the likelihood that the seal would fail or be bypassed," and (ii) modifying the boot attachment section (36) of the Sugiyama seal to "extend in parallel to form a substantially cylindrical shape (as opposed to the disclosed frustoconical shape)" would "lead[] to the failure or disengagement of the boot (35) from the shafts" and

"would also result in the flexibility of the boot (35) being compromised due to the introduction of tension within the boot (35)." (Ex. 1004, '085 application PH at PET_AAM_1004-0361–0365).

137. Applicants did not refute the Examiner's conclusion that the limitations of pending dependent Claims 2–5, 7, 9–11, 14, 16, 18, and 19 did not make those claims patentable over the cited prior art. (Ex. 1004, '085 application PH at PET_AAM_1004-0355–0365).

138. In regard to pending dependent Claim 22, Applicants argued that, unlike in Claim 22, in Sugiyama, "the only portion of the boot (35) contacting the output shaft (3), the boot attachment section (36), is clearly not disposed directly radially outwardly of the circlip (8)." (Ex. 1004, '085 application PH at PET_AAM_1004-0364).

139. Applicants did not refute the Examiner's conclusion that the limitations of pending dependent Claims 23 and 24 did not make those claims patentable over the cited prior art. (Ex. 1004, '085 application PH at PET_AAM_1004-0364).

140. In regard to pending dependent Claim 25, Applicants argued that, unlike the seal configuration of Claim 25, "the boot attachment section (36) cannot provide guidance regarding each and every limitation of Claim 1 drawn towards the manner in which the recited cylindrical portion engages at least a portion of a perimeter of the recited window. Instead, Sugiyama discloses the outward tapering

of boot (35) before reaching the axial position of the circlip (8) and retaining groove (26)." (Ex. 1004, '085 application PH at PET_AAM_1004-0364–0365). But Applicants did not refute the Examiner's conclusion that the limitation of pending dependent Claim 25 did not make that patentable over the cited prior art. Ex. 1004, '085 application PH at PET_AAM_1004-0364–0365.

13. Examiner Interview – April 22, 2022

141. On April 22, 2022, the Examiner initiated another interview with Applicants. (Ex. 1004, '085 application PH at PET_AAM_1004-0388). By this time, a new Examiner took over examining the '085 application—Matthew McMahon. (Ex. 1004, '085 application PH at PET_AAM_1004-0388). During the interview, Examiner McMahon and Applicants "[d]iscussed and agreed to the attached Examiner's Amendments to place the application in condition for allowance."

14.Notice of Allowance – May 3, 2022

142. On May 3, 2022, Examiner McMahon issued a Notice of Allowance, cancelling Claim 23 and allowing pending Claims 1–5, 7, 9–12, 14–16, 18, 19, 22, 24, and 25 as amended. (Ex. 1004, '085 application PH at PET_AAM_1004-0376–0387). Examiner McMahon entered a number of Examiner amendments.

143. Amended Claim 1 is reproduced below:

A joint assembly comprising:

a first member having a first engagement means and an interior surface

recess;

a second member having a second engagement means, a portion of the second member disposed within the first member, the second engagement means engaging the first engagement means to provide a coupling of the second member to the first member and an exterior surface recess;

a window formed within the first member where the portion of the second member is disposed within the first member;

a retaining means configured to retain the coupling of the second member to the first member, wherein distal ends of the retaining means are accessible through the window, wherein distal ends of the retaining means extend in a direction radially outwardly into the window to a point at or radially inwardly from an outer wall of the first member, and wherein the retaining means is received partially into each of the interior surface recess of the first member and the exterior surface recess of the second member when the retaining means retains the coupling of the second member to the first member; and

a seal configured to cover the window, the seal coupled to the second member adjacent an end of the first member, the seal coupled to the first member adjacent the window, ~~wherein the window is at least partially covered by a cylindrical portion of the seal having an inner surface engaging the outer wall of the first member, and~~ wherein ~~the~~ a cylindrical portion of the seal ~~engages~~ covers the outer wall of the first member along at least a portion of the perimeter of the window, wherein the seal further includes a corrugated portion disposed adjacent the cylindrical portion, and wherein the corrugated portion is spaced radially from each of the first member and the second member.

Ex. 1004, '085 Application PH at PET_AAM_1004-0382–0383.

144. Amended Claim 12 is reproduced below:

a first member having an open end and a first plurality of splines formed within the open end;

a second member having a second plurality of splines formed thereon, a portion of the second member disposed within the first member, the

second plurality of splines engaging the first plurality of splines to provide a coupling of the second member to the first member;

a window formed within the first member where the portion of the second member is disposed within the first member;

a retaining ring configured to retain the coupling of the second member to the first member, wherein distal ends of the retaining ring are accessible through the window, the first member including an interior surface annular recess and the second member including an exterior surface annular recess, wherein the retaining ~~means~~ ring is received partially into each of the interior surface recess of the first member and the exterior surface recess of the second member when the retaining ~~means~~ ring retains the coupling of the second member to the first member, and wherein the distal ends of the retaining ring extend in a direction radially outwardly into the window to a point at or radially inwardly from an outer wall of the first member; and

a seal configured to cover the window, the seal coupled to the second member adjacent [[an]] the open end of the first member, the seal coupled to the first member adjacent the window, ~~wherein the window is at least partially covered by a cylindrical portion of the seal having an inner surface engaging the outer wall of the first member,~~ wherein ~~the~~ a cylindrical portion of the seal engages the outer wall of the first member along at least a portion of the perimeter of the window, wherein the seal further includes a corrugated portion disposed adjacent the cylindrical portion, and wherein the corrugated portion is spaced radially from each of the first member and the second member.

Ex. 1004, '085 Application PH at PET_AAM_1004-0383–0384.

145. Amended Claim 15 is reproduced below:

A method of servicing a joint assembly comprising:

providing a joint assembly, the joint assembly including:

a first member having a first engagement means and an interior surface recess;

a second member having a second engagement means and an exterior surface recess, a portion of the second member disposed

within the first member, the second engagement means engaging the first engagement means to provide a coupling of the second member to the first member;

a window formed within the first member where the portion of the second member is disposed within the first member;

a retaining means configured to retain the coupling of the second member to the first member, wherein distal ends of the retaining means are accessible through the window, wherein the distal ends of the retaining means extend in a direction radially outwardly into the window to a point at or radially inwardly from an outer wall of the first member, and wherein the retaining means is received partially into each of the interior surface recess of the first member and the exterior surface recess of the second member when the retaining means retains the coupling of the second member to the first member, and;

a seal configured to cover the window, the seal coupled to the second member adjacent an end of the first member, the seal coupled to the first member adjacent the window, ~~wherein the window is at least partially covered by a cylindrical portion of the seal having an inner surface engaging the outer wall of the first member,~~ wherein ~~the~~ a cylindrical portion of the seal ~~engages~~ covers the outer wall of the first member along at least a portion of the perimeter of the window, wherein the seal further includes a corrugated portion disposed adjacent the cylindrical portion, and wherein the corrugated potion is spaced radially from each of the first member and the second member;

uncovering the window from the seal to provide access to the distal ends of the retaining means;

manipulating the distal ends of the retaining means through the window to release the coupling of the second member to the first member; and

separating the first member and the second member by disengaging the second engagement means from the first engagement means.

Ex. 1004, '085 Application PH at PET_AAM_1004-0384–0385.

146. Claim 24 was also amended as follows: "The joint assembly of C~~laim~~

~~23~~ Claim 1, wherein the window is continuous with an open end of the first member, and wherein the corrugated portion of the seal is disposed directly radially outwardly of the open end of the first member." (Ex. 1004, '085 Application PH at PET_AAM_1004-0385–0386).

147. Examiner McMahon stated that "the arguments in Applicant's Appeal Brief filed February 2022 are persuasive." (Ex. 1004, '085 Application PH at PET_AAM_1004-0386). The Examiner, however, identified a new prior art reference, U.S. Patent No. 7,722,089 (Ex. 1009, Nauer). (Ex. 1004, '085 Application PH at PET_AAM_1004-0386 (Nauer "discloses a joint assembly with a seal (40) similar to that required in previous independent claims 1, 12, and 15)). As illustrated by the Figures of Nauer (including Figures 2 and 3 below), and as the Examiner concluded, Nauer describes many of the limitations of pending Claims 1, 12, and 15 before the Examiner entered amendments to those claims.

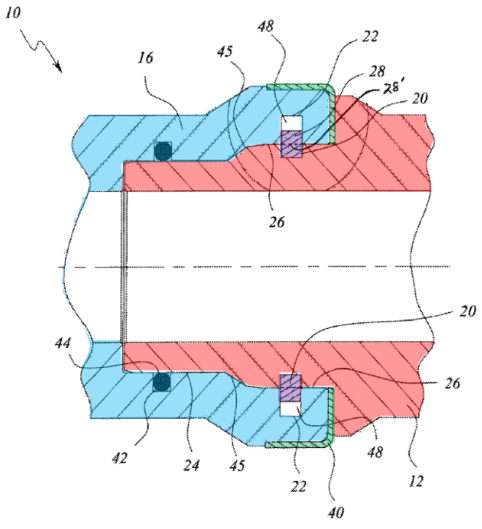


Fig. 2

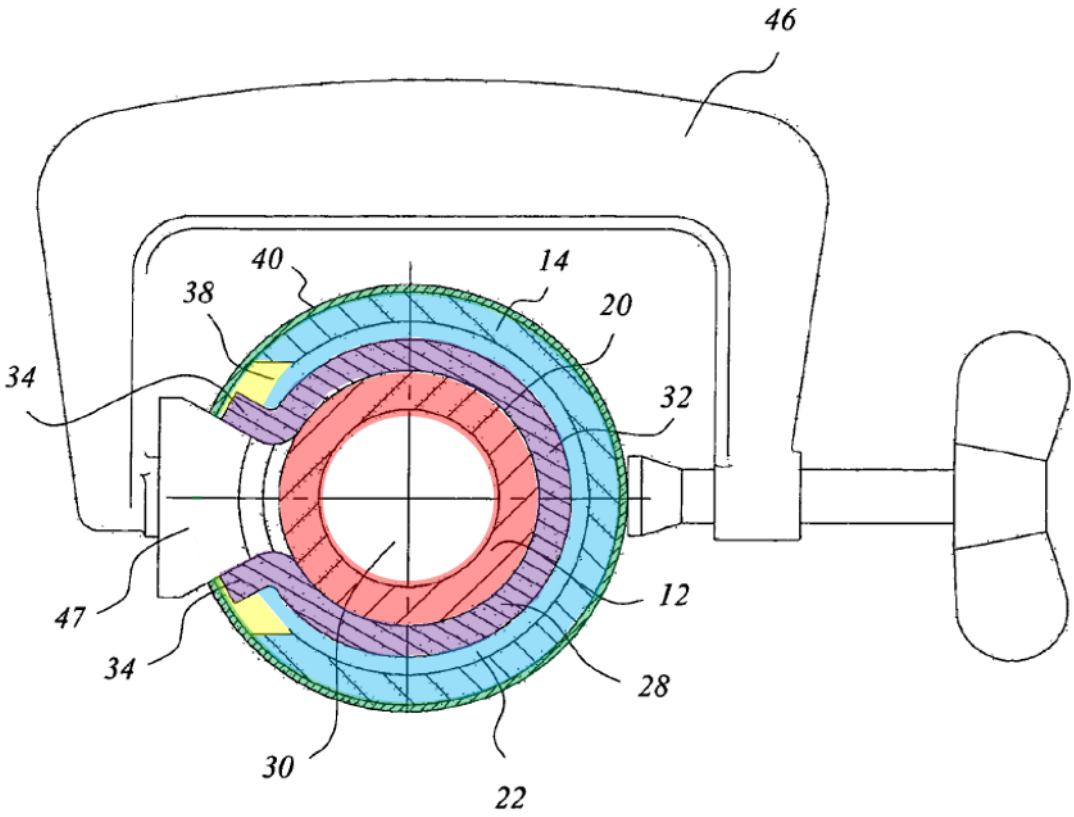


Fig. 3

148. For example, Nauer discloses a first, female shaft member, "socket 16" (blue), and a second, male shaft member, "spigot 12" (red). (Ex. 1009, Nauer at 3:41–44). "As shown in FIG. 2, the spigot and socket are adapted for axial engagement in a coupled configuration whereby the first and second conduits are sealingly connected for fluid communication." (Ex. 1009, Nauer at 3:47–50). The joint assembly of Nauer also discloses a retaining ring, "releasable retaining member 28" (purple). (Ex. 1009, Nauer at 3:55–4:4). "[T]he retaining member 28 is generally Ω-(omega)-shaped, including a generally arcuate body portion 32 and two

circumferentially spaced end portions extending radially outwardly to define respective release lugs 34." (Ex. 1009, Nauer at 4:15–19). Release lugs 34 of retaining member 28 are accessible through a window, "elongate access slot 38" (yellow), which is disposed in the first, female shaft member, socket 16. (Ex. 1009, Nauer at 4:56–56). "The slot allows access to the release lugs 34 of the retaining member thereby to permit movement of the retaining member from the locked to release configuration." (Ex. 1009, Nauer at 4:57–60; Ex. 1009, Nauer at 5:22–48, 5:65–6:3).

149. Nauer also teaches a seal, "removable elastomeric boot 40" (green), "which may be mechanically retained between the spigot and the socket, may be used to cover and seal the access slot, thereby restricting the ingress of extraneous debris in use. The boot is sufficiently flexible to allow for its displacement during assembly and disassembly of the coupling, yet has sufficient shape memory to return to act as a seal for the access slot." (Ex. 1009, Nauer at 4:60–67). Thus, Examiner McMahon stated in his reasons for allowance: "[T]o overcome this prior art reference, the subject matter of claim 23 related to the 'corrugated portion' of the seal has incorporated into independent claims 1, 12, and 15 in the Examiner's Amendment above." (Ex. 1004, '085 application PH at PET_AAM_1004-0386). According to the Examiner, "Nauer does not disclose such a corrugated portion, nor would it have been obvious to modify the seal of Nauer to have such a corrugated

portion since there would have been no motivation to do so in the fluid coupling of Nauer." (Ex. 1004, '085 application PH at PET_AAM_1004-0386).

C. The '958 Patent Claims

150. The '958 patent has 18 claims. As described above, I have been asked to investigate the validity/patentability of claims 1–18. Claims 1, 13 and 15 are independent claims and Claims 2–11, 14, and 16–18 are dependent claims.

151. Independent Claim 1 recites:

[1P] A joint assembly comprising:

[1a] a first member having a first engagement means and an interior surface recess;

[1b] a second member having a second engagement means and an exterior surface recess, a portion of the second member disposed within the first member, the second engagement means engaging the first engagement means to provide a coupling of the second member to the first member;

[1c] a window formed within the first member where the portion of the second member is disposed within the first member;

[1d] a retaining means configured to retain the coupling of the second member to the first member,

[1d(i)] wherein distal ends of the retaining means are accessible through the window,

[1d(ii)] wherein the distal ends of the retaining means extend in a direction radially outwardly into the window to a point at or radially inwardly from an outer wall of the first member, and

[1d(iii)] wherein the retaining means is received partially into each of the interior surface recess of the first member and the exterior surface recess of the second member when the retaining means retains the coupling of the second member to the first member; and

[1e] a seal configured to cover the window,

[1e(i)] the seal coupled to the second member adjacent an end of the first member,

[1e(ii)] the seal coupled to the first member adjacent the window,

[1e(iii)] wherein a cylindrical portion of the seal covers the outer wall of the first member along at least a portion of a perimeter of the window,

[1e(iv)] wherein the seal further includes a corrugated portion disposed adjacent the cylindrical portion, and

[1e(v)] wherein the corrugated portion is spaced radially from each of the first member and the second member.

Ex. 1001, '958 patent at Claim 1 (labelling added unless otherwise noted).

152. Dependent Claim 2 depends from Claim 1 and further recites: "The joint assembly of claim 1, wherein the first member includes an open end and the first engagement means of the first member is formed within the open end." (Ex. 1001, '958 patent at Claim 2).

153. Dependent Claim 3 depends from Claim 2 and further recites: "The joint assembly of claim 2, wherein the portion of the second member disposed within the first member is disposed within the open end and includes the second engagement means." (Ex. 1001, '958 patent at Claim 3).

154. Dependent Claim 4 depends from Claim 2 and further recites: "The joint assembly of claim 2, wherein the window is continuous with the open end." (Ex. 1001, '958 patent at Claim 4).

155. Dependent Claim 5 depends from Claim 1 and further recites: "The

joint assembly of claim 1, wherein the first engagement means includes a first plurality of splines and the second engagement means includes a second plurality of splines." (Ex. 1001, '958 patent at Claim 5).

156. Dependent Claim 6 depends from Claim 1 and further recites: "The joint assembly of claim 1, wherein the retaining means is configured as a retaining ring." (Ex. 1001, '958 patent at Claim 6).

157. Dependent Claim 7 depends from Claim 1 and further recites: "The joint assembly of claim 1, further comprising a constant velocity joint coupled to one of the first member and the second member." (Ex. 1001, '958 patent at Claim 7).

158. Dependent Claim 8 depends from Claim 1 and further recites: "The joint assembly of claim 1, wherein the cylindrical portion of the seal is disposed directly radially outwardly of the retaining means when the retaining means retains the coupling of the second member to the first member." (Ex. 1001, '958 patent at Claim 8).

159. Dependent Claim 9 depends from Claim 1 and further recites: "The joint assembly of claim 1, wherein the window is continuous with an open end of the first member, and wherein the corrugated portion of the seal is disposed directly radially outwardly of the open end of the first member." (Ex. 1001, '958 patent at Claim 9).

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160. Dependent Claim 10 depends from Claim 1 and further recites: "The joint assembly of claim 1, wherein the cylindrical portion of the seal is disposed at an end of the seal." (Ex. 1001, '958 patent at Claim 10).

161. Dependent Claim 11 depends from Claim 1 and further recites: "A vehicle driveline comprising the joint assembly of claim 1." (Ex. 1001, '958 patent at Claim 11).

162. Dependent Claim 12 depends from Claim 1 and further recites: "A vehicle comprising the joint assembly of claim 1." (Ex. 1001, '958 patent at Claim 12).

163. Independent Claim 13 recites:

> [13P] A joint assembly comprising:
>
> [13a] a first member having an open end and a first plurality of splines formed within the open end;
>
> [13b] a second member having a second plurality of splines formed thereon, a portion of the second member disposed within the first member, the second plurality of splines engaging the first plurality of splines to provide a coupling of the second member to the first member;
>
> [13c] a window formed within the first member where the portion of the second member is disposed within the first member;
>
> [13d] a retaining ring configured to retain the coupling of the second member to the first member,
>
> > [13d(i)] wherein distal ends of the retaining ring are accessible through the window,
> >
> > [13d(ii)] the first member including an interior surface annular recess and the second member including an exterior surface annular

recess,

[13d(iii)] wherein the retaining ring is received partially into each of the interior surface recess of the first member and the exterior surface recess of the second member when the retaining ring retains the coupling of the second member to the first member,

[13d(iv)] and wherein the distal ends of the retaining ring extend in a direction radially outwardly into the window to a point at or radially inwardly from an outer wall of the first member; and

[13e] a seal configured to cover the window,

[13e(i)] the seal coupled to the second member adjacent the open end of the first member,

[13e(ii)] the seal coupled to the first member adjacent the window,

[13e(iii)] wherein a cylindrical portion of the seal covers the outer wall of the first member along at least a portion of a perimeter of the window,

[13e(iv)] wherein the seal further includes a corrugated portion disposed adjacent the cylindrical portion, and

[13e(v)] wherein the corrugated portion is spaced radially from each of the first member and the second member.

(Ex. 1001, '958 patent at Claim 13). The "joint assembly" of Claim 13 is similar to the "joint assembly" of Claim 1. For example, limitations 13a and 13b of Claim 13 are similar to limitations 1a and 1b, except that limitations 13a and 13b recite a "plurality of splines" as the means of engagement of the first member and second member. (Ex. 1001, '958 patent at Claims 1 and 13). As another example, limitations 13d is similar to limitation 1d, except that limitation 13d recites a "retaining ring" as the means of retaining the coupling of the first and second

members. (Ex. 1001, '958 patent at Claims 1 and 13).

164. Dependent Claim 14 depends from Claim 13 and further recites: "The joint assembly of claim 13, further comprising a constant velocity joint coupled to one of the first member and the second member." (Ex. 1001, '958 patent at Claim 14).

165. Independent Claim 15 recites:

[15P] A method of servicing a joint assembly comprising:

[15-1] providing the joint assembly, the joint assembly including;

> [15-1a] a first member having a first engagement means and an interior surface recess;
>
> [15-1b] a second member having a second engagement means and an exterior surface recess, a portion of the second member disposed within the first member, the second engagement means engaging the first engagement means to provide a coupling of the second member to the first member;
>
> [15-1c] a window formed within the first member where the portion of the second member is disposed within the first member;
>
> [15-1d] a retaining means configured to retain the coupling of the second member to the first member,
>
> > [15-1d(i)] wherein distal ends of the retaining means are accessible through the window,
> >
> > [15-1d(ii)] wherein the distal ends of the retaining means extend in a direction radially outwardly into the window to a point at or radially inwardly from an outer wall of the first member, and
> >
> > [15-1d(iii) wherein the retaining means is received partially into each of the interior surface recess of the first member and the exterior surface recess of the second member when the retaining means retains the coupling of the second member to the first

member; and

[15-1e] a seal configured to cover the window,

[15-1e(i)] the seal coupled to the second member adjacent an end of the first member,

[15-1e(ii)] the seal coupled to the first member adjacent the window,

[15-1e(iii)] wherein a cylindrical portion of the seal covers the outer wall of the first member along at least a portion of a perimeter of the window,

[15-1e(iv)] wherein the seal further includes a corrugated portion disposed adjacent the cylindrical portion, and

[15-1e(v)] wherein the corrugated portion is spaced radially from each of the first member and the second member;

[15-2] uncovering the window from the cylindrical portion of the seal to provide access to the distal ends of the retaining means,

[15-3] manipulating the distal ends of the retaining means through the window to release the coupling of the second member to the first member; and

[15-4] separating the first member and the second member by disengaging the second engagement means from the first engagement means.

(Ex. 1001, '958 patent at Claim 15). For Claim 15, the "joint assembly" that is "provided" in step 15-1 (limitations [15-1a] through [15-1e]) is identical to the "joint assembly" of Claim 1 (limitations [1a] through [1e]). In this regard, step 15-1 of Claim 15 can thought of more simply as "providing the joint assembly [of Claim 1]."

166. Dependent Claim 16 depends from Claim 15 and further recites: "The

method of servicing the joint assembly of claim 15, wherein the joint assembly further comprises a constant velocity joint coupled to one of the first member and the second member." (Ex. 1001, '958 patent at Claim 16).

167. Dependent Claim 17 depends from Claim 15 and further recites: "The method of servicing the joint assembly of claim 15, further comprising coupling the separated first member with another second member to form another joint assembly." (Ex. 1001, '958 patent at Claim 17).

168. Dependent Claim 18 depends from Claim 15 and further recites: "The method of servicing the joint assembly of claim 15, further comprising coupling the separated second member with another first member to form another joint assembly." (Ex. 1001, '958 patent at Claim 18).

D. Prosecution History of the '376 Patent

1. The '833 Application – July 28, 2022

169. On July 28, 2022, the named inventors of the '958 patent, Michael Walter Hopson, Arvind Srinivasan, and Michael Kinsella (collectively, "Applicants"), filed a second patent application, U.S. Application No. 17/815,833 ("'833 application"), which later issued as U.S. Patent No. 11,598,376 (Ex. 1002, "'376 patent"). (Ex. 1005, '833 Application PH at PET_AAM_1005-0001–0039; Ex. 1002, '376 patent at (21), (22)). The '833 application claimed priority to the '085 application (which issued as the '958 patent) and the '821 application. (Ex.

1005, ’833 application PH at PET_AAM_1005-0012). The ’833 application included 20 original claims, including independent Claims 1 and 16. (Ex. 1005, ’833 application PH at PET_AAM_1005-0023–0026).

170. Original Claim 1 is reproduced below:

> A joint assembly comprising:
>
> a first member having a first engagement means and an interior surface recess;
>
> a second member having a second engagement means and an exterior surface recess, a portion of the second member disposed within the first member, the second engagement means engaging the first engagement means to provide a coupling of the second member to the first member;
>
> a window formed within the first member where the portion of the second member is disposed within the first member;
>
> a retaining means configured to retain the coupling of the second member to the first member, wherein distal ends of the retaining means are accessible through the window, wherein the distal ends of the retaining means extend in a direction radially outwardly into the window to a point at or radially inwardly from an outer surface of the first member, and wherein the retaining means is received partially into each of the interior surface recess of the first member and the exterior surface recess of the second member when the retaining means retains the coupling of the second member to the first member; and
>
> a seal configured to cover the window formed in the first member, wherein the seal is coupled to the second member adjacent an end of the first member and wherein the seal is coupled to the first member adjacent the window.

Ex. 1005, ’833 Application PH at PET_AAM_1005-0023.

171. Original Claim 16 is reproduced below:

> A method of servicing a joint assembly comprising:

providing a joint assembly, the joint assembly including:

a first member having a first engagement means and an interior surface recess;

a second member having a second engagement means and an exterior surface recess, a portion of the second member disposed within the first member, the second engagement means engaging the first engagement means to provide a coupling of the second member to the first member;

a window formed within the first member where the portion of the second member is disposed within the first member;

a retaining means configured to retain the coupling of the second member to the first member, wherein distal ends of the retaining means are accessible through the window, wherein the distal ends of the retaining means extend in a direction radially outwardly into the window to a point at or radially inwardly from an outer surface of the first member, and wherein the retaining means is received partially into each of the interior surface recess of the first member and the exterior surface recess of the second member when the retaining means retains the coupling of the second member to the first member; and

a seal configured to cover the window formed in the first member, wherein the seal is coupled to the second member adjacent an end of the first member and wherein the seal is coupled to the first member adjacent the window;

uncovering the window via adjustment of the seal to provide access to the distal ends of the retaining means;

manipulating the retaining means through the window to release the coupling of the second member to the first member; and

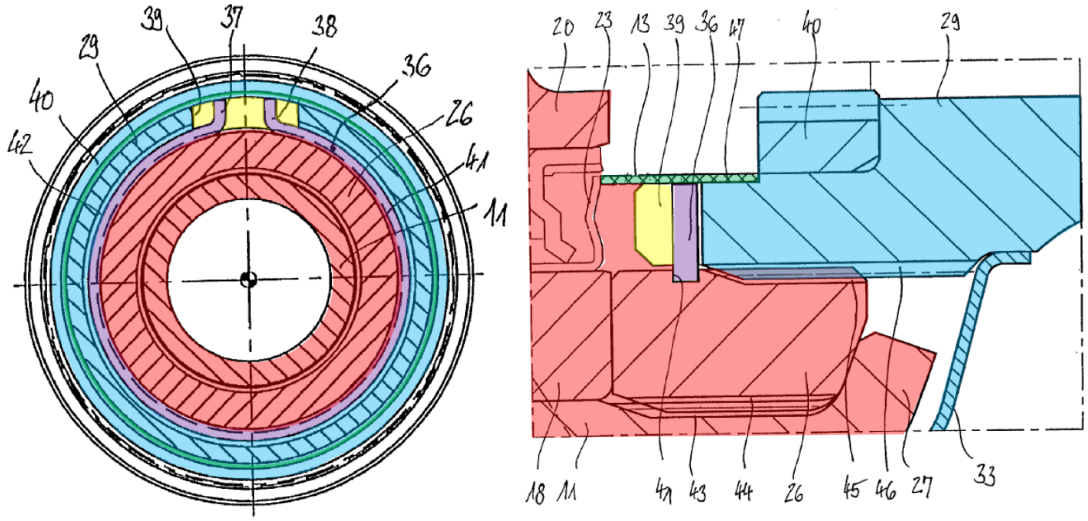
separating the first member and the second member by disengaging the second engagement means from the first engagement means.

Ex. 1005, ’833 Application PH at PET_AAM_1005-0025.

2. Non-Final Office Action – December 6, 2022

172. On December 6, 2022, the Examiner issued an Office Action, rejecting Claims 1–12 and 16–19 and objecting to Claims 13–15 and 20 as depending from a rejected base. (Ex. 1005, '833 Application PH at PET_AAM_1005-0135–0149).

173. The Examiner rejected original Claims 1–12 and 16–19 of the '833 application as being anticipated by U.S. Publication No. 2002/0070506 (Ex. 1010, "Krude '506"). (Ex. 1005, '833 Application PH at PET_AAM_1005-0139–0143). As illustrated by Figures 2 and 3 of Krude '506, the disclosure of Krude '506 is similar to the disclosure of Krude '422 and, as the Examiner concluded, it describes each and every limitation of original Claims 1–12 and 16–19 of the '833 application. (Ex. 1005, '833 Application PH at PET_AAM_1005-0139–0143).

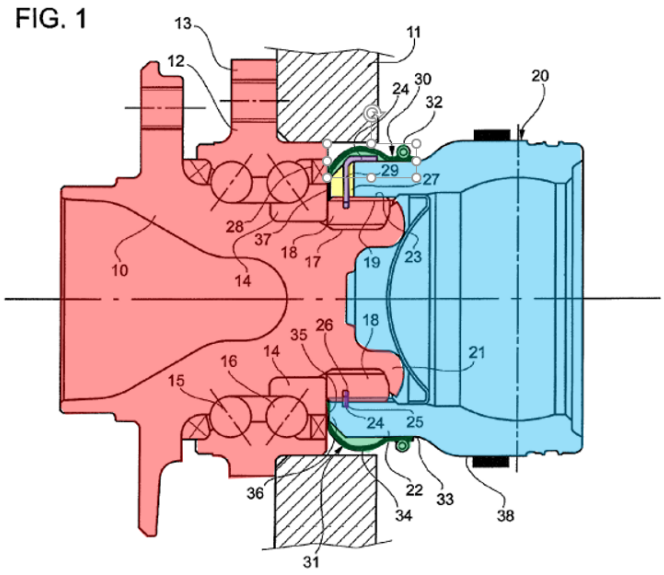


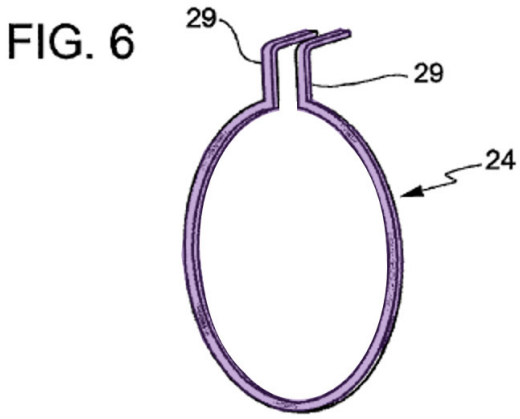
Ex. 1010, Krude '506 at Figs. 2 and 3.

174. For example, Krude '506 describes a joint assembly comprising a first, female splined shaft member, "constant velocity rotary joint 12" "includ[ing] an outer joint part 28 with a cylindrical portion 29" and "an inner toothing 46 at the

cylindrical projection" (blue), and a second, male splined shaft member, "wheel hub 11" "including "driving ring 26 which is slide on to the wheel hub 11" having "an outer toothing 45" on driving ring 26 (red). (Ex. 1010, Krude '506 at [0018]–[0022], Figs. 1–3). The first member and the second member of Krude '506 are coupled by way of a plurality of splines on each member: "an outer toothing 45 is provided at the driving ring and an inner toothing 46 at the cylindrical projection." (Ex. 1010, Krude '506 at [0022], Figs. 1–3). The joint assembly of Krude '506 also includes a retaining ring, "securing ring 36," which "includes radially outwardly opening bent ends 37, 38." (Ex. 1010, Krude '506 at [0021], Figs. 1–3). Bent ends 37, 38 of securing ring 36 are accessible through a window, "radial slot 39" (or "radial gap," "radial bore") (yellow). (Ex. 1010, Krude '506 at [0021] ("FIG. 2 shows that the securing ring 36 includes radially outwardly opening bent ends 37, 38 which pass through a radial gap 39 in the cylindrical projection 29 to permit the securing ring to be widened radially from the outside."), [0022], [0025]). Krude '506 also includes a seal, "resilient sleeve 13" (green), configured to cover the window providing access to a retaining ring. (Ex. 1010, Krude '506 at [0023]–[0026], Figs. 1–7; Ex. 1005, '833 Application PH at PET_AAM_1005-0139–0143). The seal of Krude '506 is coupled to the first and second members adjacent the window. (Ex. 1010, Krude '506 at [0023]–[0026], Figs. 1–7; Ex. 1005, '833 Application PH at PET_AAM_1005-0139–0143).

175. The Examiner also rejected pending Claims 1–8 and 16–19 of the '376 patent as being anticipated by U.S. Patent No. 7,896,750 (Ex. 1011, "Brunetti"). (Ex. 1005, '833 Application PH at PET_AAM_1005-0143–0147). As illustrated by Figure 1 and 6, and as the Examiner concluded, Brunetti describes each and every limitation of original Claims 1–8 and 16–19 of the '833 application. (Ex. 1005, '833 Application PH at PET_AAM_1005-0143–0147).





Ex. 1011, Brunetti Figs. 1, 6.

176. For example, Brunetti describes a joint assembly comprising a first, female splined shaft member, "bell 20" having "tubular projection 22 with inner axial splines 23" (blue), and a second, male splined shaft member, "hub 10" having a "cylindrical surface 17 towards its axially outer end, onto which there is a fixed driving ring 18 with outer axial splines 19" (red). (Ex. 1011, Brunetti at 2:7–23, Figs. 1–6). The first member and the second member of Brunetti are coupled by

way of a plurality of splines on each member: "inner axial splines 23 which couple with the outer splines 19." (Ex. 1011, Brunetti at 2:20–23). The joint assembly of Brunetti also includes a retaining ring, "elastic open securing ring 24 which is received partly in an inner circular groove 25 of the bell 20, and partly in an outer circular groove 26 of the driving ring 18." (Ex. 1011, Brunetti at 2:23–27, Fig. 6). As illustrated in Figure 1–5 of Brunetti, the joint assembly also has a window, "slot 27" (yellow), for accessing securing ring 25: "The locking ring 24 has two radial arms 29 at its end, with axially bent appendixes extending through a slot 27 formed at the axially outer end of the tubular projection 22 of the bell 20." (Ex. 1011, Brunetti at 2:28–31, Figs. 1–6).

177. The joint assembly of Brunetti also includes a seal, "sealing device 30 compris[ing] a flexible sealing sleeve 31 of elastomeric material and a circumferential clamping spring 32" (green). (Ex. 1011, Brunetti at 2:32–36, Figs. 1–5).

> The sealing sleeve 31 has a main, substantially tubular portion 34 which is sealingly locked by means of the spring 32 around the outer cylindrical surface 33 of the tubular projection 22 of the joint. In order to facilitate the assembling and disassembling steps, the tubular portion 34 preferably has a free or non-deformed size which is greater than the outer diameter of the cylindrical surface 33, so that the projection 22 may easily be slipped into and out of the sleeve 31. The sealing action of the sleeve against the joint bell is ensured mechanically by the spring 32.

(Ex. 1011, Brunetti at 2:37–46). The seal of Brunetti is configured to cover the

window, slot 27. (Ex. 1011, Brunetti at Abstract ("The sleeve covers a radial slot formed in the projections and the arms of a spring locking ring for axially removably securing the joint bell to a toothed driving ring fixed on a rotatable hub."), 3:51–4:1, Claim 1).

178. The Examiner objected to original Claim 13–15 and 20 of the '833 application as being dependent upon a rejected base claim. (Ex. 1005, '833 Application PH at PET_AAM_1005-0147). The Examiner stated that those claims "would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims." (Ex. 1005, '833 Application PH at PET_AAM_1005-0147). Each of original Claims 13 and 20 require that the seal includes a "corrugated portion" and, according to the Examiner citing an online dictionary, "the term 'corrugated' can be defined as 'having the shape of a series of regular folds that look like waves.'" (Ex. 1005, '833 Application PH at PET_AAM_1005-0147). The Examiner found that neither Krude '506 nor Brunetti disclose a seal with a "corrugated portion." (Ex. 1005, '833 Application PH at PET_AAM_1005-0147). The Examiner stated, for example:

> Rather, the seal (13) of Krude, as can be seen in Figs. 1 and 4, has strictly a cylindrical sleeve shape. In Brunetti, the seal (30) has a cylindrical portion (shown at 30 in Fig. 1 where the seal is engaged by spring 32) and a curved portion (at 34), which is described as a "substantially tubular portion 34". This tubular portion, while it is curved in the state shown in Fig. 1, it does not comprise a series of folds or waves and thus cannot be considered "corrugated", as claimed.

> Further, it would not have been obvious to modify Krude, Brunetti, nor any of the other prior art devices of record to have a seal with such a "corrugated portion" since there would have been no teaching, suggestion, or motivation to do so.

1005, '833 Application PH at PET_AAM_1005-0147.

3. Amendments and Remarks After Non-Final – December 19, 2022

179. On December 19, 2022, Applicants submitted amendments and remarks in response to the Examiner's Non-final Office Action. (Ex. 1005, '833 Application PH at PET_AAM_1005-0178–0183). Applicants amended pending independent Claim 1 to incorporate the limitations of intervening Claim 8 and allowable Claim 13 and amended pending Claim 16 to incorporate the limitations of allowable Claim 20. (Ex. 1005, '833 Application PH at PET_AAM_1005-0178–0183). The amended claims recited that "the seal includes a cylindrical portion and a corrugated portion, wherein at least a portion of the window is covered by the cylindrical portion." (Ex. 1005, '833 Application PH at PET_AAM_1005-0178–0183).

180. Amended Claim 1 is reproduced below:

> A joint assembly comprising:
>
> a first member having a first engagement means and an interior surface recess;
>
> a second member having a second engagement means and an exterior surface recess, a portion of the second member disposed within the first member, the second engagement means engaging the first engagement means to provide a coupling of the second member to the first member;

a window formed within the first member where the portion of the second member is disposed within the first member;

a retaining means configured to retain the coupling of the second member to the first member, wherein distal ends of the retaining means are accessible through the window, wherein the distal ends of the retaining means extend in a direction radially outwardly into the window to a point at or radially inwardly from an outer surface of the first member, and wherein the retaining means is received partially into each of the interior surface recess of the first member and the exterior surface recess of the second member when the retaining means retains the coupling of the second member to the first member; and

a seal configured to cover the window formed in the first member, wherein the seal is coupled to the second member adjacent an end of the first member and wherein the seal is coupled to the first member adjacent the window, wherein the seal includes a cylindrical portion and a corrugated portion, wherein at least a portion of the window is covered by the cylindrical portion.

Ex. 1005, '833 Application PH at PET_AAM_1005-0179.

181. Amended Claim 16 is reproduced below:

A method of servicing a joint assembly comprising:

providing a joint assembly, the joint assembly including:

a first member having a first engagement means and an interior surface recess;

a second member having a second engagement means and an exterior surface recess, a portion of the second member disposed within the first member, the second engagement means engaging the first engagement means to provide a coupling of the second member to the first member;

a window formed within the first member where the portion of the second member is disposed within the first member;

a retaining means configured to retain the coupling of the second member to the first member, wherein distal ends of the retaining

> means are accessible through the window, wherein the distal ends of the retaining means extend in a direction radially outwardly into the window to a point at or radially inwardly from an outer surface of the first member, and wherein the retaining means is received partially into each of the interior surface recess of the first member and the exterior surface recess of the second member when the retaining means retains the coupling of the second member to the first member; and
>
> a seal configured to cover the window formed in the first member, wherein the seal is coupled to the second member adjacent an end of the first member and wherein the seal is coupled to the first member adjacent the window, wherein the seal includes a cylindrical portion and a corrugated portion, wherein at least a portion of the window is covered by the cylindrical portion;
>
> uncovering the window via adjustment of the seal to provide access to the distal ends of the retaining means;
>
> manipulating the retaining means through the window to release the coupling of the second member to the first member; and
>
> separating the first member and the second member by disengaging the second engagement means from the first engagement means.

Ex. 1005, ’833 Application PH at PET_AAM_1005-0182.

182. Applicants also cancelled original Claims 8, 13, and 20. (Ex. 1005, ’833 Application PH at PET_AAM_1005-0180, PET_AAM_1005-0181, PET_AAM_1005-0183).

4. Notice of Allowance – January 27, 2023

183. On January 27, 2023, the Examiner issued a Notice of Allowance, allowing pending Claims 1–7, 9–12, and 14–19 as amended. Ex. 1005, ’833 Application PH at PET_AAM_1005-0186–0193.

5. Supplemental Notice of Allowance – February 7, 2023

184. On February 7, 2023, the Examiner issued a Notice of Allowance, entering an Examiner's amendment correcting a typo to Claim 11 and allowing pending Claims 1–7, 9–12, and 14–19 as amended. (Ex. 1005, '833 Application PH at PET_AAM_1005-0219–0222).

E. The '376 Patent Claims

185. The '376 patent has 17 claims. Claims 1 and 14 are independent claims and Claims 2–13 and 14–17 are dependent claims.

Independent Claim 1 recites:

[1P] A joint assembly comprising:

[1a] a first member having a first engagement means and an interior surface recess;

[1b] a second member having a second engagement means and an exterior surface recess, a portion of the second member disposed within the first member, the second engagement means engaging the first engagement means to provide a coupling of the second member to the first member;

[1c] a window formed within the first member where the portion of the second member is disposed within the first member;

[1d] a retaining means configured to retain the coupling of the second member to the first member,

[1d(i)] wherein distal ends of the retaining means are accessible through the window,

[1d(ii)] wherein the distal ends of the retaining means extend in a direction radially outwardly into the window to a point at or radially inwardly from an outer surface of the first member, and

[1d(iii)] wherein the retaining means is received partially into each of the interior surface recess of the first member and the exterior

surface recess of the second member when the retaining means retains the coupling of the second member to the first member; and

[1e] a seal configured to cover the window formed in the first member,

[1e(i)] wherein the seal is coupled to the second member adjacent an end of the first member and

[1e(ii)] wherein the seal is coupled to the first member adjacent the window,

[1e(iii)] wherein the seal includes a cylindrical portion directly engaging the outer surface of the first member adjacent the window,

[1e(iv)] wherein the seal further includes a corrugated portion disposed adjacent the cylindrical portion.

Ex. 1002, '376 patent at Claim 1.

186. Dependent Claim 2 depends from Claim 1 and further recites: "The joint assembly of claim 1, wherein the first member includes an open end and the first engagement means of the first member is formed within the open end." (Ex. 1002, '376 patent at Claim 2).

187. Dependent Claim 3 depends from Claim 2 and further recites: "The joint assembly of claim 2, wherein the portion of the second member disposed within the first member is disposed within the open end and includes the second engagement means." (Ex. 1002, '376 patent at Claim 2).

188. Dependent Claim 4 depends from Claim 2 and further recites: "The joint assembly of claim 2, wherein the window is continuous with the open end." (Ex. 1002, '376 patent at Claim 4).

189. Dependent Claim 5 depends from Claim 4 and further recites: "The

joint assembly of claim 4, wherein the seal is coupled to the first member adjacent an end of the window disposed distally from the open end of the first member." (Ex. 1002, '376 patent at Claim 5).

190. Dependent Claim 6 depends from Claim 1 and further recites: "The joint assembly of claim 1, wherein the first engagement means includes a first plurality of splines and the second engagement means includes a second plurality of splines." (Ex. 1002, '376 patent at Claim 6).

191. Dependent Claim 7 depends from Claim 1 and further recites: "The joint assembly of claim 1, wherein the retaining means is configured as a retaining ring." (Ex. 1002, '376 patent at Claim 7).

192. Dependent Claim 8 depends from Claim 1 and further recites: "The joint assembly of claim 1, wherein at least a portion of the cylindrical portion directly covers the window." (Ex. 1002, '376 patent at Claim 8).

193. Dependent Claim 9 depends from Claim 1 and further recites: "The joint assembly of claim 1, wherein at least a portion of the cylindrical portion is disposed directly radially outwardly of the window." (Ex. 1002, '376 patent at Claim 9).

194. Dependent Claim 10 depends from Claim 1 and further recites: "The joint assembly of claim 1, wherein the cylindrical portion is disposed directly radially outwardly of the retaining means." (Ex. 1002, '376 patent at Claim 10).

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195. Dependent Claim 11 depends from Claim 1 and further recites: "The joint assembly of claim 1, wherein the cylindrical portion covers the retaining means." (Ex. 1002, '376 patent at Claim 11).

196. Dependent Claim 12 depends from Claim 1 and further recites: "The joint assembly of claim 1, wherein the corrugated portion is disposed radially outwardly of each of the first member and the second member." (Ex. 1002, '376 patent at Claim 12).

197. Dependent Claim 13 depends from Claim 1 and further recites: "The joint assembly of claim 1, wherein at least a portion of the corrugated portion is disposed radially outwardly of the window." (Ex. 1002, '376 patent at Claim 13).

198. Independent Claim 14 recites:

[14P] A method of servicing a joint assembly comprising:

[14-1] providing a joint assembly, the joint assembly including:

> [14-1a] a first member having a first engagement means and an interior surface recess;
>
> [14-1b] a second member having a second engagement means and an exterior surface recess, a portion of the second member disposed within the first member, the second engagement means engaging the first engagement means to provide a coupling of the second member to the first member;
>
> [14-1c] a window formed within the first member where the portion of the second member is disposed within the first member;
>
> [14-1d] a retaining means configured to retain the coupling of the second member to the first member,

> [14-1d(i)] wherein distal ends of the retaining means are accessible through the window,
>
> [14-1d(ii)] wherein the distal ends of the retaining means extend in a direction radially outwardly into the window to a point at or radially inwardly from an outer surface of the first member, and
>
> [14-1d(iii)] wherein the retaining means is received partially into each of the interior surface recess of the first member and the exterior surface recess of the second member when the retaining means retains the coupling of the second member to the first member; and
>
> [14-1e] a seal configured to cover the window formed in the first member,
>
> [14-1e(i)] wherein the seal is coupled to the second member adjacent an end of the first member and
>
> [14-1e(ii)] wherein the seal is coupled to the first member adjacent the window;
>
> [14-2] uncovering the window via adjustment of the seal to provide access to the distal ends of the retaining means;
>
> [14-3] manipulating the retaining means through the window to release the coupling of the second member to the first member; and
>
> [14-4] separating the first member and the second member by disengaging the second engagement means from the first engagement means,
>
> [14-1e(iii)] wherein the seal includes a cylindrical portion and a corrugated portion,
>
> [14-1e(iv)] wherein at least a portion of the window is covered by the cylindrical portion.

(Ex. 1002, ’376 patent at Claim 14). For Claim 14 of the ’376 patent, the “joint assembly” that is “provided” in step 14-1 (limitations 14-1a through 14-1e), including limitations 14-1e(iii) and 14-1e(iv) appended to the end of the method of

Claim 14, is similar to the "joint assembly" of Claim 1 (limitations [1a] through [1e]) with minor differences between limitations [1e(iii)] and [14-1e(iii)] and limitations [1e(iv)] and [14-1e(iv)]. (Ex. 1002, '376 patent at Claims 1 and 14).

199. Dependent Claim 15 depends from Claim 14 and further recites: "The method of claim 14, wherein the first member includes an open end and the window is continuous with the open end." (Ex. 1002, '376 patent at Claim 15).

200. Dependent Claim 16 depends from Claim 15 and further recites: "The method of claim 15, wherein uncovering the window includes sliding the seal axially towards the open end of the first member." (Ex. 1002, '376 patent at Claim 16).

201. Dependent Claim 17 depends from Claim 16 and further recites: "The method of claim 16, wherein the sliding of the seal axially occurs until the retaining means is uncovered." (Ex. 1002, '376 patent at Claim 17).

F. Claim Construction

202. I have been asked to review the claims, and ascertain the meaning of the claims, from the perspective of a person of ordinary skill and based on the principles of claim construction stated above in Section III.B. For several claim elements, I was asked to set forth the meaning the term or phrase would have to a person of ordinary skill in the art at the time of the earliest effective filing date of the '958 patent. And unless otherwise set forth herein, I have accorded the claim language its plain and ordinary meaning to a person of ordinary skill at the time of

the earliest effective filing date of the ’958 patent.

1. “engagement means”

203. The term “engagement means” appears in independent Claims 1 and 15 and dependent Claims 2, 3 and 5. (Ex. 1001, ’958 patent at Claims 1, 2, 3, 5, and 15). In particular, independent Claims 1 and 15 each recite that the joint assembly comprises “a first member having a first engagement means” and “a second member having a second engagement means . . . , the second engagement means engaging the first engagement means to provide a coupling of the second member to the first member,” and Claim 15 further recites “separating the first member and the second member by disengaging the second engagement means from the first engagement means.” (Ex. 1001, ’958 patent at Claims 1 and 15). Dependent Claims 2 and 3 relate to the position of the first and second “engagement means” relative to the first and second member, respectively, and dependent Claim 5 recites that the first and second “engagement means” includes a first and second “plurality of splines,” respectively. (Ex. 1001, ’958 patent at Claims 2, 3, and 5). In my opinion, “engagement means” as used in the claims of the ’958 patent means “*fasteners, keys and keyways, male-female couplings, interlocking features, splines, and equivalents thereof*.”

204. *“[E]ngagement means” is a means-plus-function claim limitation*: In my opinion, the term “engagement means” is a means-plus-function limitation.

"Engagement means" includes the term, "means," which I understand creates a presumption that "engagement means" is a means-plus-function limitation, which may be rebutted if the properly construed claim limitation itself recites sufficiently definite structure to perform the claimed function. Here, a person of ordinary skill in the art would not understand "engagement means" to provide sufficiently definite structure to perform the claimed function. For example, the word "engagement" of "engagement means" is functional in nature, not structural, and a person of ordinary skill in the art would not understand the remaining claim language to define sufficient structure to perform the claimed function. Rather, a person of ordinary skill in the art would need to refer to the specification of the '958 patent to determine the structure of the "engagement means."

205. *The function performed by "engagement means"*: In my opinion, the function performed by the "engagement means" is "coupling the first member to the second member." My understanding of the function performed by the "engagement means" is confirmed by the intrinsic evidence, including the claims, specification, and prosecution history of the '958 patent. For example, both independent Claims 1 and 15 each recite that the first and second "engagement means" of the first member and second member each engage the other "to provide a coupling of the second member to the first member." (Ex. 1001, '958 patent at Claims 1 and 15).

206. My understanding that the function performed by the "engagement

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means" is "coupling the first member to the second member" is also confirmed by the specification of the '958 patent. For example, the specification explains that the purpose of the "first engagement means" and the "second engagement means" of the first member and second member, respectively, is "to couple the first member and second member." (Ex. 1001, '958 patent at 4:33–35; Ex. 1001, '958 patent at 2:16–21 ("A portion of the second member is disposed within the first member, where the second engagement means engages the first engagement means to provide a coupling of the second member to the first member."), 4:11–19 ("A portion of the second member is disposed within the first member so that the second engagement means engages the first engagement means to provide a coupling of the second member to the first member.")).

207. In the EXAMPLE and preferred embodiment of the '958 patent (Figures 1–3), the "engagement means" are complementary splines, "internal splines 160" on the first, female shaft member, and "external splines 170" on the second, male shaft member. (Ex. 1001, '958 patent at 6:32–34, Figs. 1–3). The specification of the '958 patent describes these complementary splines as functioning to couple the first member and second member. (Ex. 1001, '958 patent at Abstract ("A joint assembly includes a first member having splines formed therein. A second member includes splines formed thereon and is coupled to the first member."), 2:39–42 ("Internal splines formed on either the inner joint member or the outer joint member

couple with external splines formed on the powertrain or a final drive component shaft and secured with an expanding snap ring."), 2:7–11 ("The joint assembly can include a joint having splines formed therein and a shaft having splines formed thereon coupled to the joint, where the splines of the shaft engage the splines of the joint."), 2:34–37 ("The first member has an open end and a first plurality of splines formed within the open end. The second member has a second plurality of splines formed thereon. A portion of the second member is disposed within the first member, where the second plurality of splines engages the first plurality of splines to provide a coupling of the second member to the first member."), 6:3–10 ("The first member 110 has an open end 150 and a first plurality of splines 160 formed within the open end 150. The second member 120 has a second plurality of splines 170 formed thereon. A portion 180 of the second member 120 is disposed within the open end 150 of the first member 110, where the second plurality of splines 170 engages the first plurality of splines 160 to provide a coupling of the second member 120 to the first member 110.")).

208. The specification explains that "other engagement means can be employed to couple the first member 110 and second member 120." (Ex. 1001, '958 patent at 6:32–35; Ex. 1001, '958 patent at 4:33–43). Other than complementary splines, the specification identifies "fasteners, keys and keyways, male-female couplings, [and] interlocking features" as potential "engagement means," all of

which are also "configured to couple the first member and second member." (Ex. 1001, '958 patent at 4:33–37).

209. My understanding that the function performed by the "engagement means" is "coupling the first member to the second member" is also confirmed by the prosecution history of the '958 patent. During prosecution of the '085 application (which issued as the '958 patent), the Examiner cited to complementary splines on the joint assemblies of the cited prior art as disclosing the claimed "engagement means." These complementary splines function to couple the first member and the second member of the joint assemblies of the prior art.

210. *The corresponding structure that performs the function*: In my opinion, the corresponding structures set forth in the specification of the '958 patent that perform the function of "coupling the first member to the second member" are "fasteners, keys and keyways, male-female couplings, interlocking features, and splines."

211. The specification of the '958 patent identifies the following structures as "engagement means" that perform the function of "coupling the first member to the second member":

> The first engagement means and the second engagement means can be configured to couple the first member and second member in various ways, including various fasteners, keys and keyways, male-female couplings, interlocking features, and so on. In certain embodiments, the first engagement means can include a first plurality of splines and the second engagement can include a second plurality of splines. The first

> plurality of splines and the second plurality of splines can be complementary, where one can be a set of male splines and the other a set of female splines.

(Ex. 1001, ’958 patent at 4:33–43). The specification identifies no other structures that perform the function of “coupling the first member to the second member.”

212. Accordingly, “engagement means” as used in the claims of the ’958 patent means “*fasteners, keys and keyways, male-female couplings, interlocking features, splines, and equivalents thereof*.”

213. As I describe in more detail below, the “engagement means” features of the prior art joint assemblies that I rely on to form my opinions that Claims 1–18 of the ’958 patent are unpatentable and invalid are complementary, male and female splines. In my opinion, even if “engagement means” is not a means-plus-function limitation, under ordinary principles of claim construction, a person of ordinary skill in the art would understand that “engagement means” at least covers complementary, male and female splines, consistent with the EXAMPLE and preferred embodiment of the ’958 patent. (Ex. 1001, ’958 patent at 6:32–34, Figs. 1–3). Thus, my opinions on unpatentability and invalidity would remain the same.

2. “retaining means”

214. The term “retaining means” appears in independent Claims 1 and 15 and dependent Claims 6 and 8. (Ex. 1001, ’958 patent at Claims 1, 6, 8, and 15). For example, independent Claims 1 and 15 each recite that “a retaining means

configured to retain the coupling of the second member to the first member," and Claim 15 further recites "manipulating the distal ends of the retaining means through the window to release the coupling of the second member to the first member." (Ex. 1001, '958 patent at Claims 1 and 15). In my opinion, "retaining means" as used in the claims of the '958 patent means "*retaining ring, snap ring, and equivalents thereof*."

215. *"[R]etaining means" is a means-plus-function claim limitation*: In my opinion, the term "retaining means" is a means-plus-function limitation. "Retaining means" includes the term, "means," which I understand creates a presumption that "retaining means" is a means-plus-function limitation, which may be rebutted if the properly construed claim limitation itself recites sufficiently definite structure to perform the claimed function. Here, a person of ordinary skill in the art would not understand "retaining means" to provide sufficiently definite structure to perform the claimed function. For example, the word "retaining" of "retaining means" is functional in nature, not structural.

216. A person of ordinary skill in the art would also not understand the remaining claim language to define sufficient structure to perform the claimed function. Here, Claims 1 and 15 further recite: (i) the first member has "an interior surface recess," the second member has "an exterior surface recess," and "the retaining means is received partially into each of the interior surface recess of the

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first member and the exterior surface recess of the second member when the retaining means retains the coupling of the second member to the first member"; (ii) "distal ends of the retaining means are accessible through the window"; and (iii) "the distal ends of the retaining means extend in a direction radially outwardly into the window to a point at or radially inwardly from an outer wall of the first member." (Ex. 1001, '958 patent at Claims 1 and 15). Claim 15 further recites the step of (iv) "manipulating the distal ends of the retaining means through the window to release the coupling of the second member to the first member." (Ex. 1001, '958 patent at Claims 1 and 15). These limitations provide some structure to the claimed "retaining means," including structure consistent with a "retaining ring" (which a person of ordinary skill in the art may also refer to as a "snap ring," "circlip," or "c-clip"). However, a person of ordinary skill in the art would understand that other types of "retaining means" may have the structural features as recited by this additional claim language. A person of ordinary skill in the art would need to refer to the specification of the '958 patent to determine the structure of the "retaining means."

217. *The function performed by "retaining means"*: In my opinion, the function performed by the "retaining means" is "retaining the coupling of the first member and the second member." My understanding of the function performed by the "retaining means" is confirmed by the intrinsic evidence, including the claims, specification, and prosecution history of the '958 patent. For example, both

independent Claims 1 and 15 each recite that the "retaining means" is "configured to retain the coupling of the second member to the first member." (Ex. 1001, '958 patent at Claim 1 and 15).

218. My understanding that the function performed by the "retaining means" is "retaining the coupling of the first member and the second member" is also confirmed by the specification of the '958 patent. For example, the specification of the '958 patent explains that the purpose of the "retaining means" is "to retain the coupling of the second member to the first member." (Ex. 1001, '958 patent at 2:23–28, 4:11–15 ("a retaining means configured to retain the coupling of the second member to the first member")). The specification also describes a method of servicing a joint assembly, including the step of "manipulating the retaining means through the window to release the coupling of the second member to the first member," which supports my opinion that the function of the "retaining ring" is "retaining the coupling of the first member and the second member." (Ex. 1001, '958 patent at 2:47–50, 5:20–29).

219. In the EXAMPLE and preferred embodiment of the '958 patent (Figures 1–3), the "retaining means" is a "retaining ring" or "snap ring," terms that a person of ordinary skill in the art would understand are interchangeable, along with "circlip," "circular clip," "securing ring," and other similar terms. (Ex. 1001, '958 patent at Abstract ("A ring retains the first member to the second member."), 2:12–

13 ("a ring retains the shaft to the joint), 2:29–31 ("retaining ring"), 2:39–41 ("The retaining ring is configured to retain the coupling of the second member to the first member . . . ."), 4:48–51 ("The retaining means can be configured as a retaining ring . . . ."), 5:45–61 ("The snap ring may be thicker, have sharper corners, or use deeper grooves in the corresponding splined components in order to increase axial retention force. To maintain the ability to disassemble the CV joint for field service repairs, the retaining ring can contain outward facing tabs and an access window on the internally splined outer race extension to allow access to the tabs for the purpose of unseating the retaining ring for disassembly without the use of heavy prying tools and permanently damaging components.")). The specification does not identify any "retaining means" other than a "retaining ring" or "snap ring." The specification describes the retaining ring (or snap ring) as functioning "to retain the coupling of the second member 120 to the first member 110." (Ex. 1001, '958 patent at 6:13–14 ("The retaining ring 140 is configured to retain the coupling of the second member 120 to the first member 110."); Ex. 1001, '958 patent at 5:65–8:18 (describing Figs. 1–3 and "retaining ring 140")).

220. My understanding that the function performed by the "retaining means" is "retaining the coupling of the first member and the second member" is also confirmed by the prosecution history of the '958 patent. During prosecution of the '085 application (which issued as the '958 patent), the Examiner cited to retaining

rings of the joint assemblies of the cited prior art as disclosing the claimed "retaining means." These retaining rings function to retain the coupling of the first member and the second member of the joint assemblies of the prior art.

221. *The corresponding structure that performs the function*: In my opinion, the corresponding structure set forth in the specification of the '958 patent that performs the function of "retaining the coupling of the first member and the second member" are "retaining rings" or "snap rings."

222. The specification of the '958 patent identifies "retaining ring 140" as a "retaining means," and, in regard to the EXAMPLE and preferred embodiment of Figures 1–3, explains that "retaining ring 140 is configured as a discontinuous annular expandable snap ring." (Ex. 1001, '958 patent at 6:35–37). The specification explains that the particular design of "retaining ring 140" (or "snap ring") (e.g., cross-sectional shape, thickness, or sharpness of corners) may vary based on "the retention force required for a desired application" (Ex. 1001, '958 patent at 7:46–8:18), but the specification identifies no other structures that perform the function of "retaining the coupling of the first member and the second member."

223. Accordingly, "retaining means" as used in the claims of the '958 patent means "*retaining ring, snap ring, and equivalents thereof*."

224. As I describe in more detail below, the "retaining means" features of the prior art joint assemblies that I rely on to form my opinions that Claims 1–18 of

the ’958 patent are unpatentable and invalid are retaining rings. In my opinion, even if “retaining means” is not a means-plus-function limitation, under ordinary principles of claim construction, a person of ordinary skill in the art would understand that “retaining means” at least covers retaining rings, consistent with the EXAMPLE and preferred embodiment of the ’958 patent. (Ex. 1001, ’958 patent at 5:65–8:17, Figs. 1–3). Thus, my opinions on unpatentability and invalidity would remain the same.

3. “perimeter of the window”

225. The term “perimeter of the window” appears in independent Claims 1, 13, and 15. (Ex. 1001, ’958 patent at Claims 1, 13, and 15). In particular, independent Claims 1, 13, and 15 each recite that “a cylindrical portion of the seal covers the outer wall of the first member along at least a portion of a perimeter of the window.” (Ex. 1001, ’958 patent at Claims 1, 13, and 15). For purposes of this Declaration, I have applied the following claim construction for “perimeter of the window”: “*positions around the window where an outer surface of the first member deviates radially inwardly to define the opening corresponding of the window*.”

226. On August 4, 2021, Applicants argued in an Appeal Brief that “perimeter” means “the boundary of a closed plane figure” or “a line or strip bounding or protecting an area,” and, therefore, that “[t]he boundary of the window as recited in Claims 1, 12, and 15 therefore refers to those positions around the

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window where an outer surface of the first member deviates radially inwardly to define the opening corresponding to the window." (Ex. 1004, '085 Application PH at PET_AAM_1004-0298–0302). Applicants argued, for example:

> [E]ach of Claims 1, 12, and 15 recites a configuration wherein the inner surface of the cylindrical portion of the seal must be contacting the outer wall of the first member along at least one position where the outer surface of the outer wall deviates radially inwardly to define the perimeter of the window. For example, if an edge is formed at the outer surface of the first member to define a boundary of the window, the inner surface of the cylindrical portion of the seal must engage the first member along such an edge at one or more positions to disclose the described relationship as recited in any of Claims 1, 12, and 15.

(Ex. 1004, '085 Application PH at PET_AAM_1004-0299–0300). I apply the definition of "perimeter of the window" set forth during prosecution.

227. Accordingly, I apply the following definition of "perimeter of the window" as used in the claims of the '958 patent, "*positions around the window where an outer surface of the first member deviates radially inwardly to define the opening corresponding of the window*." To the extent that "perimeter of the window" is given its plain and ordinary meaning or a different meaning, my opinions on the invalidity or unpatentability of Claims 1–18 of the '958 patent would not change because, as described more fully below, the prior art also discloses seals that are coupled to and that cover the outer walls of shaft members along at least a portion of a "perimeter of the window" as that term would be understood by persons of ordinary skill in the art.

4. "cylindrical portion of the seal"

228. The term "cylindrical portion of the seal" appears in independent Claims 1, 13, and 15. (Ex. 1001, '958 patent at Claims 1, 13, and 15). In particular, independent Claims 1, 13, and 15 recite that "a cylindrical portion of the seal covers the outer wall of the first member along at least a portion of a perimeter of the window," and the method claim of independent Claim 15 further recites the step of "uncovering the window from the cylindrical portion of the seal to provide access to the distal ends of the retaining means." (Ex. 1001, '958 patent at Claims 1, 13, and 15). Dependent Claim 8 recites that "the cylindrical portion of the seal is disposed directly radially outwardly of the retaining means when the retaining means retains the coupling of the second member to the first member," and dependent Claim 10 recites that "the cylindrical portion of the seal is disposed at an end of the seal." (Ex. 1001, '958 patent at Claims 8, 10). For purposes of this Declaration, I have applied the following claim construction for "cylindrical portion of the seal": "*a closed annular portion of the seal that is extended in an axial direction thereof, and not to a conical, frustoconical, or otherwise tapered shape that is formed by the seal*."

229. On August 4, 2021, Applicants argued in an Appeal Brief that "cylindrical" means "relating to or having the form or properties of a cylinder," wherein "cylinder" means "the surface traced by a straight line moving parallel to a fixed straight line and intersecting a fixed planar closed curve." (Ex. 1004, '085

Application PH at PET_AAM_1004-0298–0302). Applicants further argued that "cylindrical portion of the seal," therefore, means "a closed annular portion of the seal that is extended in an axial direction thereof, and not to a conical, frustoconical, or otherwise tapered shape that is formed by the seal." (Ex. 1004, '085 Application PH at PET_AAM_1004-0298–0302). Applicants also attempted to overcome the Examiner's rejection based on the seal of Sugiyama by arguing that "a frustoconical portion of the boot (35)" of Sugiyama was not a "cylindrical portion of the seal" as claimed. (Ex. 1004, '085 application PH at PET_AAM_1004-0302). I apply the definition of "cylindrical portion of the seal" set forth during prosecution.

230. As I described above, boot seals are common in the automotive industry and are typically clamped on one end of the seal to a first shaft and clamped on the other end of the seal to a second shaft. This clamping of boot seals forms a cylindrical portion of the seal as defined during prosecution, one that is a closed annular portion of the seal that is extended in an axial direction thereof, and not to a conical, frustoconical, or otherwise tapered shape that is formed by the seal.

231. Accordingly, I apply the following definition of "cylindrical portion of the seal" as used in the claims of the '958 patent, "*a closed annular portion of the seal that is extended in an axial direction thereof, and not to a conical, frustoconical, or otherwise tapered shape that is formed by the seal*." To the extent that "cylindrical portion [of the seal]" is given its plain and ordinary meaning or a

different meaning, my opinions on the invalidity or unpatentability of Claims 1–18 of the ’958 patent would not change because, as described more fully below, the prior art also discloses seals having a “cylindrical portion” as that term would be understood by persons of ordinary skill in the art.

5. “corrugated portion [of the seal]”

232. The term “corrugated portion [of the seal]” appears in independent Claims 1, 13, and 15. (Ex. 1001, ’958 patent at Claims 1, 13, and 15). In particular, independent Claims 1, 13, and 15 recite that “the seal further includes a corrugated portion disposed adjacent they cylindrical portion, and wherein the corrugated portion is spaced radially from each of the first member and the second member.” (Ex. 1001, ’958 patent at Claims 1, 13, and 15). Dependent Claim 9 further recites that “the corrugated portion of the seal is disposed directly radially outwardly of the open end of the first member.” (Ex. 1001, ’958 patent at Claim 9). For purposes of this Declaration, I have applied the following claim construction for “corrugated portion [of the seal]”: “*portion of the seal having the shape of a series of regular folds that look like waves*.” I also note that seals may have a single corrugation or multiple corrugations, each having a “corrugated portion” as that term was defined during prosecution or as understood by those of ordinary skill in the art.

233. During prosecution of the ’833 application, which issued as the ’376 patent, the Examiner found that original claims Claim 13–15 and 20 of the ’833

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application, which recite that the seal includes a "corrugated portion," would be allowable if rewritten in independent form. (Ex. 1005, '833 Application PH at PET_AAM_1005-0147). Citing a dictionary, the Examiner defined "corrugated" to mean "having the shape of a series of regular folds that look like waves." (Ex. 1005, '833 Application PH at PET_AAM_1005-0147). The Examiner then found that neither Krude '506 nor Brunetti disclose a having the shape of a series of regular folds that look like waves:

> Rather, the seal (13) of Krude, as can be seen in Figs. 1 and 4, has strictly a cylindrical sleeve shape. In Brunetti, the seal (30) has a cylindrical portion (shown at 30 in Fig. 1 where the seal is engaged by spring 32) and a curved portion (at 34), which is described as a "substantially tubular portion 34". This tubular portion, while it is curved in the state shown in Fig. 1, it does not comprise a series of folds or waves and thus cannot be considered "corrugated," as claimed.

1005, '833 Application PH at PET_AAM_1005-0147. I apply the definition of "corrugated portion of the seal" set forth during prosecution.

234. As I described above, boot seals are common in the automotive industry and often have portions having the shape of a series of regular folds that look like waves, as defined to be a "corrugated portion" during prosecution. Corrugated seals may have single corrugations or multiple corrugations, and each has a "corrugated portion" as defined during prosecution. For example, Freudenberg Sealing Technologies (Ex. 1029), which makes "[c]ustomer-specific boots for automotive . . . applications," including "dust covers as part of its boots portfolio," describes the

use of both [s]ingle- and multiple-convolution boots" for "[p]rotection from external influences." (Ex. 1029, Freudenberg; Ex. 1019, Rabson at 2:62–3:2, Fig. 1 (disclosing boot seal, "bellows 6," having "tubular cylindrical end sections 9 and 10" "joined by a single convolution section 12"); Ex. 1026, Idies at Abstract, 1:13–25, Figs. 1–4 (disclosing "sealing bellows" having single corrugation)).

235. Accordingly, I apply the following definition of "corrugated portion of the seal" as used in the claims of the '958 patent, "*portion of the seal having the shape of a series of regular folds that look like waves*." To the extent that "corrugated portion [of the seal]" is given its plain and ordinary meaning or a different meaning, my opinions on the invalidity or unpatentability of Claims 1–18 of the '958 patent would not change because, as described more fully below, the prior art also discloses seals having a "corrugated portion" as that term would be understood by persons of ordinary skill in the art.

VIII. SUMMARY OF THE INVALIDATING PRIOR ART

A. 2016 Jeep Renegade Service Manual ("Renegade Manual")

236. The Jeep Renegade is a subcompact crossover SUV produced by Stellantis, formerly known as Chrysler, under the Jeep brand. (Ex. 1013, Renegade Manual at PET_AAM_1013-0002).



(https://en.wikipedia.org/wiki/Jeep_Renegade). The Jeep Renegade has several model years, including model year 2016. (Ex. 1013, Renegade Manual at PET_AAM_1013-0001–0002; https://en.wikipedia.org/wiki/Jeep_Renegade).

237. "2016 Jeep Renegade Service Information Manual" (Ex. 1013, "Renegade Manual") is a service information manual published by Mopar/Tech Authority ("Tech Authority"). Tech Authority was (and remains) the official source for service information relating to Alfa Romero, Chrysler, Dodge, Fiat, Jeep, Ram and SRT branded vehicles. (https://web.archive.org/web/20161009134631/https://www.techauthority.com/). Among other things, Tech Authority is an established publisher of service manuals, including service manuals for Jeep vehicles, and is reputable and well known in the automotive industry.

(https://web.archive.org/web/20161009134631/https://www.techauthority.com/. Ex. 1013, Renegade Manual).

238. The Renegade Manual (Ex. 1013) is a printout of the service manual for the 2016 Jeep Renegade that came loaded on a compact disc (CD or DVD), which I have accessed and reviewed. Now, Tech Authority publishes service manuals for Jeep vehicles, including the 2016 Jeep Renegade, online by way of a subscription service. On November 4, 2024, I accessed the service manual for the 2016 Jeep Renegade via Stellantis' "Independent Operator Portal," "https://stellantisiop.com/iop/app/landing," using a 3-day Tech Authority subscription. The service manual for the 2016 Jeep Renegade on the compact disc (a printed copy of which is at Exhibit 1013) contains the same disclosure as the service manual for the 2016 Jeep Renegade currently available online via Stellantis' Independent Operator Portal.

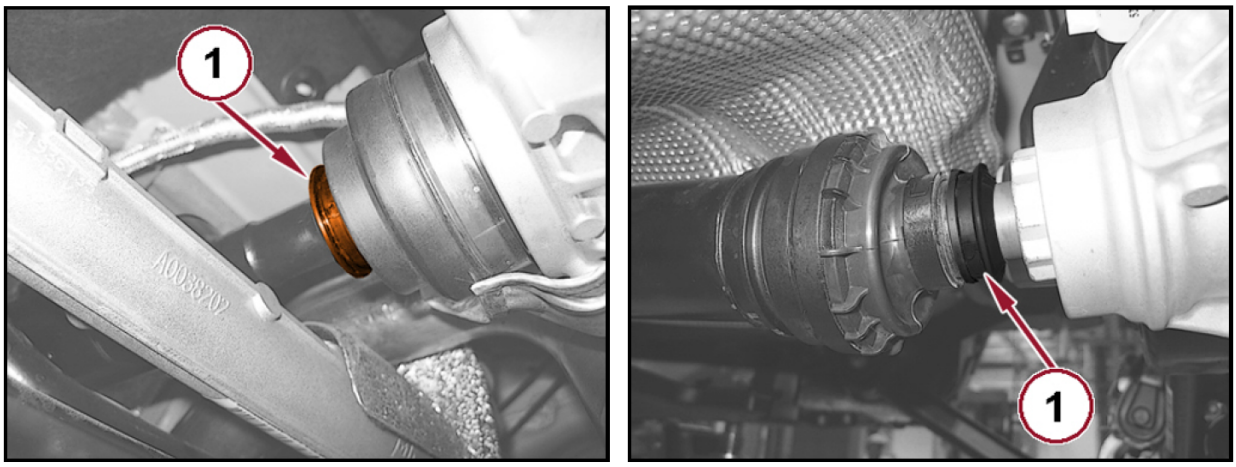
239. I understand that the Renegade Manual is prior art to the '958 patent.

240. Chapter 3 of the Renegade Manual generally relates to service information for the differential and driveline of the 2016 Jeep Renegade. (Ex. 1013, Renegade Manual). The Renegade Manual includes "Removal and Installation" information for the "Propeller Shaft" for four engine sizes of the 2016 Jeep Renegade, "1.4 Turbo Multiair," "2.0 Turbo Diesel – 120 / 140 HP," "2.0 Turbo Diesel – 170 HP," and "2.4 Multiair," as well as "Removal and Installation"

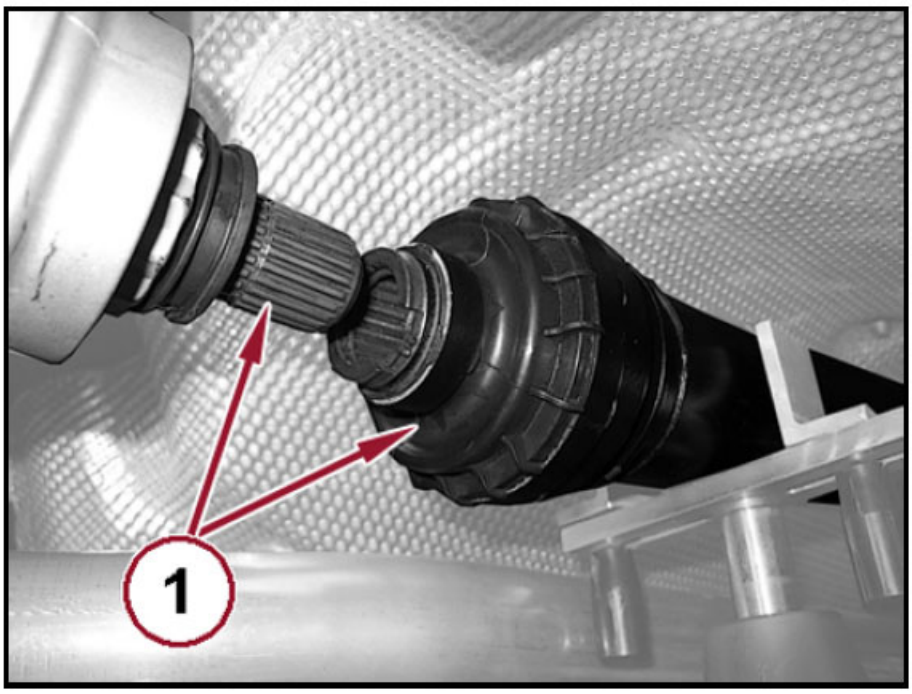
information relating to the "Rear Driveline Module." (Ex. 1013, Renegade Manual). The disclosure of the Renegade Manual is similar for these different sections but, for purposes of this Declaration and for consistency, I will primarily rely on "Chapter 3 – Differential and Driveline / Propeller Shaft / Removal and Installation" for the "1.4 Turbo Multiair" engine size." (Ex. 1013, Renegade Manual at PET_AAM_1013-0194–0204).

241. The Renegade Manual generally describes propshaft joint assemblies with retaining rings that are accessible through an access window for servicing. (Ex. 1013, Renegade Manual). Removal Steps 1–28 relate to removing the propshaft from the 2016 Jeep Renegade after disconnecting it from the power transfer unit ("PTU") (on one end of the propeller shaft) and the pinion of the rear driveline unit ("RDU") (on the other end of the propeller shaft). (Ex. 1013, Renegade Manual at PET_AAM_1013-0194–0200, Removal Steps 1–28). Installation Steps 1–22 relate to installing a propshaft (or re-installing the propshaft previously removed) back into the 2016 Jeep Renegade after servicing, including by connecting the propshaft to the PTU and RDU. (Ex. 1013, Renegade Manual at PET_AAM_1013-0200–0204, Installation Steps 1–22).

242. The Renegade Manual discloses two propshaft joint assemblies, one between the propshaft and PTU (left) and one between the propshaft and the RDU (right).

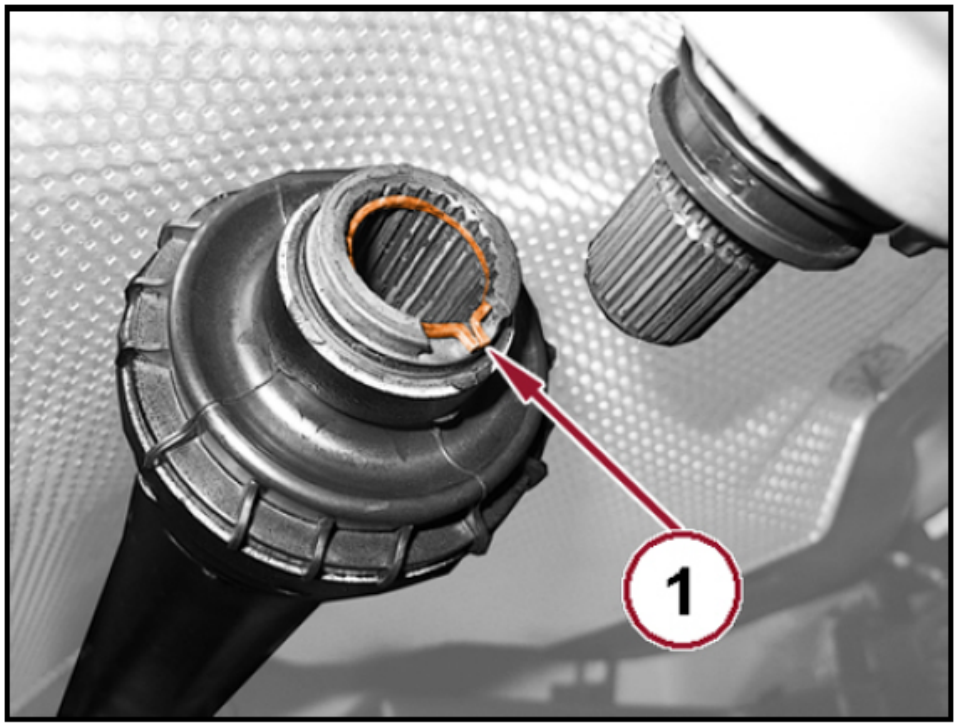


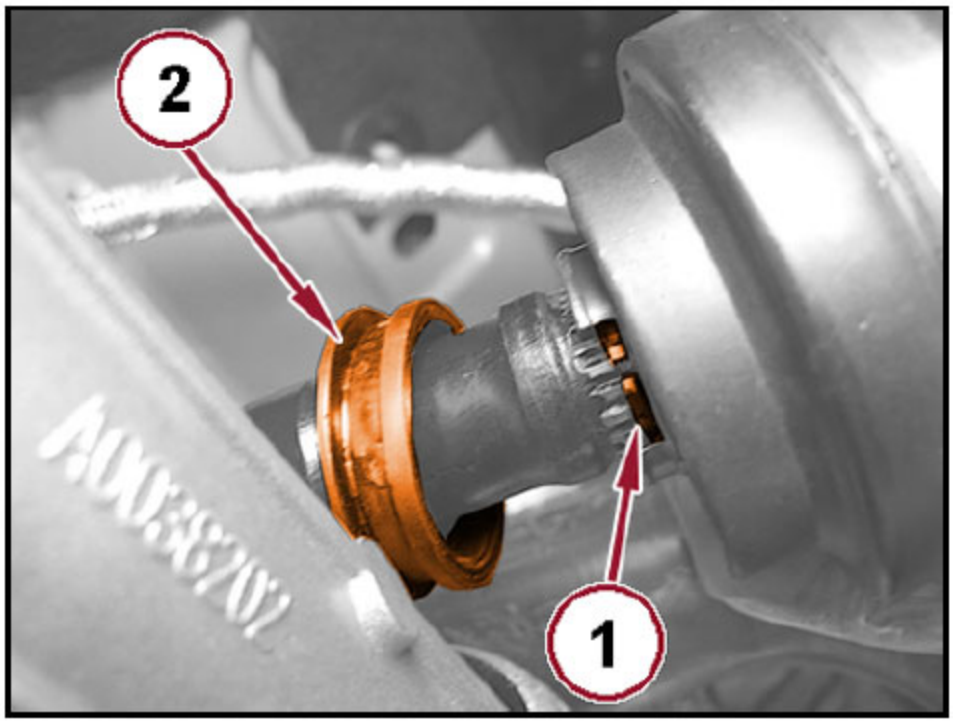
(Ex. 1013, Renegade Manual at PET_AAM_1013-0197–0198, Removal Steps 16 (PTU), 23 (RDU)). Each joint assembly comprises a first, female shaft member with a plurality of female, internal splines, and a second male shaft member with a plurality of male, external splines:



(Ex. 1013, Renegade Manual at PET_AAM_1013-0199, Removal Step 25 (RDU); Ex. 1013, Renegade Manual at PET_AAM_1013-0198–0201, Removal Step 19

(PTU), Installation Steps 1–4 (PTU and RDU)). The first member and the second member of the joint assemblies of Renegade Manual are coupled by way of the plurality of splines on each member. (Ex. 1013, Renegade Manual at PET_AAM_1013-0197–0203, Removal Steps 18, 19 (PTU) and 25–27 (RDU), Installation Steps 8–9 (RDU) and 11–12 (PTU)). The joint assemblies of the Renegade Manual also include a retaining means—an elastic, propeller shaft retaining ring or "snap ring," which is colored in orange and numbered "1" in the images from Installation Steps 8 and 11, reproduced below:

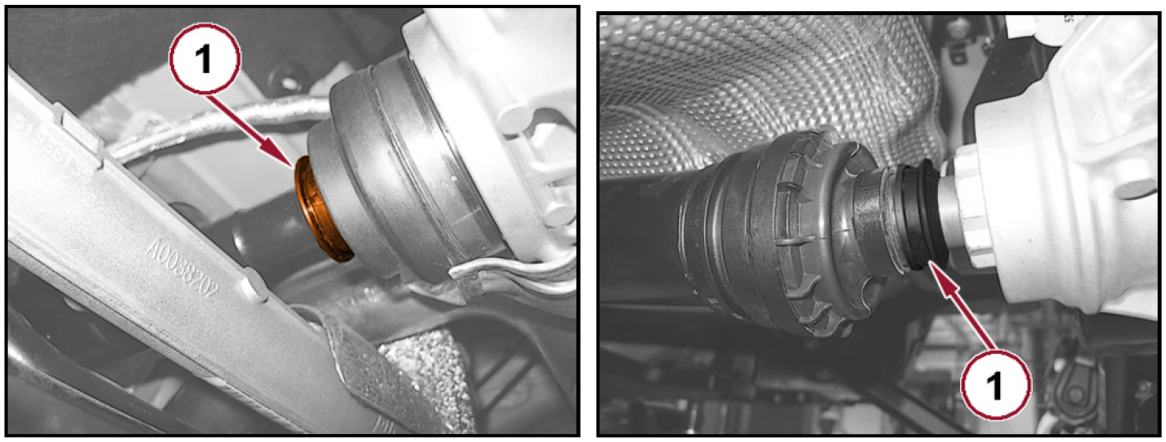




(Ex. 1013, Renegade Manual at PET_AAM_1013-0202–0203, Installation Steps 8 (RDU) and 11 (PTU); Ex. 1013, Renegade Manual at PET_AAM_1013-0201, Installation Step 3 ("Install a NEW snap ring (1) in the drive shaft."), Step 4 ("Install a NEW snap ring (1) in the Power Transfer Unit (PTU)"); Ex. 1013, Renegade Manual at PET_AAM_1013-0193, Special Tools ("Elastic Ring Spreader")). For the joint assembly at the PTU, the retaining ring is received by corresponding annular grooves (or recesses) in the PTU and propshaft. (Ex. 1013, Renegade Manual at PET_AAM_1013-0197–0203, Removal Step 17, Installation Steps 4 and 11). For the joint assembly at the RDU, the retaining ring is received by corresponding annular grooves (or recesses) in the propshaft and pinion shaft of the RDU. (Ex. 1013, Renegade Manual at PET_AAM_1013-0199–0202, Removal Step

24, Installation Steps 3 and 8). The retaining rings retain the coupling of the first member and second member of each joint assembly.

243. As illustrated above in the images from Installation Steps 8 and 11, the first, female shaft members each comprise a window, which provides access to distal ends of the snap ring. (Ex. 1013, Renegade Manual at PET_AAM_1013-0202–0203, Installation Steps 8 (RDU) and 11 (PTU)). The joint assemblies of the Renegade Manual are sealed by a "dust cover" or "dust seal" (numbered "1" in the images of Removal Steps 16 (PTU) and 23 (RDU) reproduced below). (Ex. 1013, Renegade Manual at PET_AAM_1013-0197–0198, Removal Steps 16 (PTU), 23 (RDU)). Each seal is coupled to the first female shaft member and second male shaft member and configured to cover the window of the first female shaft member.



(Ex. 1013, Renegade Manual at PET_AAM_1013-0197–0198, Removal Steps 16 (PTU), 23 (RDU)).

244. To service the propshaft of the 2016 Jeep Renegade, the Renegade Manual describes, among other removal steps: (i) "Slide the dust cover (1) at the

front of the propeller shaft away from the Power Transfer Unit (PTU) to access the snap ring"; (ii) "Use tool 2019500030 (1) to open propeller snap ring at the PTU," where the referenced tool is an "Elastic Ring Spreader"; (iii) "Disconnect the propeller shaft (1) from the PTU"; (iv) "Slide the dust cover (1) at the rear of the propeller shaft towards the differential to access the snap ring" (v) "Use tool 2019500030 (1) to open propeller snap ring at the Rear Drive Line Unit (RDU)," and (vi) "Disconnect the propeller shaft from the pinion of the RDU (1)." (Ex. 1013, Renegade Manual at PET_AAM_1013-0197–0199, Removal Steps 16–18 (PTU) and 23–25 (RDU)). The Renegade Manual also describes a number of installation steps, including: (i) "Install a NEW dust seal (1) on the pinion shaft of the Rear Driveline Unit (RDU)," (ii) "Install a NEW dust seal (1) on the front shaft of the propeller shaft," (iii) "Install a NEW snap ring (1) in the drive shaft," (iv) "Install a NEW snap ring (1) in the Power Transfer Unit (PTU)," (v) "Connect the propeller shaft (1) to the pinion of the RDU, verify the snap ring is seated in the groove of the pinion shaft," (vi) "Position the new dust cover (1) over the joint over the joint at the rear of the propeller shaft," (vii) "Connect the propeller shaft (1) to PTU, verify the snap ring is (1) seated in the groove of the propeller shaft," and (viii) "Position the new dust cover (2) over the joint at the front of the propeller shaft." (Ex. 1013, Renegade Manual at PET_AAM_1013-0200–0203, Installation Steps 1–4, 8, 9, 11, and 12).

B. U.S. Patent No. 6,739,422 ("Krude '422")

245. U.S. Patent 6,739,422 ("Krude '422") is a United States patent that issued on May 25, 2004. Ex. 1008, Krude '422 at (45). I understand that Krude '422 is prior art to the '958 patent. Krude '422 generally relates to an assembly for supporting and connecting a wheel of a motor vehicle to a driveshaft. (Ex. 1008, Krude '422 at Abstract).

246. Figure 5a of Krude '422, reproduced below, shows an assembly "with the wheel hub and joint unit separated from the wheel carrier, in a longitudinal section." (Ex. 1008, Krude '422 at 5:18–20, Fig. 5).

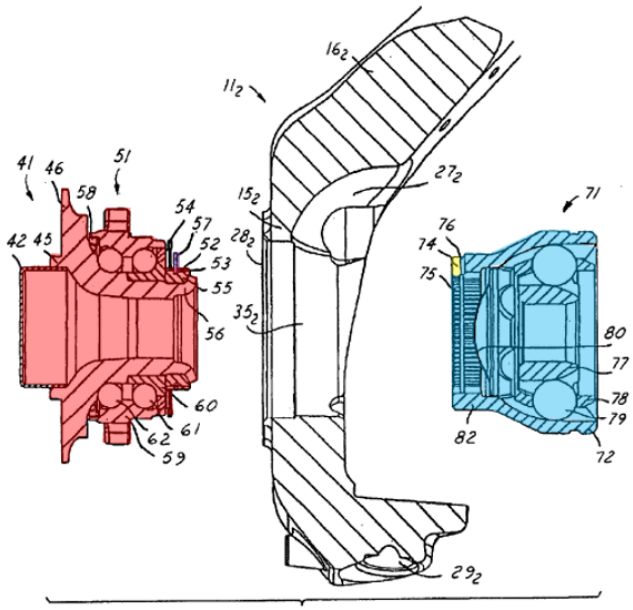


FIG. 5a

(Ex. 1008, Krude '422 at Fig. 5). Krude '422 discloses a first, female splined shaft member, "constant velocity joint 71" with outer "an joint part 72 with a sleeve

projection 82" and "inner toothing 75" (blue), and a second male splined shaft member, "wheel hub 41" with outer toothing 52" (red). (Ex. 1008, Krude '422 at 5:66–6:43, Figs. 1–10). The first member and the second member of Krude '422 are coupled by way of a plurality of splines on each member: "When the unit is assembled, the inner toothing 75 engages the outer toothing 52 at the wheel hub 41." (Ex. 1008, Krude '422 at 6:40–41, Figs. 1–10). The joint assembly of Krude '422 also includes a retaining ring, "securing ring 57" (purple) for "connecting the wheel hub unit 41 and the constant velocity joint 71." (Ex. 1008, Krude '422 at 7:26–34; Ex. 1008, Krude '422 at 6:40–43 ("When the unit is assembled, the inner toothing 75 engages the outer toothing 52 at the wheel hub 41, with the annular groove 53 overlapping with the annular groove 76 and with both, jointly, accommodating a securing ring 57."), 7:6–7, 7:13–15, 7:60–62, 7:66–8:15).

247. Figure 8 of Krude '422, reproduced below, shows the assembly "in a cross-sectional view along sectional line A–A," and depicts the retaining ring, "securing ring 57" (purple).

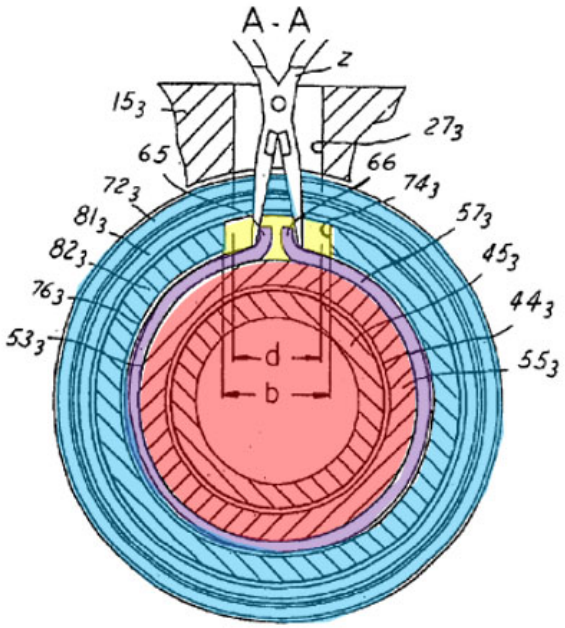


FIG. 8

(Ex. 1008, Krude '422 at 5:28–30, Fig. 8). For example, "outwardly bent portions" of securing ring 57 "at the ring ends 65, 66" are accessible through a window, "notch 74" (yellow), in the first member. (Ex. 1008, Krude '422 at 7:19–25, 7:66–8:32, Figs. 7–9).

> By gripping the ends 65, 66 of the securing ring 57_3 and compressing same by means of the pliers Z, it is possible to reduce the securing ring 57_3 in such a way that it enters the annular groove 53_3 in the driving ring 55_3 more deeply while at the same time sliding out of the inner annular groove 76_3 in the outer joint part 72_3, so that the constant velocity joint 71_3 can be removed from the hub unit 41_3 and especially from the driving ring 53_3 in a non-destructive way.

Ex. 1008, Krude '422 at 8:23–32.

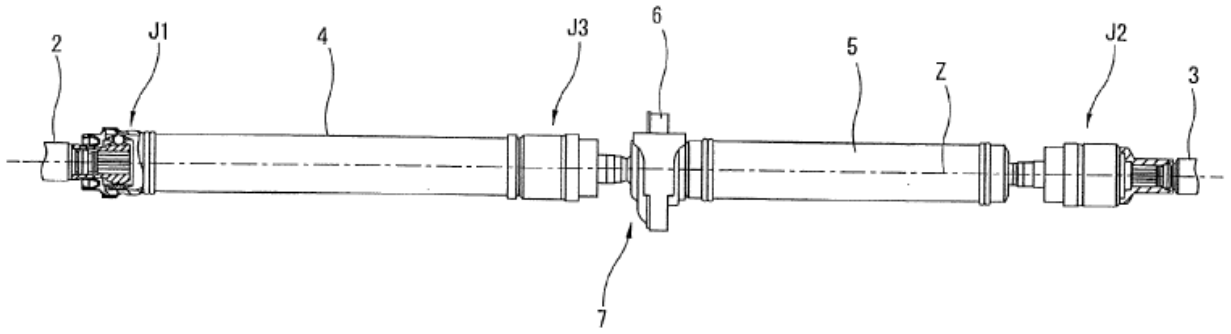
C. U.S. Publication No. 2018/0003240 ("Sugiyama")

248. U.S. Publication No. 2018/0003240 (Ex. 1007, "Sugiyama") is a

January 4, 2018, publication of a United States Patent Application No. 15/630,295, which was filed on June 22, 2017, and claims priority to a foreign patent application, JP 2016-129514 (Ex. 1035, "Sugiyama Priority Application"), filed on June 30, 2016. (Ex. 1007, Sugiyama at (21), (22), (43)). I understand that Sugiyama is prior art to the '958 patent. Sugiyama generally relates to a power transmission shaft, and describes various joint assemblies with retaining rings that are accessible through an access window.

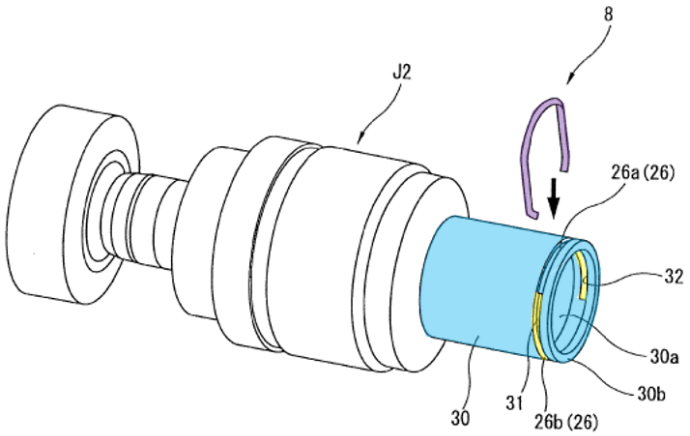
249. Figure 1 of Sugiyama, reproduced below, illustrates "a side view of a propeller shaft (a power transmission shaft)." (Ex. 1007, Sugiyama at [0008], Fig. 1). "Power transmission shaft 1 includes: a driving shaft 4 integrally rotatably linked to an input shaft 2 interlinked to a transmission (not shown) via a first constant velocity (universal) joint J1; and a driven shaft 5 integrally rotatably linked to an output shaft 3 interlinked to a differential (not shown) via a second constant velocity (universal) joint J2." (Ex. 1007, Sugiyama at [0031]).

FIG.1



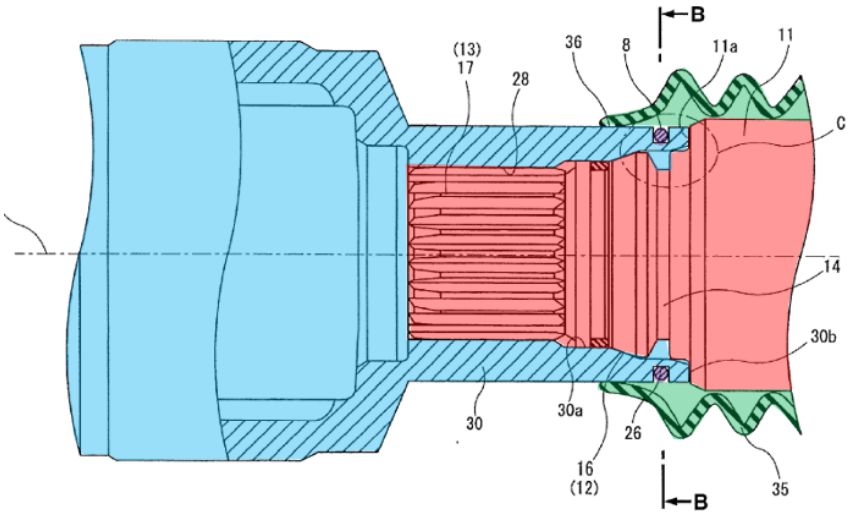
250. Figure 4 of Sugiyama, reproduced below, illustrates "a perspective view in a proximity of a cylindrical section of a second constant velocity (universal) joint shown in FIG. 1," i.e., "J2"

FIG.4



(Ex. 1007, Sugiyama at [0011], Fig. 4). Figure 7, also reproduced below, "shows a longitudinal cross sectional view in a state in which the output shaft is inserted into the cylindrical section of the second constant velocity (universal) joint." (Ex. 1007, Sugiyama at [0049], Fig. 7).

FIG.7



In reference to J2 of Figures 4 and 7, Sugiyama teaches a female shaft member, "cylindrical section 30" of the rear end of J2 (blue), which "serves to link second constant velocity (universal) joint J2 to output shaft 3." (Ex. 1007, Sugiyama at [0050], Fig. 4). Sugiyama also teaches a male shaft member, "output shaft 3" having a "large diameter section 11," "middle diameter section 12," and a "small diameter section 13 integrally disposed on an end section of middle diameter section 12" (red). (Ex. 1007, Sugiyama at [0034], [0049], [0050], Figs. 2, 4 and 7). Cylindrical section 30 has a set of female splines,[3] "which male spline 17 of output shaft 3 is engaged

[3] Paragraph [0050] of Sugiyama refers to the set of female splines as "female spline 17 with with which male spline 17 of output shaft 3 is engaged from the axial direction." (Ex. 1007, Sugiyama at [0050]). Figures 4–7, 11(a) and (b), 12(a) and (b), and 13(a) and (b) appear to identify the set of female splines with the reference number, "28." Regardless of whether the set of female splines on the first, female

from the axial direction is cutout formed along the axial direction at the inner peripheral side of insertion hole 30 a." (Ex. 1007, Sugiyama at [0050], Figs. 4 and 7).

251. Sugiyama also discloses the use of a retaining ring, "circlip (retaining ring) 8" (purple), "which serves as a retainer (or stopper) for input shaft 2 and output shaft 3 during linkages between input shaft 2 and output shaft 3 and first and second constant velocity (universal) joints." (Ex. 1007, Sugiyama at [0035], [0059], Figs. 4, 7). The retaining ring is accessible through windows, "through holes (31, 32)." (Ex. 1007, Sugiyama at Abstract, [0046], [0047], [0051]–[0056], [0059], Figs. 4, 7).

252. The joint assembly of Sugiyama, including the windows and retaining ring, is also sealed by a "water-proof boot 35" (green), "which serves to prevent an invasion of water or dust from first and second through holes 31, 32." (Ex. 1007, Sugiyama at [0058], Fig. 7). The boot seal "is mounted on cylindrical section 30 in a form of extending on and over cylindrical section 30 and output shaft 3 so as to enclose first and second through holes 31, 32," and "is attached and fixed to cylindrical section 30 via a boot attachment section 36." (Ex. 1007, Sugiyama at [0058], Fig. 7; Ex. 1007, Sugiyama at [0048], [0094], [0146], Claim 20). "This

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splined shaft are splines 17 or 28, a person of ordinary skill in the art would understand that Sugiyama teaches a first set of female splines as a means for engaging the second, male splined shaft member.

water-proof boot 35 has a middle section structured in a substantially bellows shape so that water-proof boot 35 is formed to enable expansion and contraction (telescopically) in the axial direction." (Ex. 1007, Sugiyama at [0058], Fig. 7; Ex. 1007, Sugiyama at [0048] (describing water-proof boot 27 for sealing J1), [0094], [0146], Figs. 1, 3).

253. I have been asked to compare the disclosures of Sugiyama (Ex. 1007), including the disclosure of Sugiyama (Ex. 1007) that I rely upon to form my opinions, to the disclosures of the Sugiyama Priority Application (Ex. 1035) (Japanese application at PET_AAM_1035-0001–0042, translated from Japanese to English at PET_AAM_1035-0043–0092). The disclosures of Sugiyama and the Sugiyama Priority Application are materially the same. In particular, there is a 1:1 correspondence between every figure. (Ex. 1007, Sugiyama at Figs. 1–19; Ex. 1035, Sugiyama Priority Application at PET_AAM_1035-0073–0091). There is also a nearly 1:1 correspondence between the Abstract and description of Sugiyama (Ex. 1007) and the Abstract and description of the Sugiyama Priority Application (Ex. 1035), with immaterial differences in some phrasing. The table below identifies disclosures of Sugiyama (Ex. 1007) that correspond to the disclosures of the Sugiyama Priority Application (Ex. 1035).

Sugiyama (Ex. 1007)	**Sugiyama Priority Application (Ex. 1035)**
Abstract	Abstract
Fig. 1	Fig. 1

Sugiyama (Ex. 1007)	**Sugiyama Priority Application (Ex. 1035)**
Fig. 2	Fig. 2
Fig. 3	Fig. 3
Fig. 4	Fig. 4
Fig. 5	Fig. 5
Fig. 6	Fig. 6
Fig. 7	Fig. 7
Fig. 8	Fig. 8
Fig. 9	Fig. 9
Fig. 10	Fig. 10
Fig. 11	Fig. 11
Fig. 12	Fig. 12
Fig. 13	Fig. 13
Fig. 14	Fig. 14
Fig. 15	Fig. 15
Fig. 16	Fig. 16
Fig. 17	Fig. 17
Fig. 18	Fig. 18
Fig. 19	Fig. 19
[0001]	[0001]
[0002]–[0003]	[0002]–[0004]
[0004]	[0005]–[0006]
[0005]	[0007]
[0006]	[0008]
[0007]	[0009]
[0008]–[0026]	[0010]
[0027]	[0011]
[0028]–[0029]	[0012]
[0030]–[0032]	[0013]
[0033]	[0014]
[0034]	[0015]
[0035]	[0016]
[0036]	[0017]
[0037]	[0018]
[0038]	[0019]
[0039]	[0020]
[0040]	[0021]
[0041]	[0022]

Sugiyama (Ex. 1007)	**Sugiyama Priority Application (Ex. 1035)**
[0042]	[0023]
[0043]	[0024]
[0044]	[0025]
[0045]	[0026]
[0046]	[0027]
[0047]	[0028]
[0048]	[0029]
[0049]	[0030]
[0050]	[0031]
[0051]	[0032]
[0052]	[0033]
[0053]	[0034]
[0054]	[0035]
[0055]	[0036]
[0056]	[0037]
[0057]	[0038]
[0058]	[0039]
[0059]	[0040]
[0060]–[0061]	[0041]
[0062]	[0042]
[0063]	[0043]
[0064]	[0044]
[0065]	[0045]
[0066]	[0046]
[0067]	[0047]
[0068]	[0048]
[0069]	[0049]
[0070]	[0050]
[0071]	[0051]
[0072]	[0052]
[0073]	[0053]
[0074]	[0054]
[0075]	[0055]
[0076]	[0056]
[0077]	[0057]
[0078]	[0058]
[0079]	[0059]

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Sugiyama (Ex. 1007)	**Sugiyama Priority Application (Ex. 1035)**
[0080]	[0060]
[0081]	[0061]
[0082]	[0062]
[0083]	[0063]
[0084]	[0064]
[0085]	[0065]
[0086]	[0066]
[0087]	[0067]
[0088]	[0068]
[0089]	[0069]
[0090]	[0070]
[0091]	[0071]
[0092]	[0072]
[0093]	[0073]
[0094]	[0074]
[0095]	[0075]
[0096]	[0076]
[0097]	[0077]
[0098]	[0078]
[0099]	[0079]
[0100]–[0101]	[0080]
[0102]	[0081]
[0103]	[0082]
[0104]	[0083]
[0105]–[0106]	[0084]
[0107]	[0085]
[0108]	[0086]
[0109]	[0087]
[0110]	[0088]
[0111]	[0089]
[0112]	[0090]
[0113]	[0091]
[0114]	[0092]
[0115]	[0093]
[0116]	[0094]
[0117]	[0095]
[0118]	[0096]

Sugiyama (Ex. 1007)	**Sugiyama Priority Application (Ex. 1035)**
[0119]	[0097]
[0120]	[0098]
[0121]	[0099]
[0122]	[0100]
[0123]	[0101]
[0124]	[0102]
[0125]	[0103]
[0126]	[0104]
[0127]	[0105]
[0128]	[0106]
[0129]	[0107]
[0130]	[0108]
[0131]	[0109]
[0132]	[0110]
[0133]	[0111]
[0134]	[0112]
[0135]	[0113]
[0136]	[0114]
[0137]	[0115]
[0138]	[0116]
[0139]	[0117]
[0140]	[0118]
[0141]	[0119]
[0142]	[0120]
[0143]	[0121]
[0144]	[0122]
[0145]	[0123]
[0146]	[0124]
[0147]	[0125]
[0148]	[0126]
[0149]	[0127]
[0150]	[0128]
[0151]	[0129]
[0152]	n/a
[0153]	n/a
Claim 1	Claim 1
Claim 2	Claim 2

Sugiyama (Ex. 1007)	Sugiyama Priority Application (Ex. 1035)
Claim 3	Claim 3
Claim 4	Claim 4
Claim 5	Claim 5
Claim 6	Claim 6
Claim 7	Claim 7
Claim 8	Claim 8
Claim 9	Claim 9
Claim 10	Claim 10
Claim 11	Claim 11
Claim 12	Claim 12
Claim 13	Claim 13
Claim 14	Claim 14
Claim 15	Claim 16
Claim 16	Claim 17
Claim 17	Claim 18
Claim 18	Claim 19
Claim 19	Claim 20
Claim 20	Claim 21
Claim 21	Claim 22
Claim 22	Claim 23

Thus, in my opinion, the Sugiyama Priority Application (Ex. 1035) describes the subject matter that I rely upon in Sugiyama (Ex. 1007). And, as shown in the table above, for any citation to Sugiyama (Ex. 1007) in this Declaration, there is corresponding disclosure in the Sugiyama Priority Application (Ex. 1035) that describes the same subject matter.

254. I have also been asked to evaluate whether the Sugiyama Priority Application (Ex. 1035) provides written description and enabling support for the

claims of Sugiyama (Ex. 1007), which I understand are the same claims as originally filed in the U.S. patent application that published as Sugiyama (Ex. 1007).

255. To satisfy the written description requirement, I understand that the specification of the Sugiyama Priority Application must clearly allow persons of ordinary skill in the art to recognize that the inventor invented what is claimed. In other words, I understand that the test is whether the disclosure of the Sugiyama Priority Application reasonably conveys to a person of ordinary skill in the art that the inventor had possession of the claimed subject matter as of the filing date. I understand that the test for written description requires an objective inquiry into the four corners of the specification from the perspective of a person of ordinary skill in the art. I understand that actual possession or reduction to practice outside of the specification is not enough. Rather, I understand that it is the specification itself that must demonstrate possession of the claimed subject matter.

256. I understand that the enablement requirement is separate from the written description requirement discussed above. I understand that the specification of the Sugiyama Priority Application must enable a person of ordinary skill in the art to practice the full scope of the claimed invention. I understand that the enablement requirement is satisfied when a person of ordinary skill in the art, after reading the specification of the Sugiyama Priority Application, could practice the claimed invention without undue experimentation. I understand that factors to be

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considered in determining whether a disclosure would require undue experimentation include (1) the quantity of experimentation necessary, (2) the amount of direction or guidance presented, (3) the presence or absence of working examples, (4) the nature of the invention, (5) the state of the prior art, (6) the relative skill of those in the art, (7) the predictability or unpredictability of the art, and (8) the breadth of the claims.

257. The table below identifies disclosures of the Sugiyama Priority Application (Ex. 1035) that provide written description and enabling support for the claims of Sugiyama (Ex. 1007). In my opinion, the Sugiyama Priority Application (Ex. 1035) satisfies both the written description and enablement requirement because it contains a written description of the invention and the manner and process of making and using it, in such full, clear, concise, and exact terms, to enable an ordinarily skilled artisan to practice the invention claimed in Sugiyama (Ex. 1007).

Sugiyama Claims (Ex. 1007)	**Sugiyama Priority Application (Ex. 1035)**
1 (Preamble) ("A power transmission shaft interposed between a first shaft section and a second shaft section, the first shaft section and the second shaft section being a pair of vehicle side rotational shaft sections, the first shaft section being disposed on a driving source side of the vehicle and the second shaft section being disposed on a driving wheel side, the power transmission shaft transmitting a rotation of the driving source to the driving wheel and comprising")	Abstract, [0001], [0007]–[0009], [0012]–[0129], Figs. 1–19, Claim 1 (Preamble)

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Sugiyama Claims (Ex. 1007)	**Sugiyama Priority Application (Ex. 1035)**
1 ("a shaft section disposed between the first shaft section and the second shaft section")	Abstract, [0003], [0007], [0052], [0104], [0129], Figs. 1–19, Claim 1 ("a shaft section…")
1 ("a cylindrical section rotated integrally with the shaft section and formed cylindrically, each of the pair of vehicle side rotational shaft sections being inserted into an inside of the cylindrical section")	Abstract, [0007]–[0010], [0022], [0027], [0028], [0030]–[0032], [0037]–[0039], [0048]–[0056], [0058]–[0061], [0063]–[0065], [0070]–[0075], [0104], [0129], Figs. 1–19, Claim 1 ("a cylindrical section…")
1 ("a through hole disposed in the cylindrical section and penetrated radially with respect to a rotational axial line of the pair of vehicle side rotational shaft sections, each of the pair of vehicle side rotational shaft sections having an engagement groove disposed on an outer peripheral side of the pair of vehicle side rotational shaft sections and extended in a direction around the rotational axial line of the pair of vehicle side rotational shaft sections and the engagement groove being exposed from the through hole in a state in which each of the pair of vehicle side rotational shaft sections is inserted into the cylindrical section")	Abstract, [0007], [0026]–[0028], [0032]–[0037], [0039]–[0040], [0052]–[0053], [0056], [0058]–[0061], [0063]–[0064], [0074], [0083], [0086]–[0087], [0104], [0107]–[0110], [0126], [0129], Figs. 1–19, Claim 1 ("a through hole…")
1 ("a circlip disposed to enclose at least a portion of the outer peripheral side of the cylindrical section, a portion of the circlip being inserted into the through hole from the outer peripheral side of the cylindrical section and being engaged with the engagement groove")	Abstract, [0003], [0007]–[0010], [0016], [0027], [0032], [0038], [0040]–[0041], [0043]–[0045], [0048], [0050]–[0067], [0076]–[0089], [0112]–[0116], [0129], Figs. 1–19, Claim 1 ("a circlip…")
2 ("The power transmission shaft as claimed in claim 1, wherein the cylindrical section includes a	[0027]–[0028], [0032]–[0033], [0035]–[0036],

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Sugiyama Claims (Ex. 1007)	**Sugiyama Priority Application (Ex. 1035)**
retaining groove disposed on a portion of the outer peripheral side of the cylindrical section other than the portion of the cylindrical section at which the through hole is disposed, in the direction around the rotational axial line.")	[0040]–[0043], [0056], [0063], [0092]–[0093], [0105], [0113], Figs. 1–19, Claims 1, 2
3 ("The power transmission shaft as claimed in claim 2, wherein the retaining groove is an annular groove.")	[0003], [0016], [0027], [0032], [0057], [0106], Figs. 1–19, Claims 1–3
4 ("The power transmission shaft as claimed in claim 1, wherein the through hole includes a first through hole and a second through hole, the first through hole and the second through hole being spaced apart from each other by a predetermined distance in the direction around the rotational axial line.")	Abstract, [0027]–[0028], [0032]–[0037], [0049], [0052], [0058]–[0061], [0064], [0112]–[0114], Figs. 1–19, Claims 1, 4
5 ("The power transmission shaft as claimed in claim 4, wherein the first through hole and the second through hole are disposed at symmetrical positions to the rotational axial line.")	Abstract, [0032]–[0037], [0059]–[0060], [0063], [0108]–[0109], Figs. 1–19, Claims 1, 4, 5
6 ("The power transmission shaft as claimed in claim 5, wherein shapes and positions of the first through hole and the second through hole are orthogonal to the rotational axial line, are disposed symmetrically to a phantom line passing through the rotational axial line, and the circlip is disposed line symmetrically to the phantom line.")	Abstract, [0034]–[0035], [0060], [0063], [0113], Figs. 1–19, Claims 1, 4–6
7 ("The power transmission shaft as claimed in claim 6, wherein each of the first through hole and the second through hole is formed by an elimination of a portion of the cylindrical section, a pair of planer sections are formed at both end sections of an eliminated cross section of the cylindrical section in the direction around the rotational axial line.")	Abstract, [0059]–[0060], [0108]–[0110], Figs. 1–19, Claims 1, 4–7
8 ("The power transmission shaft as claimed in claim 7, wherein the circlip includes a straight line	Abstract, [0005], [0007]–[0009], [0027], [0034],

Sugiyama Claims (Ex. 1007)	Sugiyama Priority Application (Ex. 1035)
section, a position of the straight line section at which the retaining groove is brought in contact with the pair of planer sections are formed in a straight line.")	[0038], [0040]–[0041], [0053]–[0060], Figs. 1–19, Claims 1, 4–8
9 ("The power transmission shaft as claimed in claim 8, wherein the retaining groove includes a projection section formed to project toward an outside in a radial direction of the rotational axial line at a portion of the circlip passing through the rotational axial line and intersecting a second phantom line orthogonal to the rotational axial line.")	Abstract, [0040]–[0043], [0063], Figs. 1–19, Claims 1, 4–9
10 ("The power transmission shaft as claimed in claim 5, wherein the cylindrical section includes a retaining groove disposed on an outer peripheral side of the cylindrical section and disposed at a portion of the cylindrical section other than portions of the cylindrical section at which the pair of through holes are disposed in the direction around the rotational axial line, when a phantom line passing through the rotational axial line and orthogonal to the rotational axial line is a second phantom line, the first through hole and the second through hole being formed line symmetrically to the phantom line and the second phantom line and the retaining groove being formed line symmetrically to the phantom line and the second phantom line.")	Abstract, [0034]–[0035], [0060], [0063], [0109], [0112]–[0113] , Figs. 1–19, Claims 1, 4, 5, 10
11 ("The power transmission shaft as claimed in claim 1, wherein the through hole includes a first through hole and a second through hole, both of the first and second through holes being spaced apart from each other by a predetermined distance in a direction around the rotational axial line, the retaining ring includes: a first inserting section inserted into the first through hole; a second inserting section inserted into the second through	Abstract, [0007]–[0010], [0016], [0026]–[0028], [0032]–[0037], [0039]–[0040], [0050]–[0053], [0056], [0058]–[0061], [0063]–[0064], [0074], [0083], [0086]–[0087], [0104], [0107]–[0110], [0112]–[0116], [0126],

Sugiyama Claims (Ex. 1007)	Sugiyama Priority Application (Ex. 1035)
hole; a connection section connecting one end side of the first inserting section to one end side of the second through hole; a first engagement section disposed on the other end side of the first inserting section and extended in an opposite side of the first inserting section in the direction around the rotational axial line; and a second engagement section disposed on the other end side of the second inserting section and extended in an opposite side to the second inserting section.")	[0129], Figs. 1–19, Claims 1, 11
12 ("The power transmission shaft as claimed in claim 11, wherein the first engagement section and the second engagement section are formed not to be protruded from the outer peripheral surface of the cylindrical section in a state in which the circlip is normally attached.")	Abstract, [0043], [0051], [0064]–[0067], [0082], [0086]–[0087], [0089]–[0090], Figs. 1–19, Claims 1, 11, 12
13 ("The power transmission shaft as claimed in claim 11, wherein the first engagement section and the second engagement section include a jig purpose engagement section to which a jig to remove the retaining ring is engaged.")	Abstract, [0045]–[0046], [0066], [0084], [0116], Figs. 1–19, Claims 1, 11, 13
14 ("The power transmission shaft as claimed in claim 11, wherein the first engagement section and the second engagement section include a gap against the cylindrical section in the radial direction of the rotational axial line.")	Abstract, [0043], [0067], [0081], [0084], [0117], Figs. 1–19, Claims 1, 11, 14
15 ("The power transmission shaft as claimed in claim 1, wherein the engagement groove of the pair of the vehicle side rotational shaft sections includes: a bottom surface; and a pair of rising surfaces disposed on both sides of the bottom surface in the direction of the rotational axial line, one of the pair of rising surfaces which is an opposite side to a direction in which a corresponding one of the vehicle side rotational shaft sections is pulled out from the cylindrical section being formed in such a way that one of	Abstract, [0003], [0007], [0016], [0018]–[0019], [0027], [0032], [0037]–[0038], [0045]–[0046] [0052], [0104], [0129], Figs. 1–19, Claims 1, 16

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Sugiyama Claims (Ex. 1007)	Sugiyama Priority Application (Ex. 1035)
angles formed between a corresponding one of the pair of rising surfaces which is the opposite side to the direction in which the corresponding one of the vehicle side rotational shaft sections is pulled out from the cylindrical section and the rotational axial line which is the engagement groove side is larger than 90 degrees but smaller than 180 degrees.")	
16 ("The power transmission shaft as claimed in claim 15, wherein one of the pair of rising surfaces which is at the side of the direction in which a corresponding one of the vehicle side rotational shaft sections is pulled out is formed in such a way that an angle formed between a corresponding one of the pair of rising surfaces which is at the side of the direction in which a corresponding one of the vehicle side rotational shaft sections is pulled out and the corresponding one of the vehicle side rotational shaft sections is a substantially right angle.")	Abstract, [0018]–[0020], [0068]–[0069], [0087], [0119]–[0120], Figs. 1–19, Claims 1, 16, 17
17 ("The power transmission shaft as claimed in claim 1, wherein the vehicle side rotational shaft sections include a tapered section formed at a tip side of an insertion side of the cylindrical section in such a way that a diameter of one of the vehicle side rotational shaft sections becomes smaller as a corresponding one of the vehicle side rotational shaft sections goes toward a tip side.")	Abstract, [0021], [0022], [0049]–[0050], [0070], [0121], Figs. 1–19, Claims 1, 18
18 ("The power transmission shaft as claimed in claim 1, wherein each of the vehicle side rotational shaft sections includes a butting section against which an end section of the cylindrical section is butted.")	Abstract, [0037], [0071], [0122], Figs. 1–19, Claims 1, 19
19 ("The power transmission shaft as claimed in claim 1, wherein the vehicle side rotational shaft sections include a colored section colored on outer peripheral side of the vehicle side rotational shaft sections and which is enclosed by the cylindrical	Abstract, [0072]–[0073], [0123], Figs. 1–19, Claims 1, 20

Sugiyama Claims (Ex. 1007)	Sugiyama Priority Application (Ex. 1035)
section in a state in which the vehicle side rotational shaft section is normally inserted into the cylindrical section.")	
20 ("The power transmission shaft as claimed in claim 1, wherein the cylindrical section includes a boot attachment section disposed at an opposite side to an insertion inlet into which the vehicle side rotational shaft sections are inserted with respect to the through hole at the outer peripheral side of the cylindrical section.")	Abstract, [0039], [0074], [0124], Figs. 1–19, Claims 1, 21
21 ("The power transmission shaft as claimed in claim 1, wherein either the retaining ring or the cylindrical section includes a caulking section fixed by caulking in a state in which the retaining ring is attached to the cylindrical section.")	Abstract, [0041], [0075], [0125], Figs. 1–19, Claims 1, 22
22 ("The power transmission shaft as claimed in claim 21, wherein the through hole includes a first through hole and a second through hole disposed to be spaced apart from each other by a predetermined distance in a direction around the rotational axial line and the circlip includes a first insertion section inserted into the first through hole; a second insertion section inserted into the second through hole; and a connection section connecting one end side of the first insertion section and one end side of the second insertion section.")	Abstract, [0040], [0064], [0081], [0086], [0114], [0126]–[0127], Figs. 1–19, Claims 1, 22, 23

IX. CLAIMS 1–18 OF THE '958 PATENT ARE UNPATENTABLE OVER THE PRIOR ART

258. I have evaluated the scope and content of the prior art. In addition to considering the knowledge of a person of ordinary skill, the prior art references that I relied upon in forming my opinions are listed in Section IV and identified herein.

259. In my opinion, Claims 1–18 of the ’958 patent are unpatentable as anticipated or obvious over the prior art.

A. Renegade Manual Anticipation – Claims 1–18

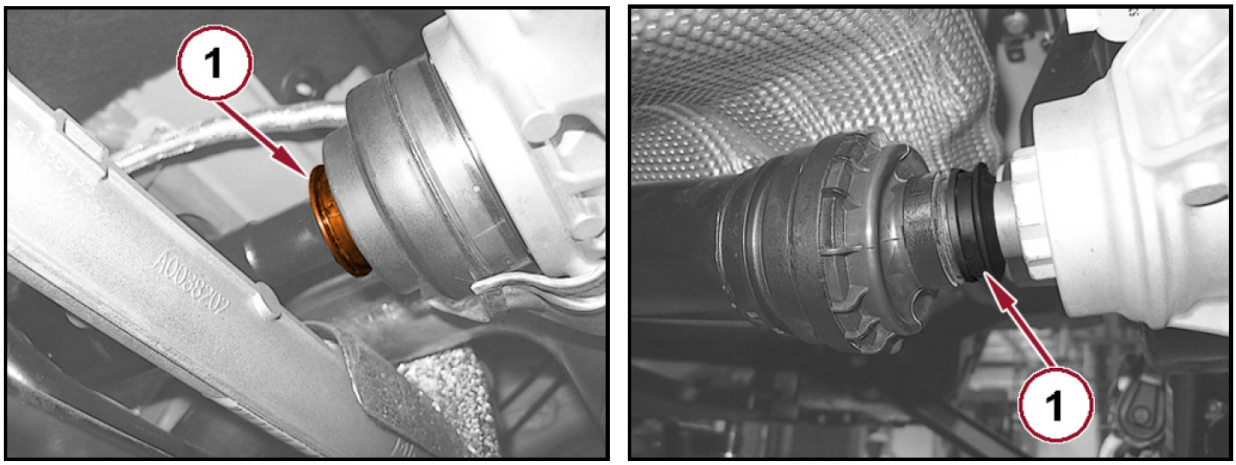
260. I provided a summary of Renegade Manual (Ex. 1013) above in Section VIII.A, which I incorporate herein by reference. I have compared Claims 1–18 of the ’958 patent to the Renegade Manual below. In my opinion, the Renegade Manual contains all of the limitations of Claims 1–18 and, therefore, anticipates those claims.

1. Claim 1

261. In my opinion, the Renegade Manual discloses all of the limitations of independent Claim 1 of the ’958 patent and, therefore, anticipates Claim 1.

[1P] A joint assembly comprising:

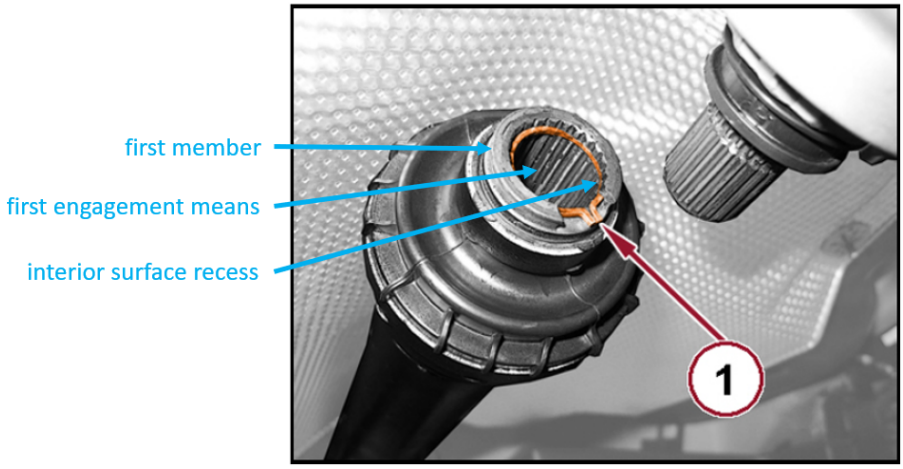
262. The Renegade Manual discloses “a joint assembly” (Ex. 1001, ’958 patent at Claim 1), including a joint assembly between the propshaft and PTU (left) and a joint assembly between the propshaft and the RDU (right).



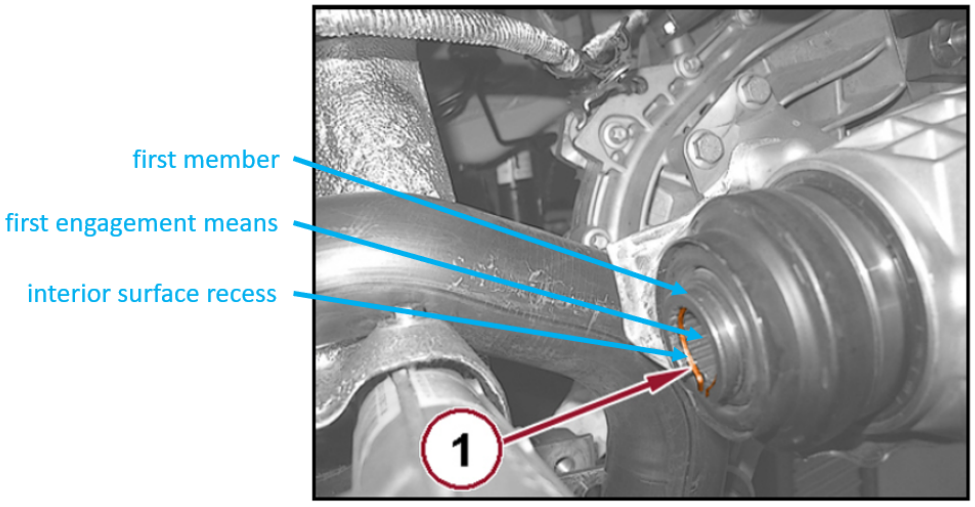
(Ex. 1013, Renegade Manual at PET_AAM_1013-0197–0198, Removal Steps 16 (PTU), 23 (RDU)).

[1a] a first member having a first engagement means and an interior surface recess;

263. The Renegade Manual discloses that each joint assembly has "a first member having a first engagement means and an interior surface recess." (Ex. 1001, '958 patent at Claim 1).



Ex. 1013, Renegade Manual at PET_AAM_1013-0202, Installation Step 8 (RDU).

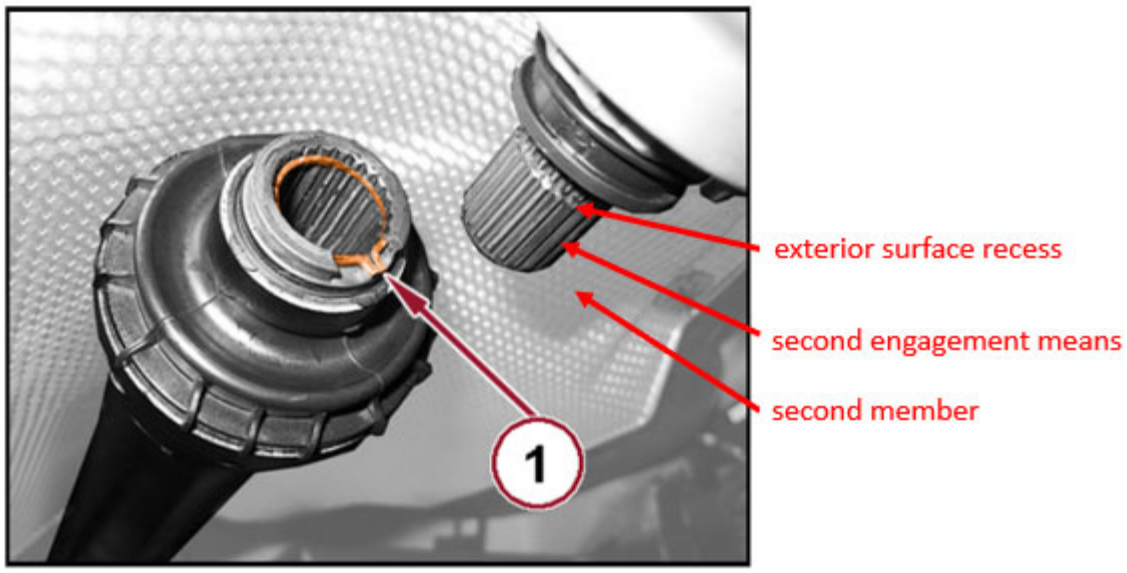


(Ex. 1013, Renegade Manual at PET_AAM_1013-0201, Installation Step 4 (PTU)).

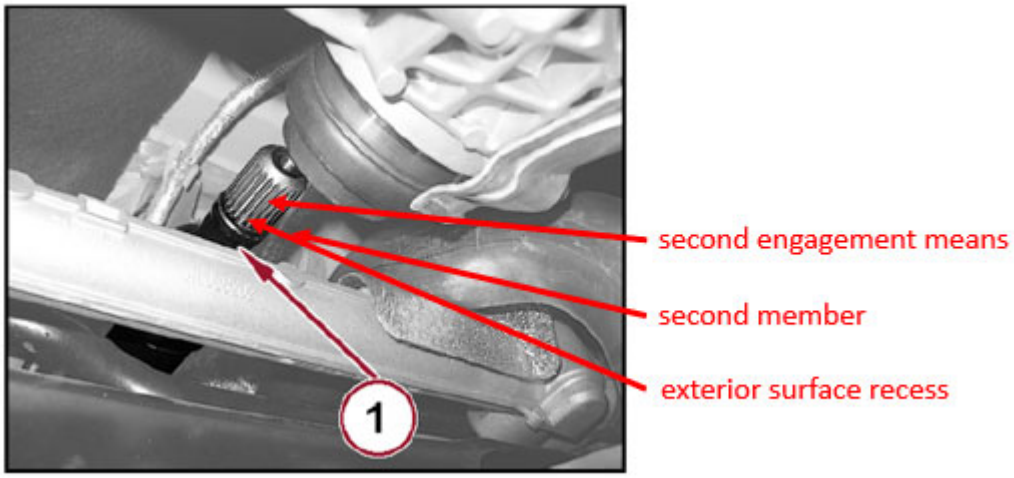
264. In particular, the propshaft of the joint assembly between the propshaft and the RDU includes a female shaft, which is a "first member." (Ex. 1013, Renegade Manual at PET_AAM_1013-0199–0202, Removal Steps 24, 25, 27, Installation Steps 3, 8). The PTU of the joint assembly between the propshaft and the PTU includes a female shaft, which is a "first member." (Ex. 1013, Renegade Manual at PET_AAM_1013-0197–0203, Removal Steps 17, 19, Installation Steps 4, 11). Each of the first members have a plurality of internal, female splines, which are "first engagement means." (Ex. 1013, Renegade Manual at PET_AAM_1013-0197–0203, Removal Steps 17, 19, 24, 25, 27, Installation Steps 3, 4, 8, 11). Each of the first members also have a "groove," an "interior surface recess," for receiving the "snap ring" within the first members (Ex. 1013, Renegade Manual at PET_AAM_1013-0199–0203, Removal Steps 24, 25, 27, Installation Steps 3, 4, 8, 11).

[1b] a second member having a second engagement means and an exterior surface recess, a portion of the second member disposed within the first member, the second engagement means engaging the first engagement means to provide a coupling of the second member to the first member;

265. The Renegade Manual discloses that each joint assembly has "a second member having a second engagement means and an exterior surface recess." (Ex. 1001, '958 patent at Claim 1).



(Ex. 1013, Renegade Manual at PET_AAM_1013-0202, Installation Step 8 (RDU)).



(Ex. 1013, Renegade Manual at PET_AAM_1013-0198, Removal Step 19 (PTU)).

266. In particular, the pinion shaft of the RDU of the joint assembly between the propshaft and the RDU includes a male shaft, which is a "second member." (Ex. 1013, Renegade Manual at PET_AAM_1013-0199–0202, Removal Steps 24, 25, 27, Installation Steps 1, 8). The propshaft of the joint assembly between the propshaft

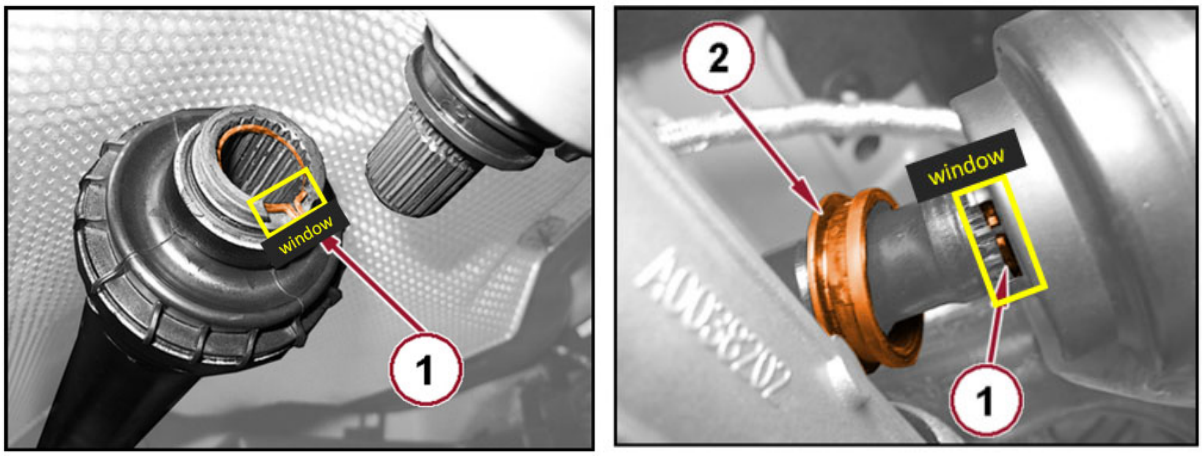
and the PTU includes a male shaft, which is a "second member." (Ex. 1013, Renegade Manual at PET_AAM_1013-0197–0203, Removal Steps 17, 19, Installation Steps 2, 11). Each of the second members have a plurality of external, male splines, which are "second engagement means." (Ex. 1013, Renegade Manual at PET_AAM_1013-0197–0203, Removal Steps 17, 19, 24, 25, 27, Installation Steps 1, 2, 8, 11). Each of the second members also has a "groove," an "exterior surface recess," for receiving the "snap ring" on the second members. (Ex. 1013, Renegade Manual at PET_AAM_1013-0197–0203, Removal Steps 17, 19, 24, 25, 27, Installation Steps 1, 2, 8 ("verify the snap ring is seated in the groove of the pinion shaft), 11 ("verify the snap ring is (1) seated in the groove of the propeller shaft")).

267. The Renegade Manual also discloses "a portion of the second member disposed within the first member, the second engagement means engaging the first engagement means to provide a coupling of the second member to the first member." (Ex. 1001, '958 patent at Claim 1). In particular, for the joint assembly between the propshaft and RDU, a portion of the pinion shaft of the RDU (second member) is disposed within the propshaft (first member), and the plurality of external, male splines (second engagement means) on the pinion shaft engage the plurality of internal, female splines (first engagement means) on the propshaft to provide a coupling of the pinion shaft to the propshaft. (Ex. 1013, Renegade Manual at

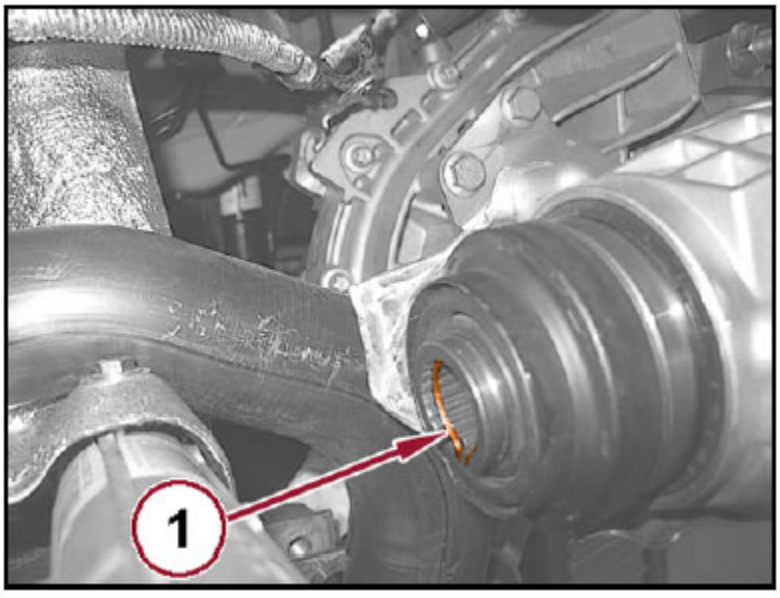
PET_AAM_1013-0198–0202, Removal Steps 23, 24, 25, 27, Installation Steps 1, 3, 8, 9). And, for the joint assembly between the propshaft and PTU, a portion of the propshaft (second member) is disposed within the PTU (first member), and the plurality of external, male splines (second engagement means) on the propshaft engage the plurality of internal, female splines (first engagement means) on the PTU to provide a coupling of the propshaft to the PTU. (Ex. 1013, Renegade Manual at PET_AAM_1013-0197–0203, Removal Steps 16, 17, 19, Installation Steps 2, 4, 11).

[1c] a window formed within the first member where the portion of the second member is disposed within the first member;

268. The Renegade Manual discloses that each joint assembly has "a window formed within the first member where the portion of the second member is disposed within the first member." (Ex. 1001, '958 patent at Claim 1). For example, Installation Steps 8 (left) and 11 (right) illustrate windows formed in each first member of the joint assemblies between the propshaft and RDU and propshaft and PTU, respectively.



(Ex. 1013, Renegade Manual at PET_AAM_1013-0202–0203, Installation Steps 8 and 11; Ex. 1013, Renegade Manual at PET_AAM_1013-0197–0201, Removal Steps 17, 24, 25, 27, Installation Steps 3).

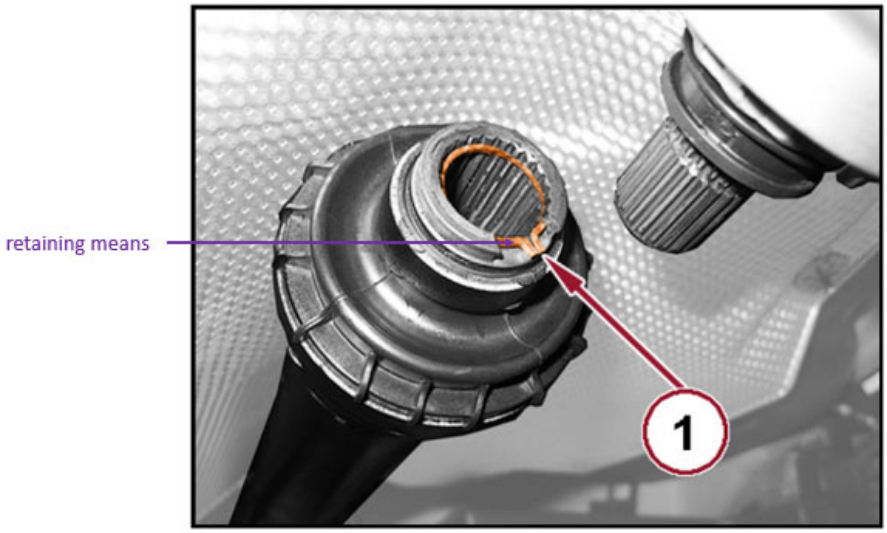


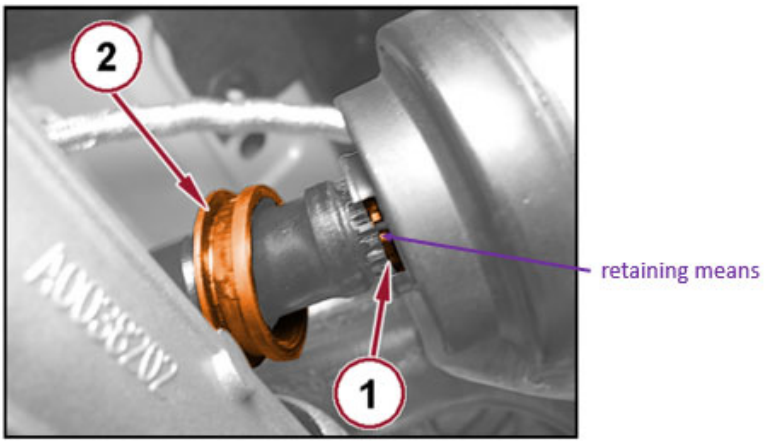
(Ex. 1013, Renegade Manual at PET_AAM_1013-0201, Installation Step 4 (depicting "window formed within the first member where the portion of the second member is disposed within the first member").) The windows are formed at a position where the second member is disposed within the first member. (Ex. 1013,

Renegade Manual at PET_AAM_1013-0197–0203, Removal Steps 17, 24, 25, 27, Installation Steps 3, 4, 8, 11).

[1d] a retaining means configured to retain the coupling of the second member to the first member,

269. The Renegade Manual discloses that each joint assembly comprises "a retaining means configured to retain the coupling of the second member to the first member" (Ex. 1001, '958 patent at Claim 1), namely an elastic "snap ring," which is a retaining ring numbered "1" in the images from Installation Steps 8 and 11, reproduced below:



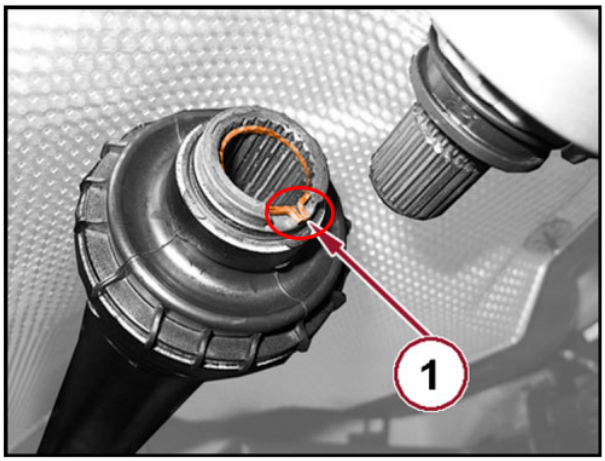


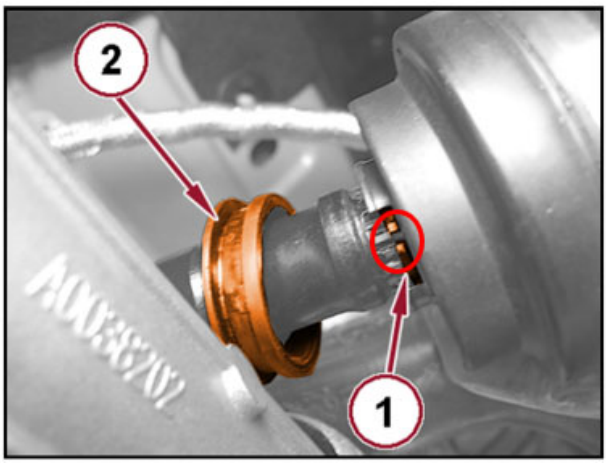
(Ex. 1013, Renegade Manual at PET_AAM_1013-0202–0203, Installation Steps 8 (RDU) and 11 (PTU); Ex. 1013, Renegade Manual at PET_AAM_1013-0197–0203, Removal Steps 16, 17, 24, 25, 27, Installation Steps 3 ("Install a NEW snap ring (1) in the drive shaft."), 4 ("Install a NEW snap ring (1) in the Power Transfer Unit (PTU)"), 8, 11; Ex. 1013, Renegade Manual at PET_AAM_1013-0193, Special Tools ("Elastic Ring Spreader")). The snap rings of the joint assemblies retain the coupling of the second member to the first member. (Ex. 1013, Renegade Manual at PET_AAM_1013-0197–0203, Removal Steps 16, 17, 24, 25, 27, Installation Steps 3, 4, 8, 11).

[1d(i)] wherein distal ends of the retaining means are accessible through the window,

270. The Renegade Manual discloses that, for each joint assembly, "distal ends of the retaining means are accessible through the window." (Ex. 1001, '958 patent at Claim 1). Images from Installation Steps 8 and 11, for example, depict distal ends of the snap rings ("retaining means") accessible through windows in the

propshaft and PTU:



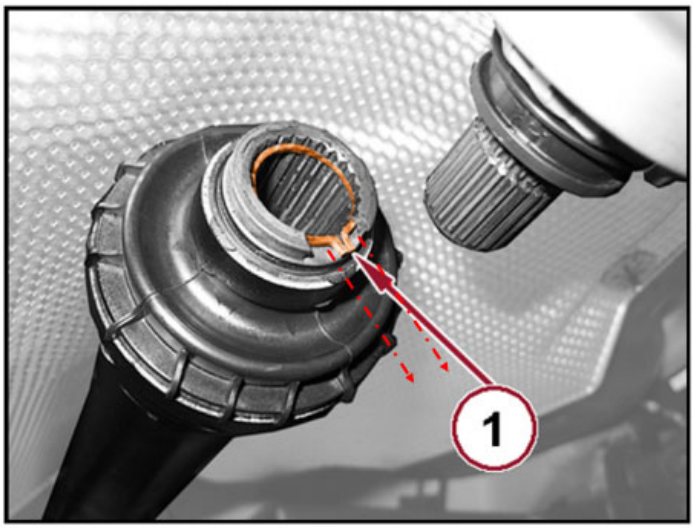


(Ex. 1013, Renegade Manual at PET_AAM_1013-0202–0203, Installation Steps 8 (RDU) and 11 (PTU); Ex. 1013, Renegade Manual at PET_AAM_1013-0197–0201, Removal Steps 16, 17, 23–27, Installation Steps 3, 4). The Renegade Manual further describes using an "Elastic Ring Spreader" to access and spread the distal ends of the snap rings to "open propeller shaft snap ring." (Ex. 1013, Renegade Manual at PET_AAM_1013-0197–0199, Removal Step 17, 24; Ex. 1013, Renegade Manual at PET_AAM_1013-0193, Special Tools ("Elastic Ring Spreader")).

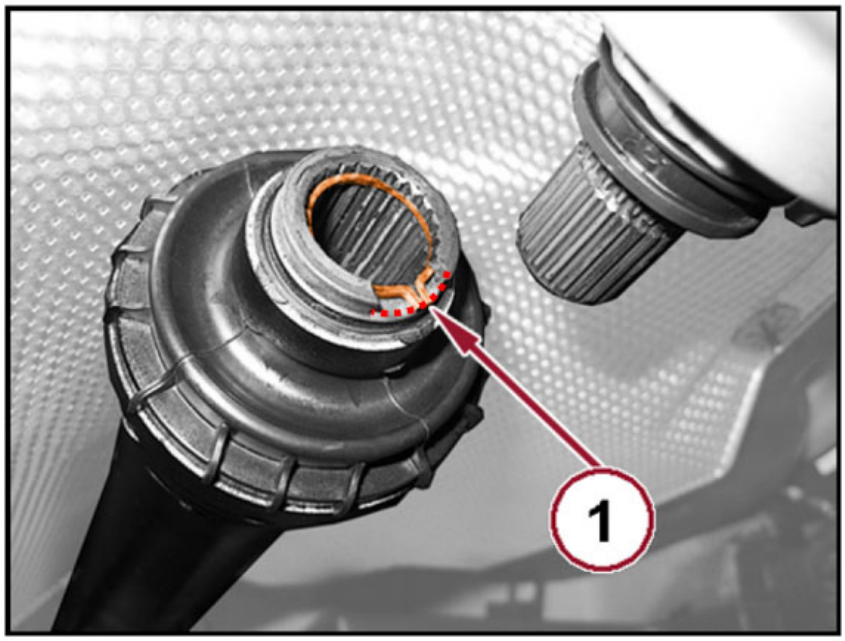
[1d(ii)] wherein the distal ends of the retaining means extend in a direction radially outwardly into the window to a point at or radially inwardly from an outer wall of the first member, and

271. The Renegade Manual discloses that, for each joint assembly, "wherein the distal ends of the retaining means extend in a direction radially outwardly into the window to a point at or radially inwardly from an outer wall of the first member." (Ex. 1001, '958 patent at Claim 1). The image from Installation Step 8, for example,

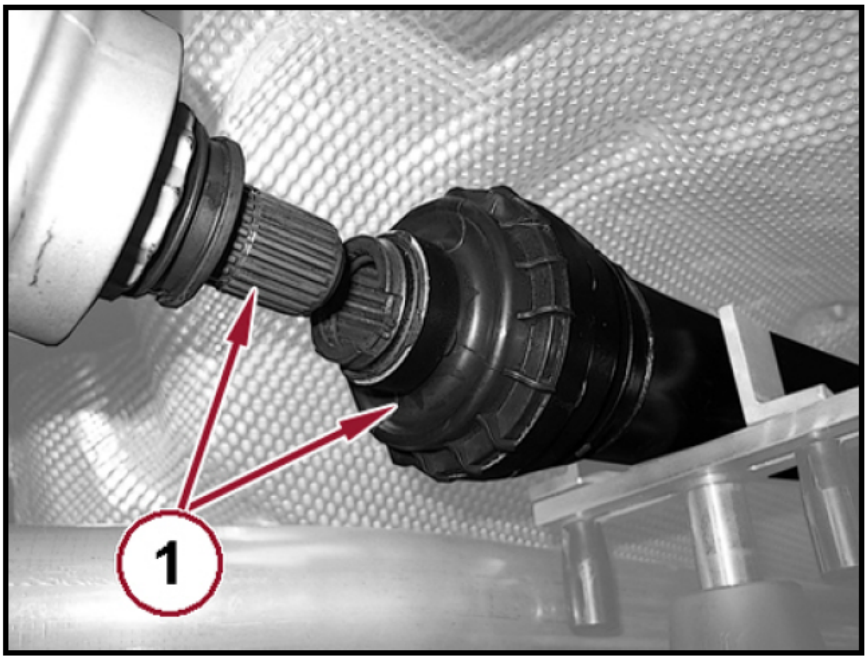
depicts distal ends of the snap ring ("retaining means") extending in a direction radially outwardly into the window, which I have illustrated with dashed, red arrows:



(Ex. 1013, Renegade Manual at PET_AAM_1013-0202, Installation Step 8 (RDU); Ex. 1013, Renegade Manual at PET_AAM_1013-0197–0203, Removal Steps 17, 24, 25, and 27, Installation Steps 3, 4, 8, 12). The same image also depicts that distal ends of the snap ring extend to a point at or radially inwardly from an outer wall of the first member, which I have illustrated with a dashed, red line:



(Ex. 1013, Renegade Manual at PET_AAM_1013-0202, Installation Steps 8 (RDU); Ex. 1013, Renegade Manual at PET_AAM_1013-0197–0203, Removal Steps 17, 24, and 27, Installation Steps 3, 4, 8, 12).



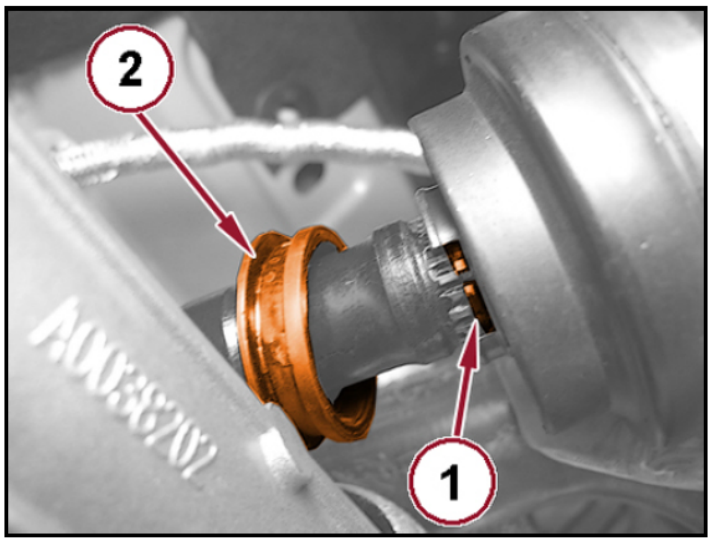
(Ex. 1013, Renegade Manual at PET_AAM_1013-0199, Removal Step 25

(depicting "distal ends of the retaining means extend in a direction radially outwardly into the window to a point at or radially inwardly from an outer wall of the first member")). The Renegade Manual further discloses "slid[ing] the dust cover . . . to access the snap ring." (Ex. 1013, Renegade Manual at PET_AAM_1013-0197–0198, Removal Steps 16, 23). This further supports my conclusion that the distal ends of the snap rings extend in a direction radially outwardly into the windows to a point at or radially inwardly from an outer wall of the first members because, otherwise, the distal ends of the snap rings would snag and catch the seals and prevent their sliding.

[1d(iii)] wherein the retaining means is received partially into each of the interior surface recess of the first member and the exterior surface recess of the second member when the retaining means retains the coupling of the second member to the first member; and

272. The Renegade Manual discloses that, for each joint assembly, "the retaining means is received partially into each of the interior surface recess of the first member and the exterior surface recess of the second member when the retaining means retains the coupling of the second member to the first member." (Ex. 1001, '958 patent at Claim 1). For example, Installation Steps 3 and 4 depict the snap rings seated in the interior surface recess of the first, female shaft members of the joint assemblies, the propshaft and PTU, and Installation Steps 8 and 11 instruct to "verify that the snap ring is seated in the groove" of the second, male shaft

members of the joint assemblies, the pinion shaft of the RDU and propeller shaft. (Ex. 1013, Renegade Manual at PET_AAM_1013-0201–0203, Installation Steps 3, 4, 8, and 11; Ex. 1013, Renegade Manual at PET_AAM_1013-0197–0200, Removal Steps 16–19, 23–27, Installation Steps 1–2). The image from Installation Step 11 also illustrates that the snap rings of the joint assemblies are received partially into each of the interior surface recess of the first members and the exterior surface recess of the second members to retain the coupling of the second members to the first members:

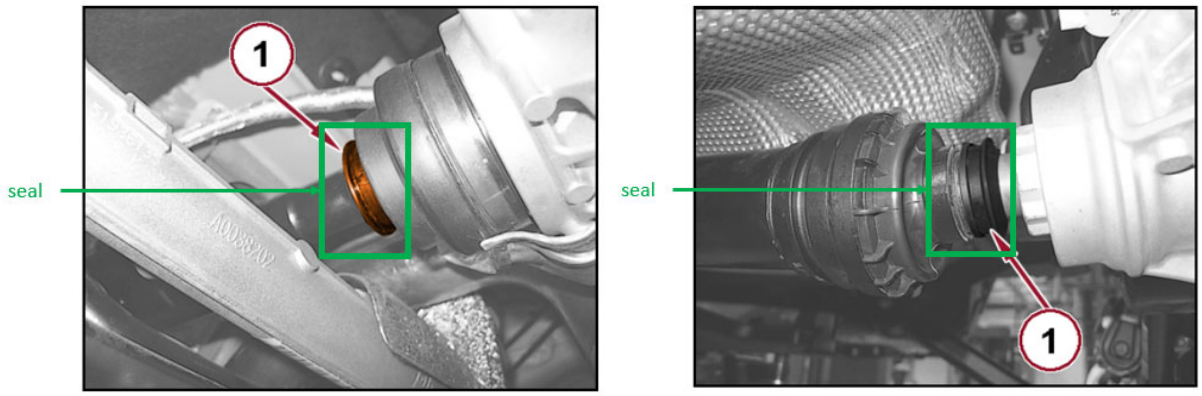


(Ex. 1013, Renegade Manual at PET_AAM_1013-0203, Installation Step 11).

[1e] a seal configured to cover the window,

273. The Renegade Manual discloses that each joint assembly comprises a "seal" (Ex. 1001, '958 patent at Claim 1), namely "dust cover" or "dust seal" (numbered "1" in the images of Removal Steps 16 (PTU) and 23 (RDU) reproduced

below).

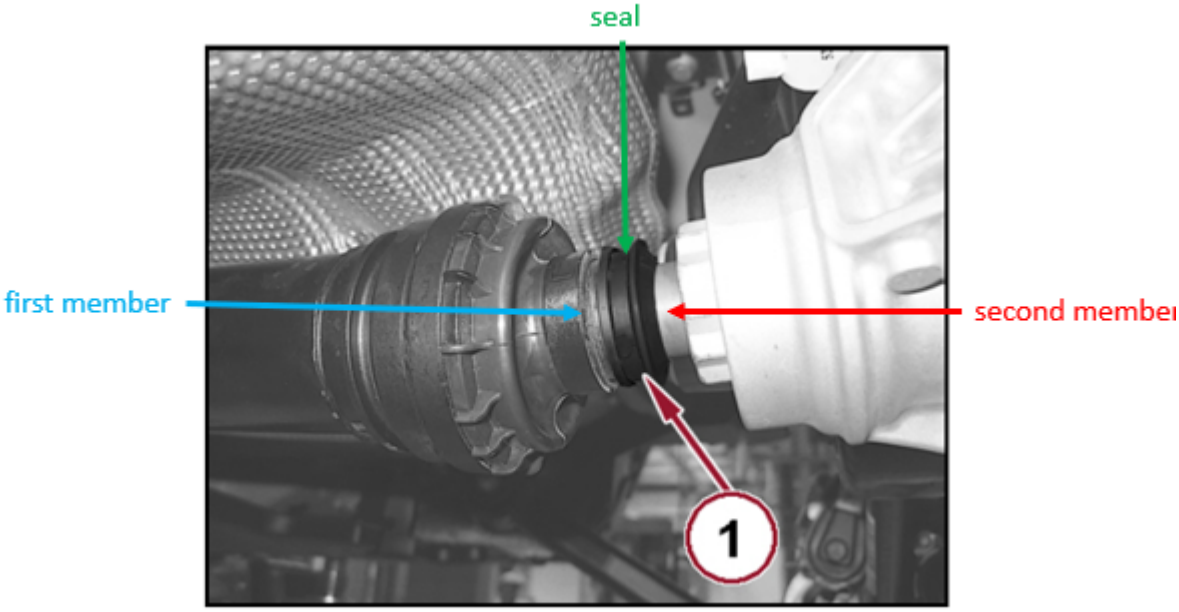


(Ex. 1013, Renegade Manual at PET_AAM_1013-0197–0198, Removal Steps 16 (PTU), 23 (RDU); Ex. 1013, Renegade Manual at PET_AAM_1013-0199–0203, Removal Steps 25, 27, Installation Steps 1, 2, 8, 9, 12). As depicted above, the seal is "configured to cover the window," and, in fact, the Renegade Manual teaches to "slide the dust cover (1)" away from the PTU and propshaft to access the snap ring through the window of the first, female shaft members. (Ex. 1013, Renegade Manual at PET_AAM_1013-0197–0198, Removal Steps 16 and 23).

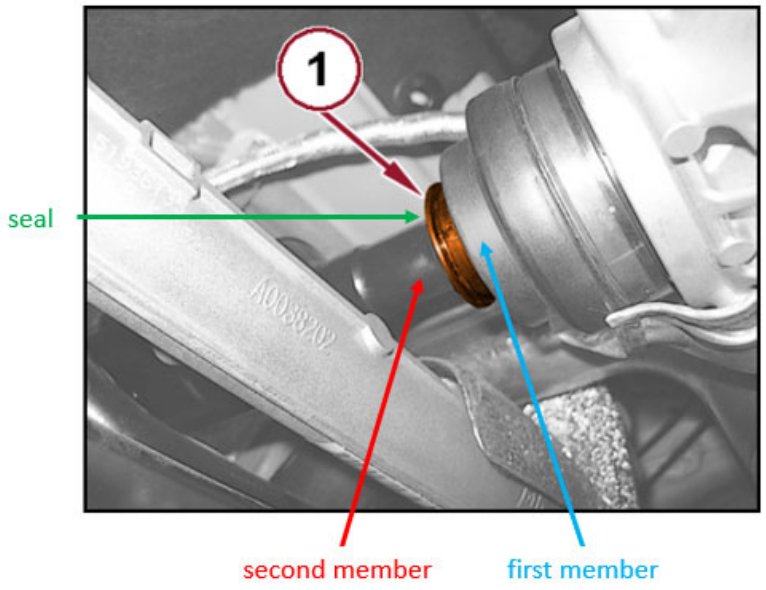
[1e(i)] the seal coupled to the second member adjacent an end of the first member,

274. The Renegade Manual discloses that the seal of each joint assembly, "dust cover" or "dust seal," is "coupled to the second member adjacent an end of the first member." (Ex. 1001, '958 patent at Claim 1). For example, in the joint assembly between the propshaft (first member) and the pinion shaft of the RDU (second member), the seal is coupled to the pinion shaft of the RDU adjacent an end of the propshaft, as depicted in Removal Step 23 and Installation Step 9 ("position

the new dust cover (1) over the joint at the rear of the propeller shaft"):



(Ex. 1013, Renegade Manual at PET_AAM_1013-0198, Removal Step 23, PET_AAM_1013-0202, Installation Step 9). Similarly, in the joint assembly between the PTU (first member) and propshaft (second member), the seal is coupled to the propshaft adjacent an end of the PTU, as depicted in Removal Step 16 and Installation Step 12 ("position the new dust cover (2) over the joint at the front of the propeller shaft"):

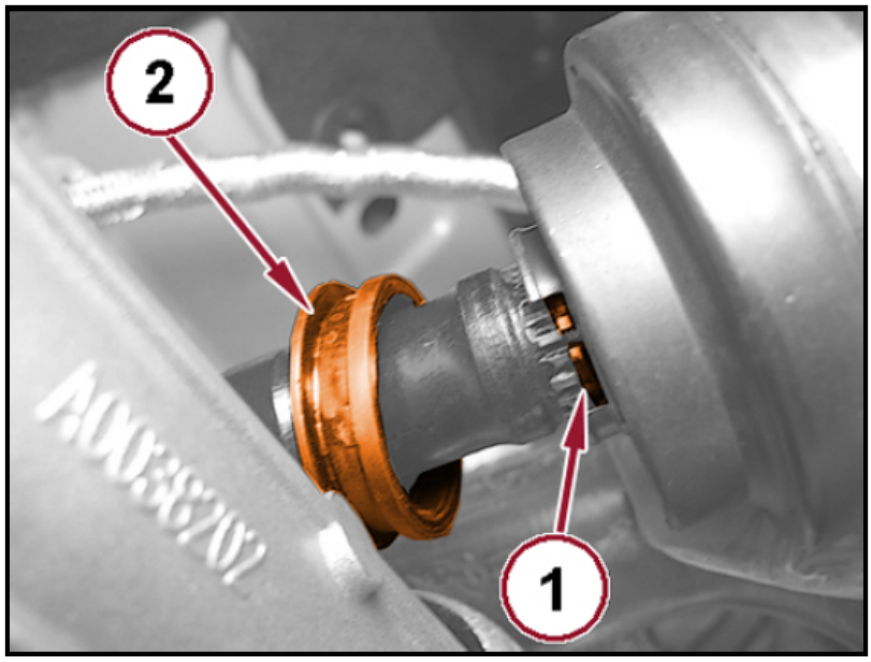


(Ex. 1013, Renegade Manual at PET_AAM_1013-0197, Removal Step 16, PET_AAM_1013-0203, Installation Step 12; Ex. 1013, Renegade Manual at PET_AAM_1013-0197–0203, Removal Steps 16, 25, 27, Installation Steps 1, 2, 8, 9, 12). My opinion that the seal disclosed by the Renegade Manual is "coupled to the second member adjacent an end of the first member" is consistent with the embodiment of Figures 1–3 of the '958 patent, in which "seal 240" is shown not to be clamped to either the first, female shaft member or second, male shaft member. (Ex. 1001, '958 patent at 6:63–7:3, Figs. 1–3).

[1e(ii)] the seal coupled to the first member adjacent the window,

275. The Renegade Manual discloses that the seal of each joint assembly, "dust cover" or "dust seal," is "coupled to the first member adjacent the window." (Ex. 1001, '958 patent at Claim 1). For example, in regard to the joint assembly

between the PTU (first member) and propshaft (second member), the image of Installation Step 12 depicts that the seal is coupled to the PTU adjacent the window in the PTU when the seal is "position[ed] . . . over the joint at the front of the propeller shaft."

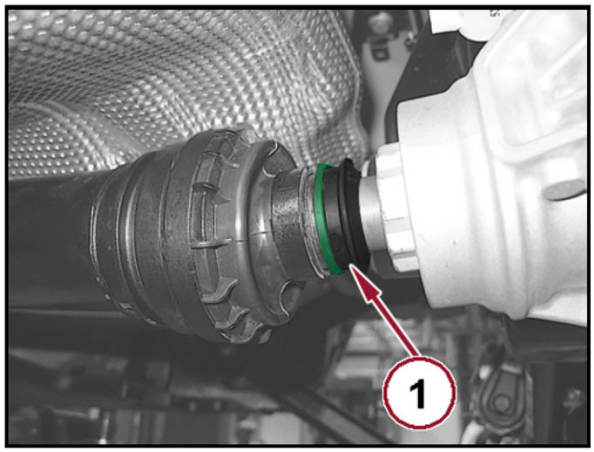


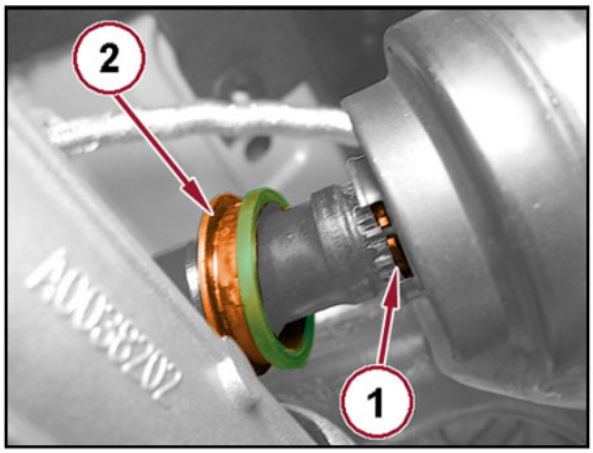
(Ex. 1013, Renegade Manual at PET_AAM_1013-0203, Installation Step 12; Ex. 1013, Renegade Manual at PET_AAM_1013-0197–0203, Removal Steps 16 (PTU), 23, 25, 27, Installation Steps 1, 2, 8, 9, 12). My opinion that the seal disclosed by the Renegade Manual is "coupled to the first member adjacent the window" is consistent with the embodiment of Figures 1–3 of the '958 patent, in which "seal 240" is shown not to be clamped to either the first, female shaft member or second, male shaft member. (Ex. 1001, '958 patent at 6:63–7:3, Figs. 1–3).

[1e(iii)] wherein a cylindrical portion of the seal covers the outer wall of the first member along at least a portion of a

perimeter of the window,

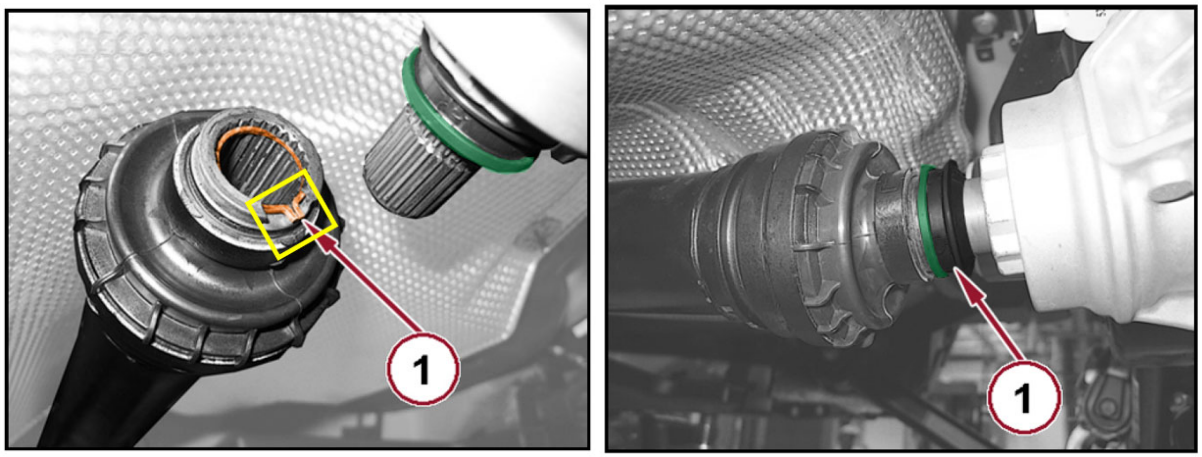
276. The Renegade Manual discloses that, for each joint assembly, "wherein a cylindrical portion of the seal covers the outer wall of the first member along at least a portion of a perimeter of the window." (Ex. 1001, '958 patent at Claim 1). For example, the Renegade Manual discloses that the seal of each joint assembly includes a "cylindrical portion," a closed annular portion of the seal that is extended in an axial direction thereof, and not to a conical, frustoconical, or otherwise tapered shape that is formed by the seal, which I have illustrated in green in an image from Removal Step 23 and Installation Step 9 for the joint assembly between the propshaft and the RDU and in an image from Installation Step 11 for the joint assembly between the propshaft and the PTU.





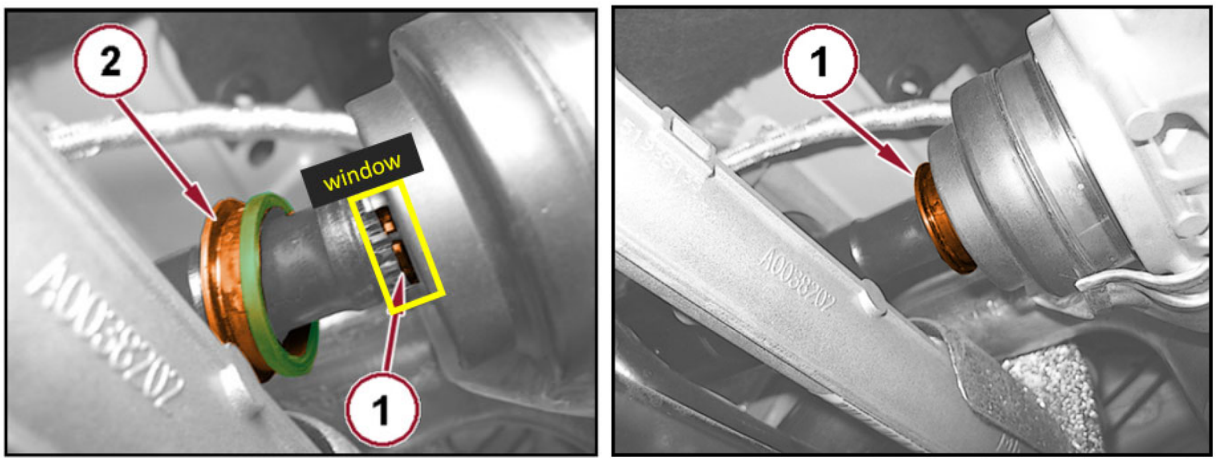
(Ex. 1013, Renegade Manual at PET_AAM_1013-0198, Removal Step 23, PET_AAM_1013-0202–0203, Installation Steps 9, 11; Ex. 1013, Renegade Manual at PET_AAM_1013-0197–0203, Removal Steps 16, 17, 24, 25, 27, Installation Steps 1–4, 8, 12).

277. The Renegade Manual also discloses that the cylindrical portions of each seal "covers the outer wall of the first member along at least a portion of a perimeter of the window." (Ex. 1001, '958 patent at Claim 1). As to the seal of the joint assembly between the propshaft and RDU, images below for Installation Steps 8 and 9 and Removal Step 23 show that, when the seal is "position[ed] over the joint at the rear of the propeller shaft," the cylindrical portion of the seal (green) covers the outer wall of the first member (the female shaft member of the propshaft) at least along a perimeter of the window, that is, at least along a portion of positions around the window (yellow) where an outer surface of the first member deviates radially inwardly to define the opening corresponding of the window.



(Ex. 1013, Renegade Manual at PET_AAM_1013-0198, Removal Step 23, PET_AAM_1013-0202, Installation Steps 8, 9; Ex. 1013, Renegade Manual at PET_AAM_1013-0199–0201, Removal Steps 24, 25, 27, Installation Steps 1, 3). As to the seal of the joint assembly between the propshaft and PTU, images below

for Removal Step 16 and Installation Step 11 show that, when the seal is "position[ed] over the joint at the front of the propeller shaft," the cylindrical portion of the seal (green) covers the outer wall of the first member (the female shaft of the PTU) at least along a perimeter of the window, that is, at least along a portion of positions around the window (yellow) where an outer surface of the first member deviates radially inwardly to define the opening corresponding of the window.

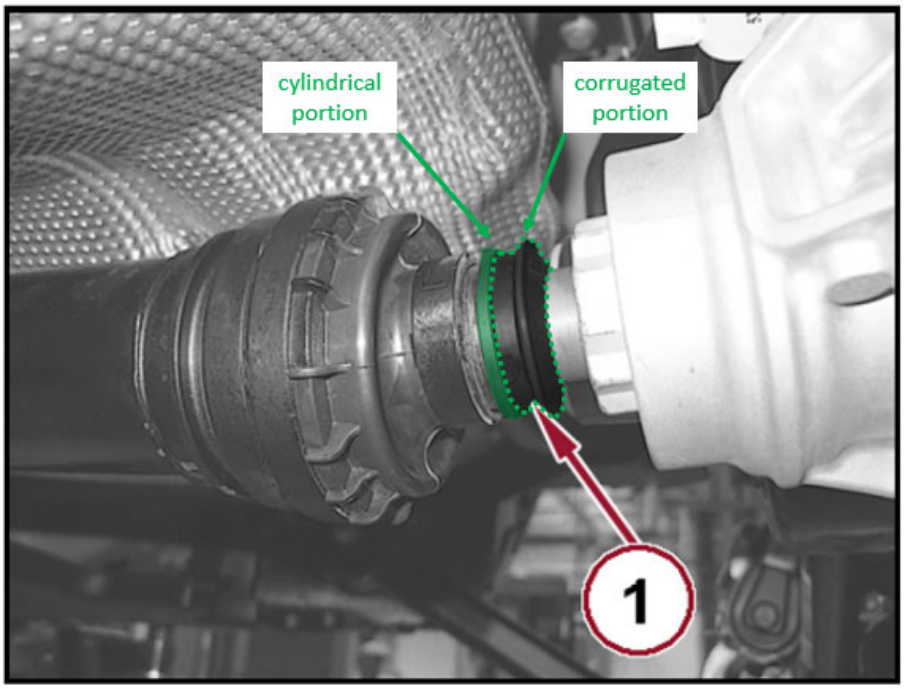


(Ex. 1013, Renegade Manual at PET_AAM_1013-0197, Removal Step 16, PET_AAM_1013-0203, Installation Step 11; Ex. 1013, Renegade Manual at PET_AAM_1013-0197–0203, Removal Steps 16, 17, Installation Steps 2, 4, 12).

[1e(iv)] wherein the seal further includes a corrugated portion disposed adjacent the cylindrical portion, and

278. The Renegade Manual discloses that, for each joint assembly, "the seal further includes a corrugated portion disposed adjacent the cylindrical portion." (Ex. 1001, '958 patent at Claim 1). For example, for the joint assembly between the propshaft and RDU, an image below for Removal Step 23 and Installation Step 9,

illustrates that, in addition to having a "cylindrical portion" (green) the seal also has a "corrugated portion" (dashed green line) a portion of the seal having the shape of a series of regular folds that look like waves, and that the corrugated portion is disposed adjacent the cylindrical portion.

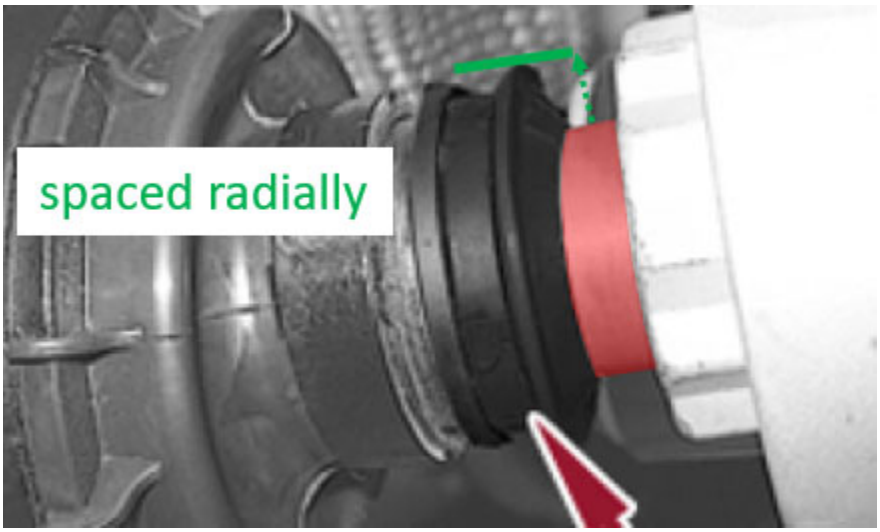


(Ex. 1013, Renegade Manual at PET_AAM_1013-0198, Removal Step 23, PET_AAM_1013-0202, Installation Step 9; Ex. 1013, Renegade Manual at PET_AAM_1013-0199–0202, Removal Steps 24, 25, 27, Installation Steps 1, 8). Images corresponding to the seal of the joint assembly between the propshaft and PTU similarly depict the seal having both a cylindrical portion and a corrugated portion disposed adjacent the cylindrical portion. (Ex. 1013, Renegade Manual at PET_AAM_1013-0197–0203, Removal Steps 16, 17, Installation Steps 2, 11).

[1e(v)] wherein the corrugated portion is spaced radially

from each of the first member and the second member.

279. The Renegade Manual discloses that, for each seal of each joint assembly, "the corrugated portion is spaced radially from each of the first member and the second member." (Ex. 1001, '958 patent at Claim 1). For example, for the joint assembly between the propshaft and RDU, an image below for Removal Step 23 and Installation Step 9, illustrates that the corrugated portion of the seal—at least at and around where the radius of the corrugated portion of the seal is greatest, which I depicted with a solid, green line—is spaced radially from the second, male pinion shaft member of the RDU (red).



(Ex. 1013, Renegade Manual at PET_AAM_1013-0198, Removal Step 23, PET_AAM_1013-0202, Installation Step 9; Ex. 1013, Renegade Manual at PET_AAM_1013-0199–0202, Removal Steps 24, 25, 27, Installation Steps 1, 8). Images corresponding to the seal of the joint assembly between the propshaft and PTU similarly depict that the corrugated portion of the seal—at least at and around

where the radius of the corrugated portion of the seal is greatest—is spaced radially from the second, male shaft member of the propshaft. (Ex. 1013, Renegade Manual at PET_AAM_1013-0197–0203, Removal Steps 16, 17, Installation Steps 2, 11). As depicted above and in Renegade Manual, for both joint assemblies, the corrugated portion of the seal has a maximum radius greater than the maximum radius of the cylindrical portion of the seal. (Ex. 1013, Renegade Manual at PET_AAM_1013-0197–0203, Removal Steps 16, 17, 23–27, Installation Steps 1, 2, 8, 11). And, because the cylindrical portion of the seal "covers the outer wall of the first member along at least a portion of a perimeter of the window" for the reasons stated above with respect to limitation [1e(iii)], the "corrugated potion" of each seal is also spaced radially from each first member, the first, female shaft member of the propshaft and first, female shaft member of the PTU. (Ex. 1013, Renegade Manual at PET_AAM_1013-0197–0203, Removal Steps 16, 17, 23–27, Installation Steps 1, 2, 8, 11).

Conclusion for Claim 1

280. In my opinion, the Renegade Manual discloses all of the limitations of independent Claim 1 of the '958 patent and, therefore, anticipates Claim 1.

2. Claim 2

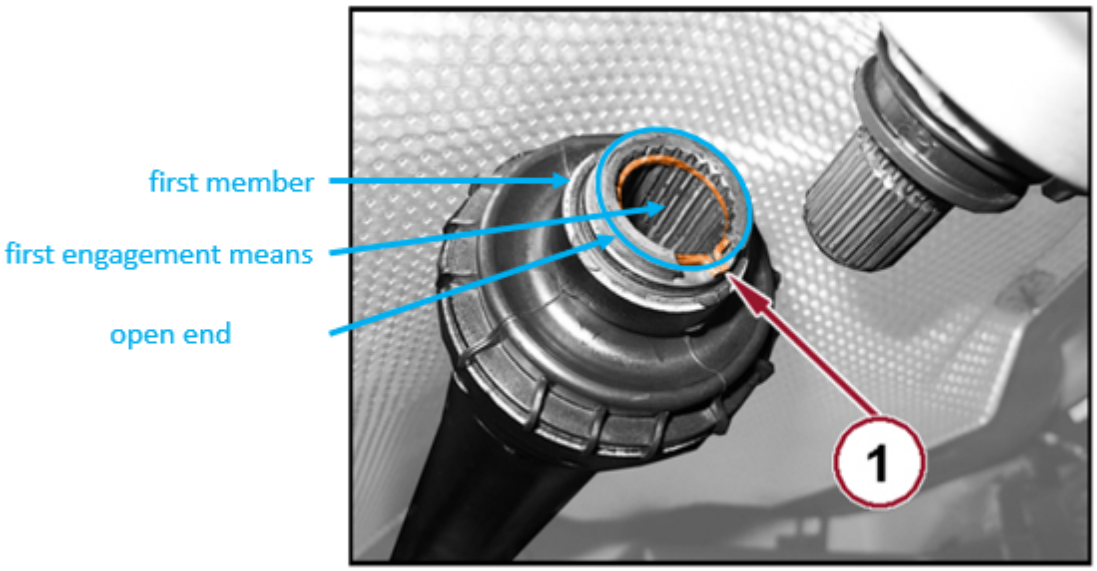
The joint assembly of claim 1, wherein the first member includes an open end and the first engagement means of the first member is formed within the open end.

281. In my opinion, the Renegade Manual discloses all of the limitations of

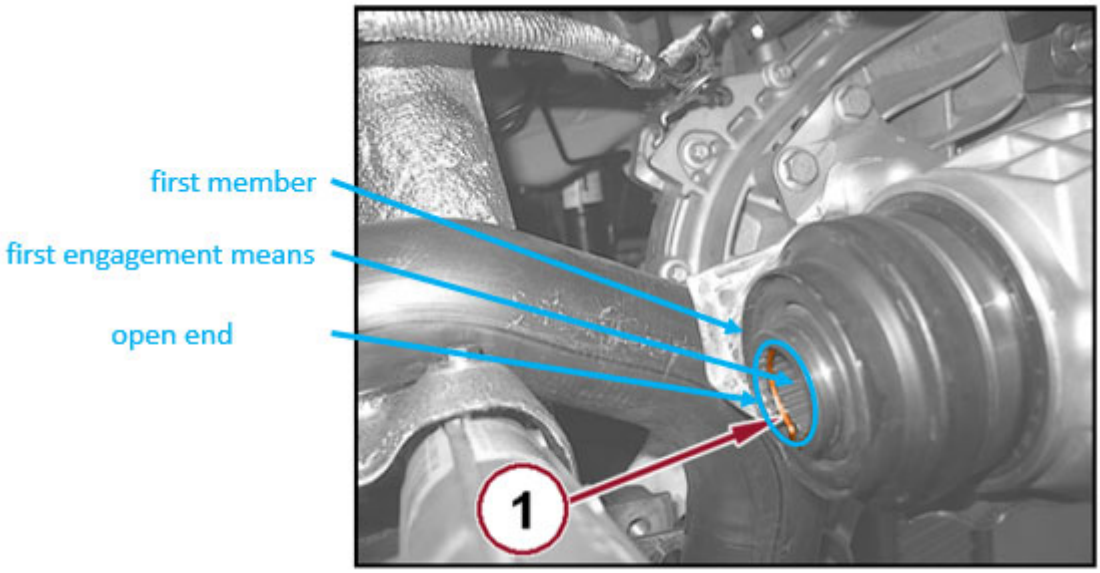
dependent Claim 2 of the ’958 patent and, therefore, anticipates Claim 2.

282. Claim 2 depends from Claim 1. (Ex. 1001, ’958 patent at Claim 2). The Renegade Manual discloses every limitation of Claim 1 for the reasons stated above in regard to Claim 1.

283. The Renegade Manual further discloses that, for each joint assembly, “the first member includes an open end and the first engagement means of the first member is formed within the open end.” (Ex. 1001, ’958 patent at Claim 2).



(Ex. 1013, Renegade Manual at PET_AAM_1013-0202 Installation Step 8 (RDU); Ex. 1013, Renegade Manual at PET_AAM_1013-0199–0202, Removal Steps 24, 25, 27, Installation Steps 3, 8, 9).



(Ex. 1013, Renegade Manual at PET_AAM_1013-0201, Installation Step 4 (PTU); Ex. 1013, Renegade Manual at PET_AAM_1013-0197–0203, Removal Steps 17, 19, Installation Steps 4, 11).

3. Claim 3

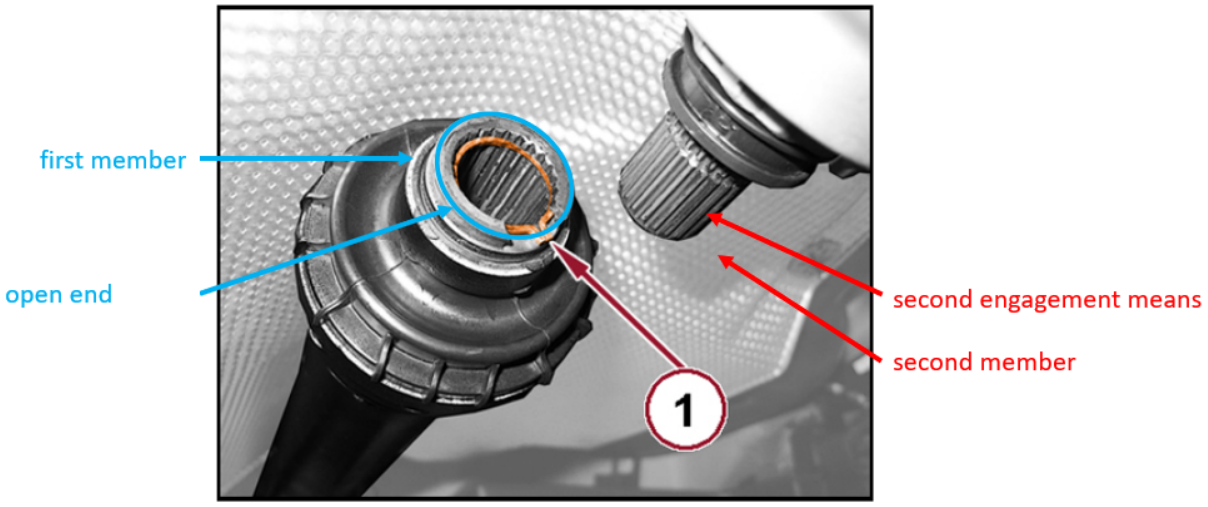
The joint assembly of claim 2, wherein the portion of the second member disposed within the first member is disposed within the open end and includes the second engagement means.

284. In my opinion, the Renegade Manual discloses all of the limitations of dependent Claim 3 of the ’958 patent and, therefore, anticipates Claim 3.

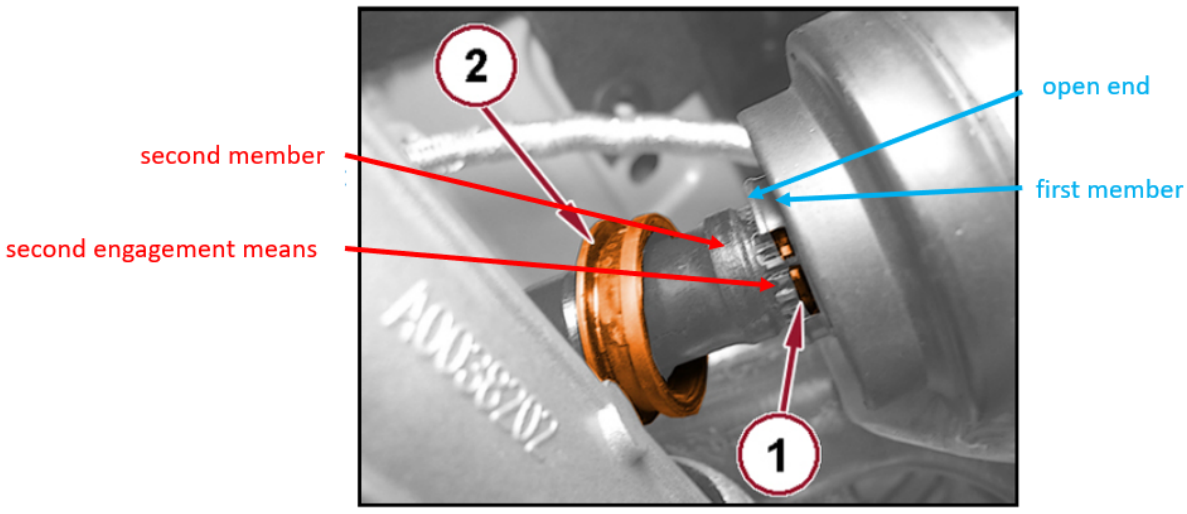
285. Claim 3 depends from Claim 2. (Ex. 1001, ’958 patent at Claim 3). The Renegade Manual discloses every limitation of Claim 2 for the reasons stated above in regard to Claim 2.

286. The Renegade Manual further discloses that, for each joint assembly,

"the portion of the second member disposed within the first member is disposed within the open end and includes the second engagement means." (Ex. 1001, '958 patent at Claim 3).



(Ex. 1013, Renegade Manual at PET_AAM_1013-0202, Installation Step 8 (RDU); Ex. 1013, Renegade Manual at PET_AAM_1013-0199–0202, Removal Steps 24, 25, 27, Installation Steps 1, 3, 8, 9).



(Ex. 1013, Renegade Manual at PET_AAM_1013-0203, Installation Step 11 (PTU);

Ex. 1013, Renegade Manual at PET_AAM_1013-0197–0201, Removal Steps 17, 19, Installation Steps 2, 4).

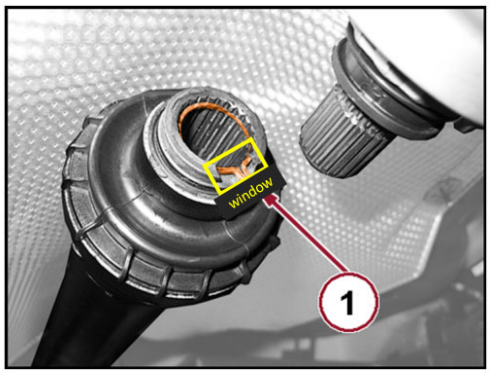
4. Claim 4

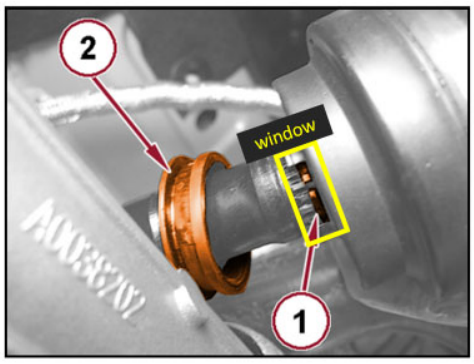
The joint assembly of claim 2, wherein the window is continuous with the open end.

287. In my opinion, the Renegade Manual discloses all of the limitations of dependent Claim 4 of the ’958 patent and, therefore, anticipates Claim 4.

288. Claim 4 depends from Claim 2. (Ex. 1001, ’958 patent at Claim 4). The Renegade Manual discloses every limitation of Claim 2 for the reasons stated above in regard to Claim 2.

289. The Renegade Manual further discloses that, for each joint assembly, “the window is continuous with the open end.” (Ex. 1001, ’958 patent at Claim 4). For example, Installation Steps 8 (left) and 11 (right) illustrate windows formed in each first member of the joint assemblies between the propshaft and RDU and propshaft and PTU, respectively, and each window is continuous with the open end of the first members.





(Ex. 1013, Renegade Manual at PET_AAM_1013-0202–0203, Installation Steps 8 and 11; Ex. 1013, Renegade Manual at PET_AAM_1013-0197–0201, Removal Steps 17, 24, 25, 27, Installation Steps 3, 4).

5. Claim 5

The joint assembly of claim 1, wherein the first engagement means includes a first plurality of splines and the second engagement means includes a second plurality of splines.

290. In my opinion, the Renegade Manual discloses all of the limitations of dependent Claim 5 of the ’958 patent and, therefore, anticipates Claim 5.

291. Claim 5 depends from Claim 1. (Ex. 1001, ’958 patent at Claim 5). The Renegade Manual discloses every limitation of Claim 1 for the reasons stated above in regard to Claim 1.

292. The Renegade Manual further discloses that, for each joint assembly, “the first engagement means includes a first plurality of splines and the second engagement means includes a second plurality of splines.” (Ex. 1001, ’958 patent at Claim 5). As I described above in regard to limitations [1a] (“a first member having a first engagement means . . . ”) and [1b] (“a second member having a second engagement means . . . ”), the first engagement means of each joint assembly comprise a plurality of internal, female splines, and the second engagement means of each joint assembly comprise a plurality of external, male splines. Therefore, the Renegade Manual discloses this limitation of Claim 5 for the reasons stated above

in regard to limitations [1a] and [1b].

6. Claim 6

The joint assembly of claim 1, wherein the retaining means is configured as a retaining ring.

293. In my opinion, the Renegade Manual discloses all of the limitations of dependent Claim 6 of the ’958 patent and, therefore, anticipates Claim 6.

294. Claim 6 depends from Claim 1. (Ex. 1001, ’958 patent at Claim 6). The Renegade Manual discloses every limitation of Claim 1 for the reasons stated above in regard to Claim 1.

295. The Renegade Manual further discloses that, for each joint assembly, “the retaining means is configured as a retaining ring.” (Ex. 1001, ’958 patent at Claim 6). As I described above in regard to limitation [1d] (“retaining means configured to retain the coupling of the second member to the first member”), the retaining means of each joint assembly is an elastic “snap ring,” which is a retaining ring. The Renegade Manual discloses this limitation of Claim 6 for the reasons stated above in regard to limitations [1d].

7. Claim 7

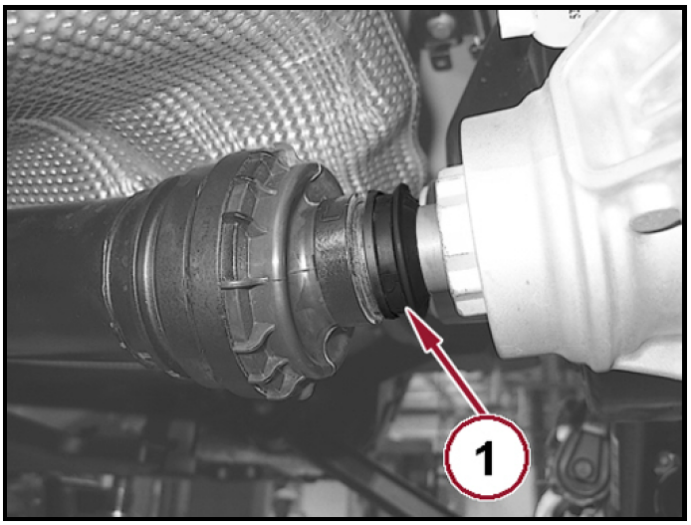
The joint assembly of claim 1, further comprising a constant velocity joint coupled to one of the first member and the second member.

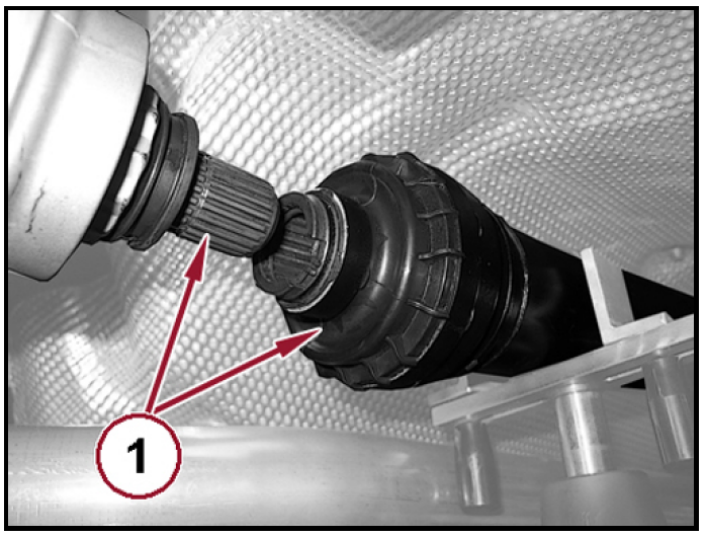
296. In my opinion, the Renegade Manual discloses all of the limitations of dependent Claim 7 of the ’958 patent and, therefore, anticipates Claim 7.

297. Claim 7 depends from Claim 1. (Ex. 1001, '958 patent at Claim 7). The Renegade Manual discloses every limitation of Claim 1 for the reasons stated above in regard to Claim 1.

298. The Renegade Manual further discloses that "a constant velocity joint coupled to one of the first member and the second member." (Ex. 1001, '958 patent at Claim 7). In particular, at the time of the earliest effective filing date of the '958 patent, persons of ordinary skill in the art would have known and understood that the PTU of the Jeep® Renegade integrates a constant velocity joint. (Ex. 1033, Autocar Pro; Ex. 1034, Green Car Congress). GKN Driveline supplied the all-wheel drive (AWD) system for the Jeep® Renegade. (Ex. 1033, Autocar Pro; Ex. 1034, Green Car Congress). "To meet the tight packaging targets of a compact SUV and small city car, GKN integrated a number of key features of the driveline system, saving space and optimizing cost and efficiency. Instead of a standard power transfer unit (PTU), GKN developed a monobloc housing that fully integrates the propshaft's constant velocity joint." (Ex. 1033, Autocar Pro; Ex. 1034, Green Car Congress). Thus, at least in the propshaft-PTU joint assembly, where the PTU includes a female shaft, which is a "first member (Ex. 1013, Renegade Manual at PET_AAM_1013-0197–0203, Removal Steps 17, 19, Installation Steps 2, 4, 11), a constant velocity joint (integrated into the PTU) is further coupled to the first member (of the PTU).

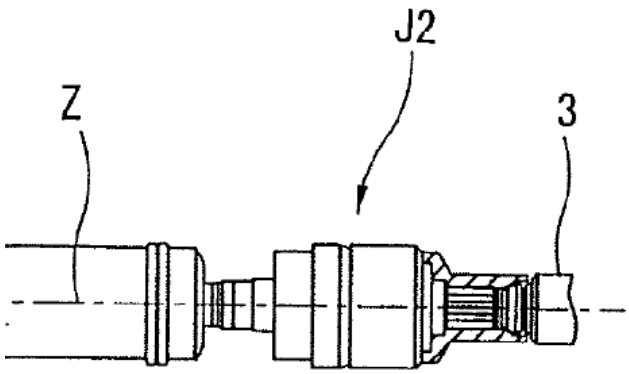
299. A person of ordinary skill in the art would also understand that the propshaft of the propshaft-RDU joint assembly, which includes a female shaft, which is a "first member" (Ex. 1013, Renegade Manual at PET_AAM_1013-0199–0202, Removal Steps 24, 25, 27, Installation Steps 3, 8), is coupled to a constant velocity joint. In particular, Removal Steps 23 and 25 depict what appears to be the enclosed, cup side of a constant velocity joint, sealed by a rubber boot.

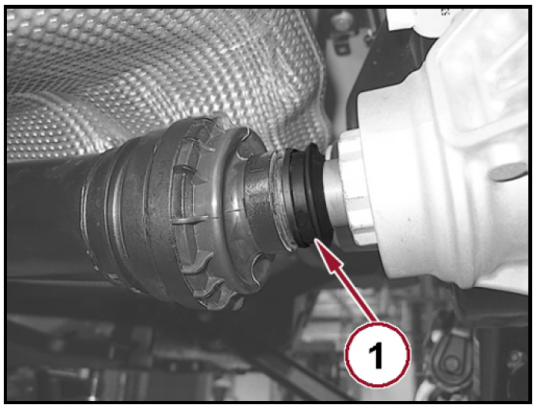




(Ex. 1013, Renegade Manual at PET_AAM_1013-0198–0199, Removal Steps 23,

25; Ex. 1013, Renegade Manual at PET_AAM_1013-0199–0203 (Removal Step 27 and Installation Steps 3, 8, 9.) The Renegade Manual's disclosure regarding the center bearing further confirms my opinion that the first, female shaft member of the propshaft-RDU joint assembly is coupled also to a constant velocity joint. For example, as shown in Removal Steps 11 and 12, the joint at the center bearing also appears to be a constant velocity joint and is enclosed, which indicates to a person of ordinary skill in the art that the joint is a constant velocity joint. (Ex. 1013, Renegade Manual at PET_AAM_1013-0195–0196 (Removal Steps 11, 12; Ex. 1013, Renegade Manual at PET_AAM_1013-0195–0202–0203 (Installation Steps 10, 13). Had the joint at the center bearing been a non-constant velocity joint, the propshaft-RDU joint assembly would need to be coupled to a non-constant velocity joint. In this regard, a person of ordinary skill in the art would have understood that the constant velocity joint coupled to the propshaft-RDU joint assembly of the Renegade Manual is similar to that disclosed by Sugiyama, which teaches that "a driven shaft 5 integrally rotatably linked to an output shaft 3 interlinked to a differential (not shown) via a second constant velocity (universal) joint J2."





(Ex. 1007, Sugiyama at [0031], Fig. 1; Ex. 1013, Renegade Manual at PET_AAM_1013-0198–0199, Removal Step 23.)

8. Claim 8

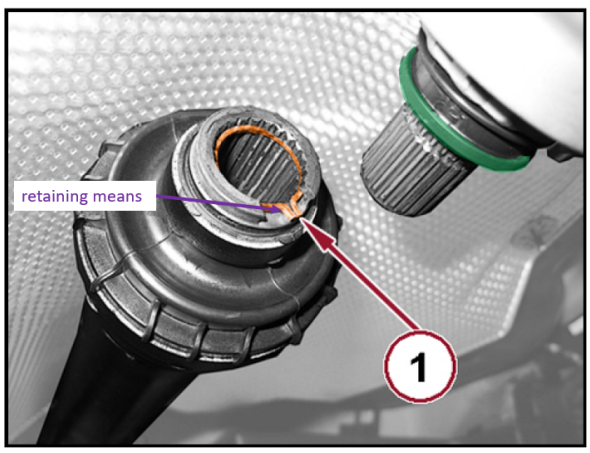
The joint assembly of claim 1, wherein the cylindrical portion of the seal is disposed directly radially outwardly of the retaining means when the retaining means retains the coupling of the second member to the first member.

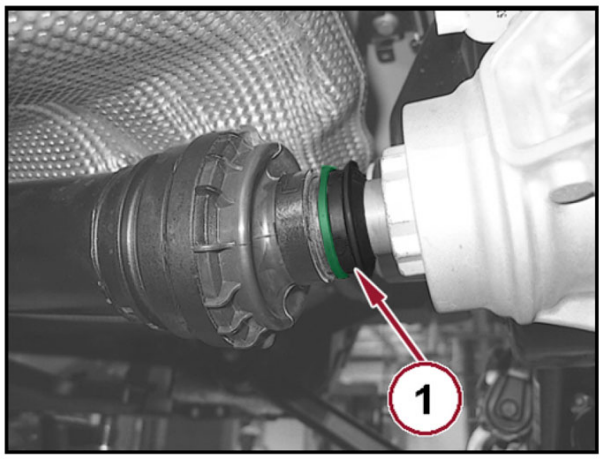
300. In my opinion, the Renegade Manual discloses all of the limitations of dependent Claim 8 of the ’958 patent and, therefore, anticipates Claim 8.

301. Claim 8 depends from Claim 1. (Ex. 1001, ’958 patent at Claim 8). The Renegade Manual discloses every limitation of Claim 1 for the reasons stated above in regard to Claim 1.

302. The Renegade Manual further discloses that, for each joint assembly, “the cylindrical portion of the seal is disposed directly radially outwardly of the retaining means when the retaining means retains the coupling of the second member to the first member.” (Ex. 1001, ’958 patent at Claim 8). For example, as to the seal

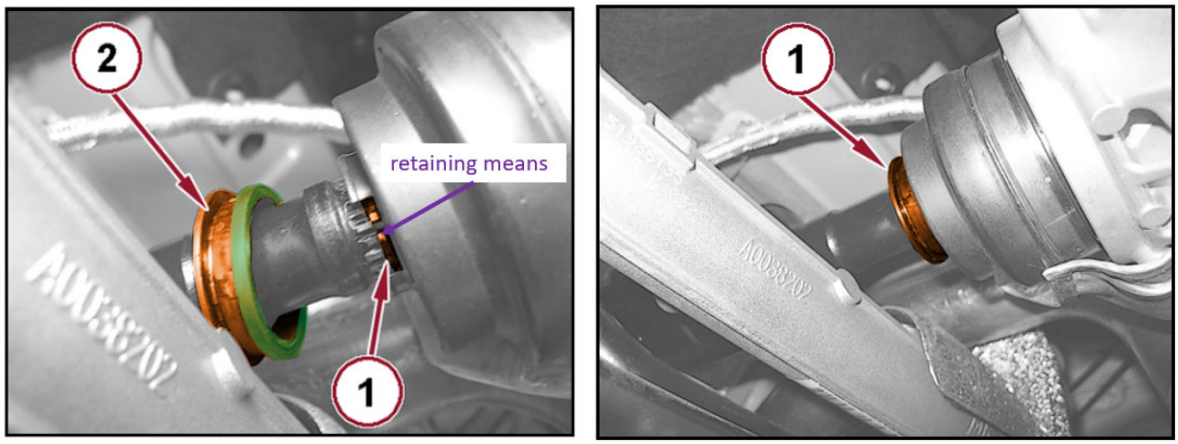
of the joint assembly between the propshaft and RDU, images below for Installation Steps 8 and 9 and Removal Step 23 show that, when the seal is "position[ed] over the joint at the rear of the propeller shaft," the cylindrical portion of the seal (green) is disposed directly radially outwardly of the retaining means (retaining ring or snap ring) when the retaining means retains the coupling of the second member (pinion shaft member of RDU) to the first member (female shaft member of propshaft).





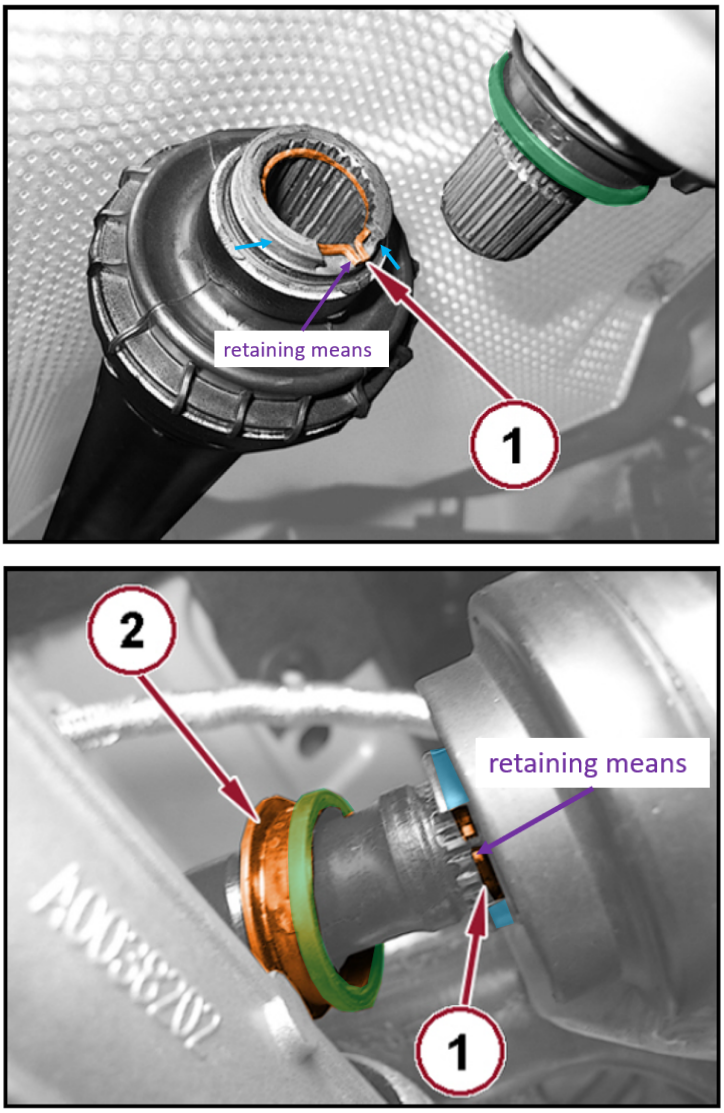
(Ex. 1013, Renegade Manual at PET_AAM_1013-0198, Removal Step 23, PET_AAM_1013-0202, Installation Steps 8, 9; Ex. 1013, Renegade Manual at PET_AAM_1013-0198–0201, Removal Steps 24, 25, 27, Installation Steps 1, 3). As to the seal of the joint assembly between the propshaft and PTU, images below for Removal Step 16 and Installation Step 11 show that, when the seal is "position[ed] over the joint at the front of the propeller shaft," the cylindrical portion of the seal (green) is disposed directly radially outwardly of the retaining means (retaining ring or snap ring) when the retaining means retains the coupling of the

second member (male shaft member of propshaft) to the first member (female shaft member of PTU).



(Ex. 1013, Renegade Manual at PET_AAM_1013-0197, Removal Step 16, PET_AAM_1013-0203, Installation Step 11; Ex. 1013, Renegade Manual at PET_AAM_1013-0197–0203, Removal Steps 16, 17, Installation Steps 2, 4, 12).

303. It can also be seen from several images of the Renegade Manual, including images for Installation Steps 8 (RDU) and 11 (PTU), that the first members of the joint assemblies each have an external, semi-annular groove (broken up by the window of each joint assembly) configured to receive the cylindrical portion of the seal, which I indicate below with blue arrows in the image for Installation Step 8 and in blue color in the image for Installation Step 11.



(Ex. 1013, Renegade Manual at PET_AAM_1013-0202–0203, Installation Steps 8 and 11; Ex. 1013, Renegade Manual at PET_AAM_1013-0197–0203, Removal Steps 16, 17, 19, 23–27, Installation Steps 1–4, 8, 9, 11). The retaining ring of each joint assembly is circumferentially aligned with these grooves. This further supports my conclusion with respect to Claim 8 that the cylindrical portion of the seal is disposed directly radially outwardly of the retaining means when the retaining means retains the coupling of the second member to the first member.

9. Claim 9

The joint assembly of claim 1, wherein the window is continuous with an open end of the first member, and wherein the corrugated portion of the seal is disposed directly radially outwardly of the open end of the first member.

304. In my opinion, the Renegade Manual discloses all of the limitations of dependent Claim 9 of the ’958 patent and, therefore, anticipates Claim 9.

305. Claim 9 depends from Claim 1. (Ex. 1001, ’958 patent at Claim 9). Renegade Manual discloses every limitation of Claim 1 for the reasons stated above in regard to Claim 1.

306. Renegade Manual further discloses that, for each joint assembly, “the window is continuous with an open end of the first member, and wherein the corrugated portion of the seal is disposed directly radially outwardly of the open end of the first member.” (Ex. 1001, ’958 patent at Claim 9).

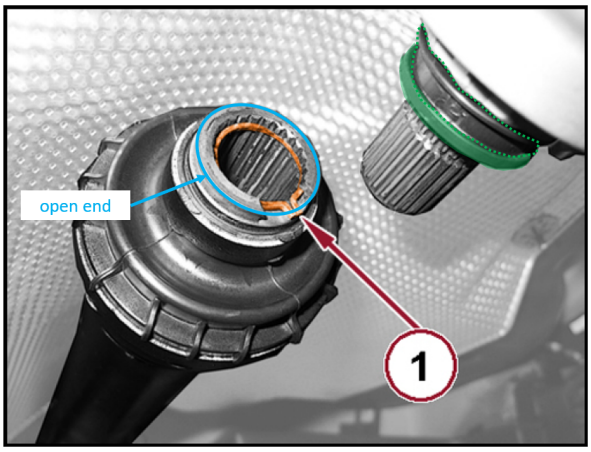
307. The limitation of Claim 9, “the window is continuous with an open end of the first member,” is the same as the limitation of Claim 4, “the window is continuous with the open end,” which depends from Claim 2, which further recites “the first member includes an open end and the first engagement means of the first member is formed within the open end.” (Ex. 1001, ’958 patent at Claims 2 and 4). The Renegade Manual discloses this limitation of Claim 9 for the reasons stated above in regard to Claims 2 and 4.

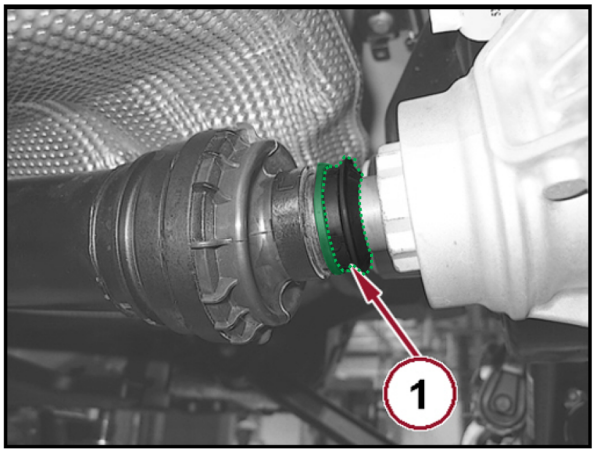
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PET_AAM_1032-0205

308. The Renegade Manual further discloses the remainder of Claim 9, that, for each joint assembly, "the corrugated portion of the seal is disposed directly radially outwardly of the open end of the first member." (Ex. 1001, '958 patent at Claim 9).

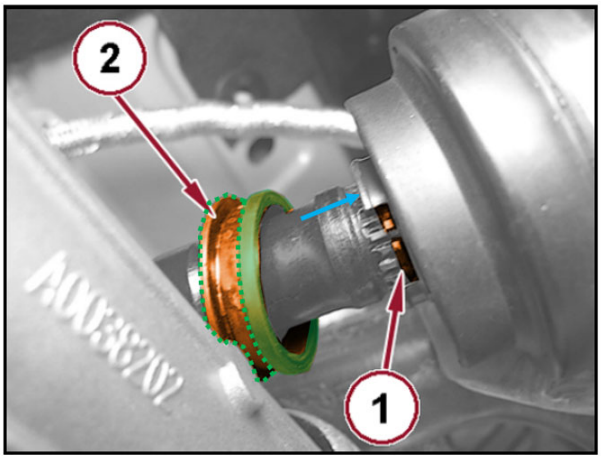
309. As I described above in regarding to limitation [1e(v)] of Claim 1, the corrugated portion of the seal is "spaced radially from each of the first member and the second member." Thus, in my opinion, because the corrugated portion of the seal is spaced radially from the first member, it is also disposed radially outwardly of the open end of the first member as recited in Claim 9.

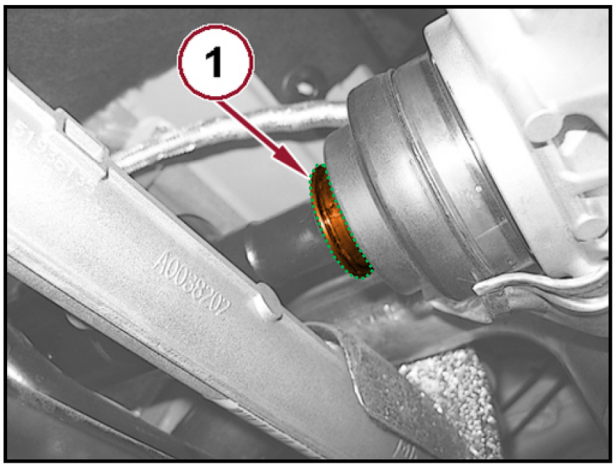
310. Moreover, as to the seal of the joint assembly between the propshaft and RDU, images below for Installation Steps 8 and 9 and Removal Step 23 show that, when the seal is "position[ed] over the joint at the rear of the propeller shaft," the corrugated portion of the seal (green dashed line) is disposed directly radially outwardly of the open end (blue circle) of the first member (female shaft member of propshaft).





(Ex. 1013, Renegade Manual at PET_AAM_1013-0198, Removal Step 23, PET_AAM_1013-0202, Installation Steps 8, 9; Ex. 1013, Renegade Manual at PET_AAM_1013-0199–0201, Removal Steps 24, 25, 27, Installation Steps 1, 3). As to the seal of the joint assembly between the propshaft and PTU, images below for Removal Step 16 and Installation Step 11 show that, when the seal is "position[ed] over the joint at the front of the propeller shaft," the corrugated portion of the seal (green dashed line) is disposed directly radially outwardly of the open end (blue arrow) of the first member (female shaft member of PTU).

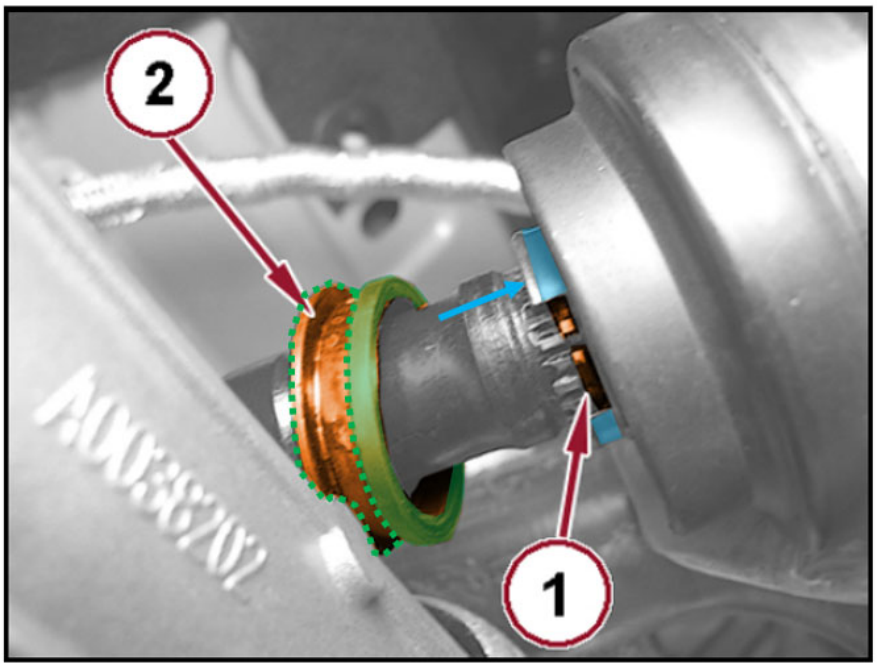




(Ex. 1013, Renegade Manual at PET_AAM_1013-0197, Removal Steps 16,

PET_AAM_1013-0203, Installation Steps 11; Ex. 1013, Renegade Manual at PET_AAM_1013-0197–0203, Removal Steps 16, 17, Installation Steps 2, 4, 12).

311. As I describe above in regard to dependent Claim 8, it can also be seen from several images of the Renegade Manual, including images for Installation Steps 8 (RDU) and 11 (PTU), that the first members of the joint assemblies each have an external, semi-annular groove (broken up by the window of each joint assembly) configured to receive the cylindrical portion of the seal, which I indicate below with blue color in the image for Installation Step 11. These grooves are spaced from the open end (blue arrow) of the first member (in the below image for Installation Step 11, female shaft member of PTU).



(Ex. 1013, Renegade Manual at PET_AAM_1013-0202–0203, Installation Steps 8 and 11; Ex. 1013, Renegade Manual at PET_AAM_1013-0197–0203, Removal

Steps 16, 17, 19, 23–27, Installation Steps 1–4, 8, 9, 11). This further supports my conclusion with respect to Claim 9 that the corrugated portion of the seal, which is disposed adjacent to the cylindrical portion of the seal, is disposed directly radially outwardly of the open end of the first member.

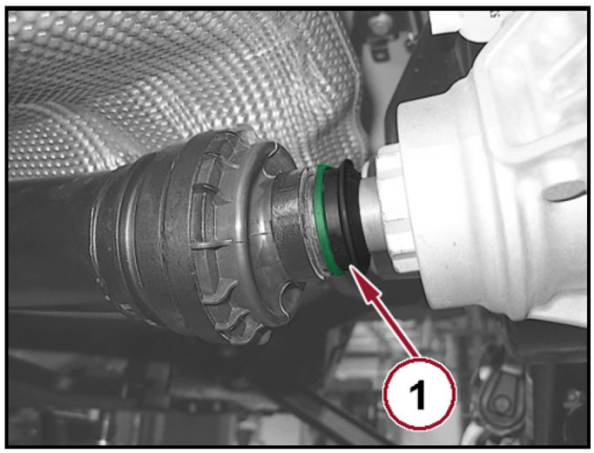
10. Claim 10

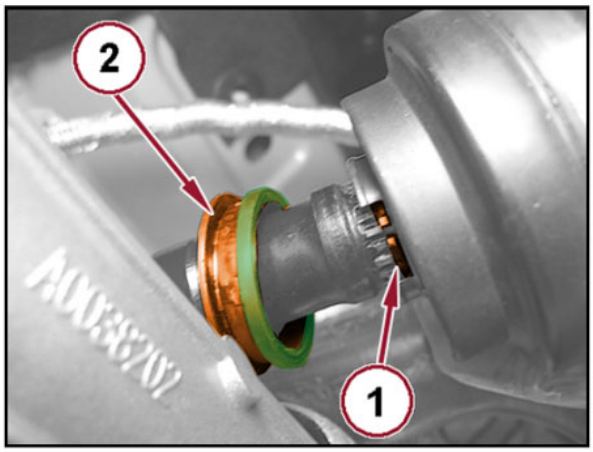
The joint assembly of claim 1, wherein the cylindrical portion of the seal is disposed at an end of the seal.

312. In my opinion, the Renegade Manual discloses all of the limitations of dependent Claim 10 of the ’958 patent and, therefore, anticipates Claim 10.

313. Claim 10 depends from Claim 1. Ex. 1001, ’958 patent at Claim 10. The Renegade Manual discloses every limitation of Claim 1 for the reasons stated above in regard to Claim 1.

314. The Renegade Manual further discloses the limitation of Claim 10, “the cylindrical portion of the seal is disposed at an end of the seal.” (Ex. 1001, ’958 patent at Claim 1). For example, the Renegade Manual discloses that the seal of each joint assembly includes a “cylindrical portion,” which I have illustrated in green in an image from Removal Step 23 and Installation Step 9 for the joint assembly between the propshaft and the RDU and in an image from Installation Step 11 for the joint assembly between the propshaft and the PTU.





(Ex. 1013, Renegade Manual at PET_AAM_1013-0197, Removal Step 23, PET_AAM_1013-0202–0203, Installation Steps 9, 11; Ex. 1013, Renegade Manual at PET_AAM_1013-0197–0203, Removal Steps 16, 17, 24, 25, 27, Installation Steps 1–4, 8, 12). For each seal, the cylindrical portion of the seal is disposed at an end of the seal.

11. Claim 11

A vehicle driveline comprising the joint assembly of claim 1.

315. In my opinion, the Renegade Manual discloses all of the limitations of dependent Claim 11 of the ’958 patent and, therefore, anticipates Claim 11.

316. Claim 11 depends from Claim 1. (Ex. 1001, ’958 patent at Claim 11). The Renegade Manual discloses every limitation of Claim 1 for the reasons stated above in regard to Claim 1.

317. The Renegade Manual further discloses the limitation of Claim 11, “A vehicle driveline comprising the joint assembly of claim 1.” (Ex. 1001, ’958 patent at Claim 1). Specifically, the 2016 Jeep Renegade vehicle driveline comprises the

joint assemblies between the propshaft and RDU and propshaft and PTU that I described above in regard to Claim 1. (Ex. 1013, Renegade Manual).

12. Claim 12

A vehicle comprising the joint assembly of claim 1.

318. In my opinion, Renegade Manual discloses all of the limitations of dependent Claim 12 of the ’958 patent and, therefore, anticipates Claim 12.

319. Claim 12 depends from Claim 1. Ex. 1001, ’958 patent at Claim 12. Renegade Manual discloses every limitation of Claim 1 for the reasons stated above in regard to Claim 1.

320. Renegade Manual further discloses the limitation of Claim 12, “A vehicle comprising the joint assembly of claim 1.” Ex. 1001, ’958 patent at Claim 1. Specifically, the 2016 Jeep Renegade vehicle comprises the joint assemblies between the propshaft and RDU and propshaft and PTU that I described above in regard to Claim 1. (Ex. 1013, Renegade Manual).

13. Claim 13

321. In my opinion, the Renegade Manual discloses all of the limitations of independent Claim 13 of the ’958 patent and, therefore, anticipates Claim 13.

[13P] A joint assembly comprising:

322. The Renegade Manual discloses “a joint assembly.” (Ex. 1001, ’958 patent at Claim 13).

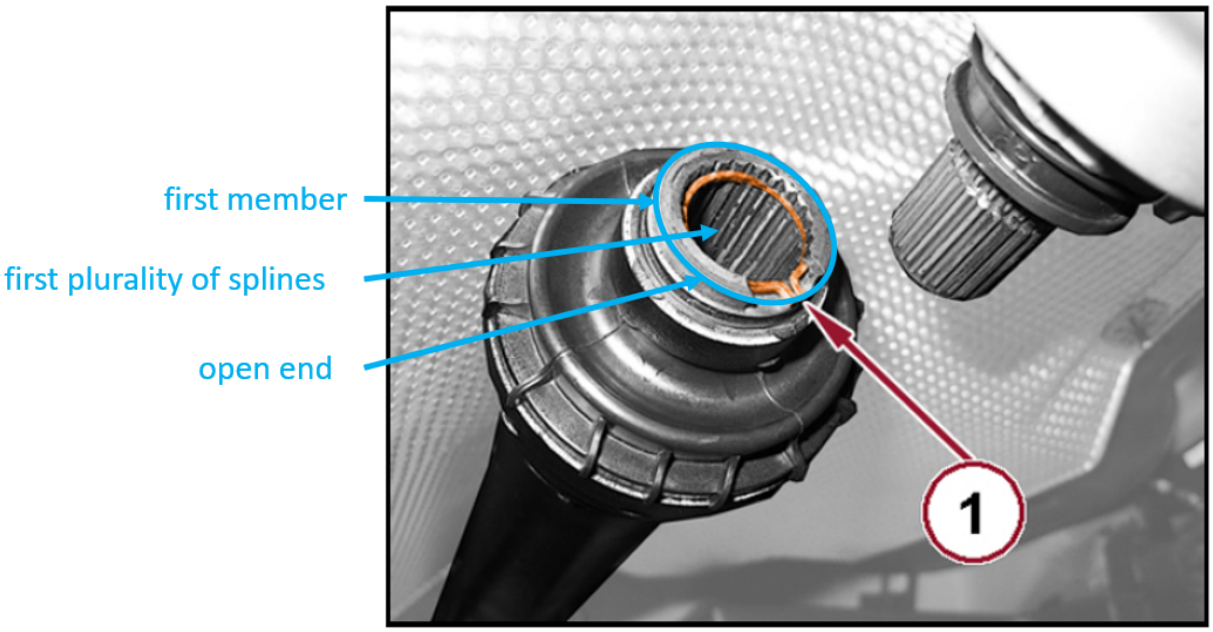
323. Limitation [13P] is the same as limitation [1P]. (Ex. 1001, ’958 patent

at Claims 1 and 13). The Renegade Manual discloses limitation [13P] for the reasons stated above in regard to limitation [1P].

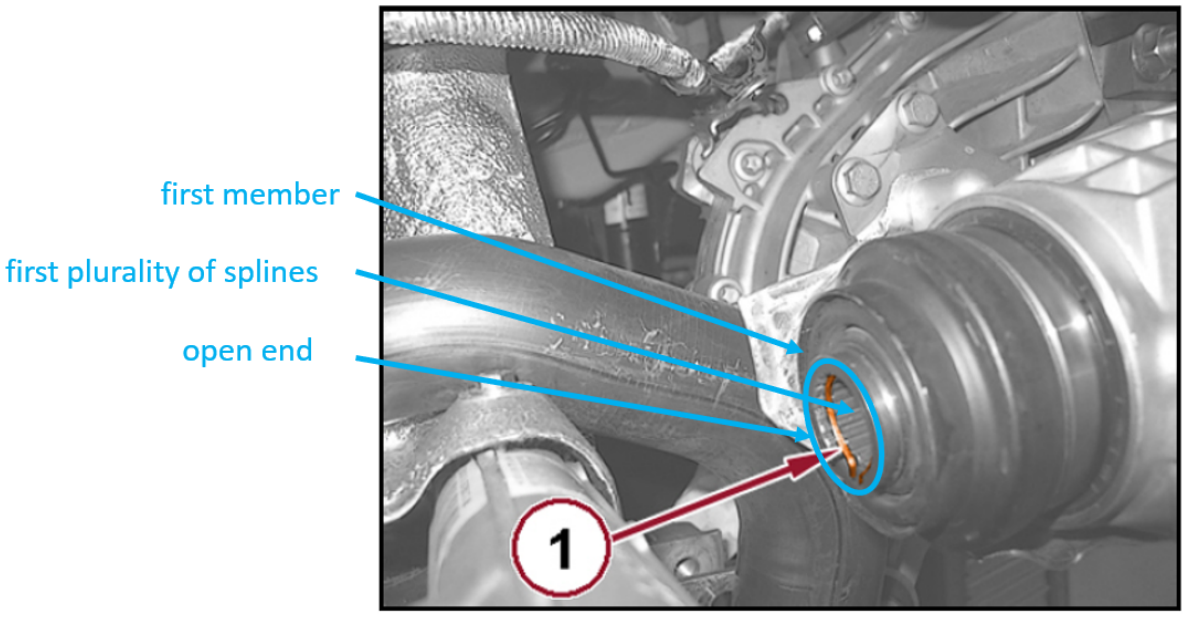
[13a] a first member having an open end and a first plurality of splines formed within the open end;

324. The Renegade Manual discloses "a first member having an open end and a first plurality of splines formed within the open end." (Ex. 1001, '958 patent at Claim 13).

325. Limitation [13a] is similar to limitation [1a], which recites "a first member having a first engagement means and an interior surface recess," Claim 2, which depends from Claim 1 and further recites "wherein the first member includes an open end and the first engagement means of the first member is formed within the open end," and Claim 5, which depends from Claim 1 and further recites "wherein the first engagement means includes a first plurality of splines and the second engagement means includes a second plurality of splines. (Ex. 1001, '958 patent at Claims 1, 2, 5). The Renegade Manual discloses limitation [13a] for the reasons stated above in regard to limitation [1a] and Claims 2 and 5.



(Ex. 1013, Renegade Manual at PET_AAM_1013-0202, Installation Step 8 (RDU)).



(Ex. 1013, Renegade Manual at PET_AAM_1013-0201, Installation Step 4 (PTU)).

326. In particular, the propshaft of the joint assembly between the propshaft and the RDU includes a female shaft, which is a "first member," having an open end.

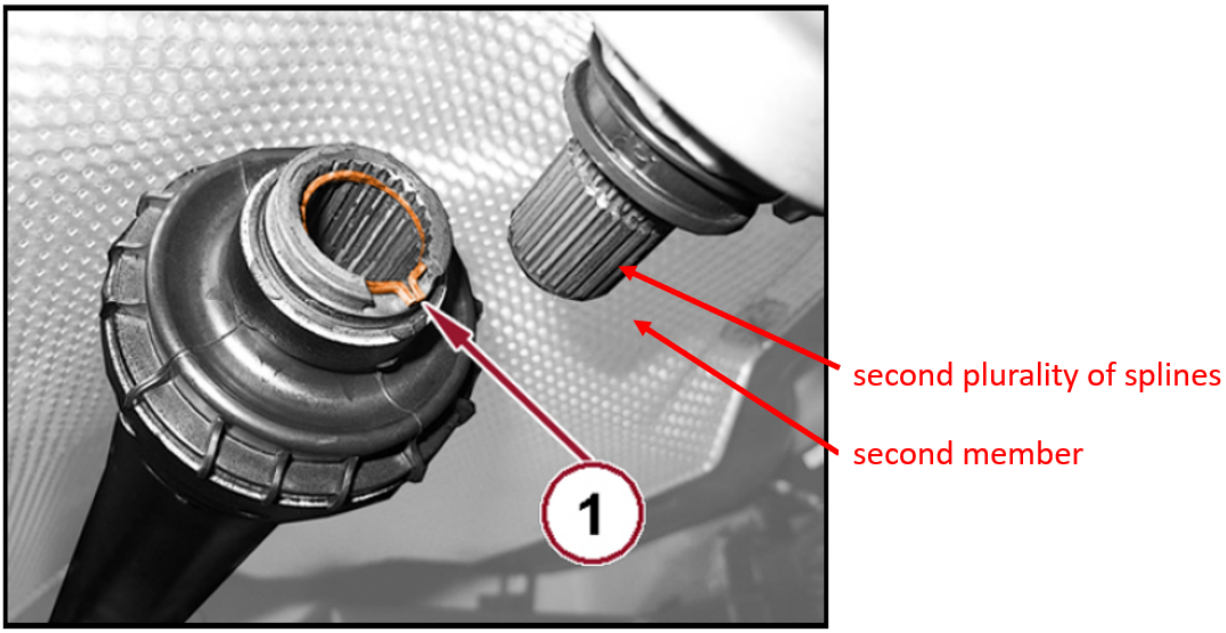
(Ex. 1013, Renegade Manual at PET_AAM_1013-0199–0202, Removal Steps 24, 25, 27, Installation Steps 3, 8). The PTU of the joint assembly between the propshaft and the PTU includes a female shaft, which is a "first member," having an open end. (Ex. 1013, Renegade Manual at PET_AAM_1013-0197–0203, Removal Steps 17, 19, Installation Steps 4, 11). Each of the first members have a plurality of internal, female splines, formed within the open end of the first members. (Ex. 1013, Renegade Manual at PET_AAM_1013-0197–0203, Removal Steps 17, 19, 24, 25, 27, Installation Steps 3, 4, 8, 11).

[13b] a second member having a second plurality of splines formed thereon, a portion of the second member disposed within the first member, the second plurality of splines engaging the first plurality of splines to provide a coupling of the second member to the first member;

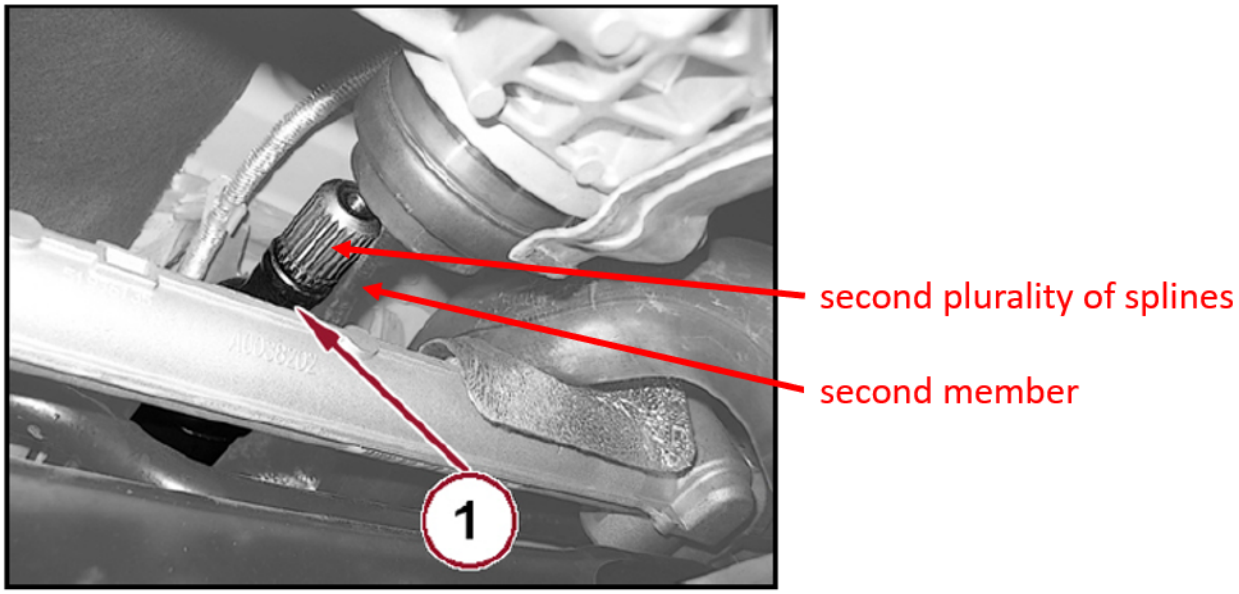
327. The Renegade Manual discloses "a second member having a second plurality of splines formed thereon, a portion of the second member disposed within the first member, the second plurality of splines engaging the first plurality of splines to provide a coupling of the second member to the first member." (Ex. 1001, '958 patent at Claim 13).

328. Limitation [13b] is similar to limitation [1b], which recites "a second member having a second engagement means and an exterior surface recess, a portion of the second member disposed within the first member, the second engagement means engaging the first engagement means to provide a coupling of the second

member to the first member," except that limitation [13b] recites that the "second engagement means" of limitation [1b] is a "second plurality of splines" formed on the second member. Ex. 1001, '958 patent at Claim 1, 13. The Renegade Manual discloses limitation [13b] for the reasons stated above in regard to limitation [1b].



(Ex. 1013, Renegade Manual at PET_AAM_1013-0202, Installation Step 8 (RDU)).



(Ex. 1013, Renegade Manual at PET_AAM_1013-0198, Removal Step 19 (PTU)).

329. In particular, the pinion shaft of the RDU of the joint assembly between the propshaft and the RDU includes a male shaft, which is a "second member." (Ex. 1013, Renegade Manual at PET_AAM_1013-0199–0202, Removal Steps 24, 25, 27, Installation Steps 1, 8). The propshaft of the joint assembly between the propshaft and the PTU includes a male shaft, which is a "second member." (Ex. 1013, Renegade Manual at PET_AAM_1013-0197–0203, Removal Steps 17, 19, Installation Steps 2, 11). Each of the second members have a plurality of external, male splines, which are "second plurality of splines," formed on the second members. (Ex. 1013, Renegade Manual at PET_AAM_1013-0197–0203, Removal Steps 17, 19, 24, 25, 27, Installation Steps 1, 2, 8, 11).

330. The Renegade Manual also discloses "a portion of the second member disposed within the first member, the second plurality of splines engaging the first

plurality of splines to provide a coupling of the second member to the first member." (Ex. 1001, '958 patent at Claim 13). In particular, for the joint assembly between the propshaft and RDU, a portion of the pinion shaft of the RDU (second member) is disposed within the propshaft (first member), and the plurality of external, male splines (second plurality of splines) on the pinion shaft engage the plurality of internal, female splines (first plurality of splines) on the propshaft to provide a coupling of the pinion shaft to the propshaft. (Ex. 1013, Renegade Manual at PET_AAM_1013-0198–0202, Removal Steps 23, 24, 25, 27, Installation Steps 1, 3, 8, 9). And, for the joint assembly between the propshaft and PTU, a portion of the propshaft (second member) is disposed within the PTU (first member), and the plurality of external, male splines (second plurality of splines) on the propshaft engage the plurality of internal, female splines (first plurality of splines) on the PTU to provide a coupling of the propshaft to the PTU. (Ex. 1013, Renegade Manual at PET_AAM_1013-0197–0203, Removal Steps 16, 17, 19, Installation Steps 2, 4, 11).

[13c] a window formed within the first member where the portion of the second member is disposed within the first member;

331. The Renegade Manual discloses, for each joint assembly, "a window formed within the first member where the portion of the second member is disposed within the first member." (Ex. 1001, '958 patent at Claim 13).

332. Limitation [13c] is the same as limitation [1c]. (Ex. 1001, '958 patent

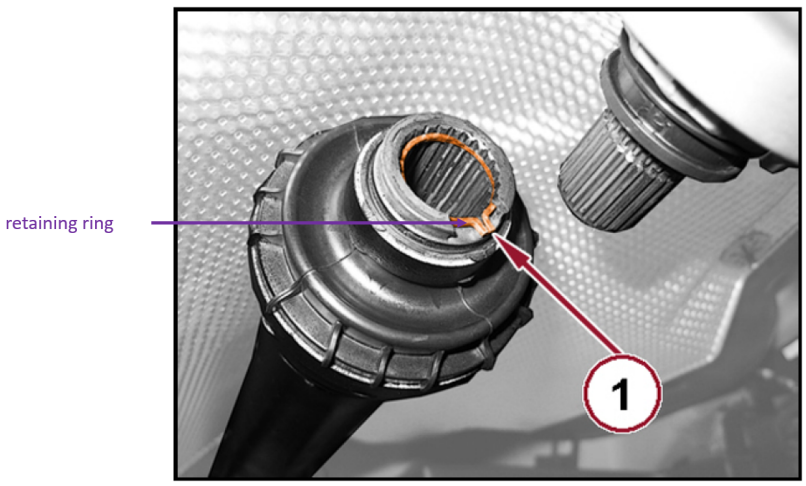
at Claims 1 and 13). The Renegade Manual discloses limitation [13c] for the reasons stated above in regard to limitation [1c].

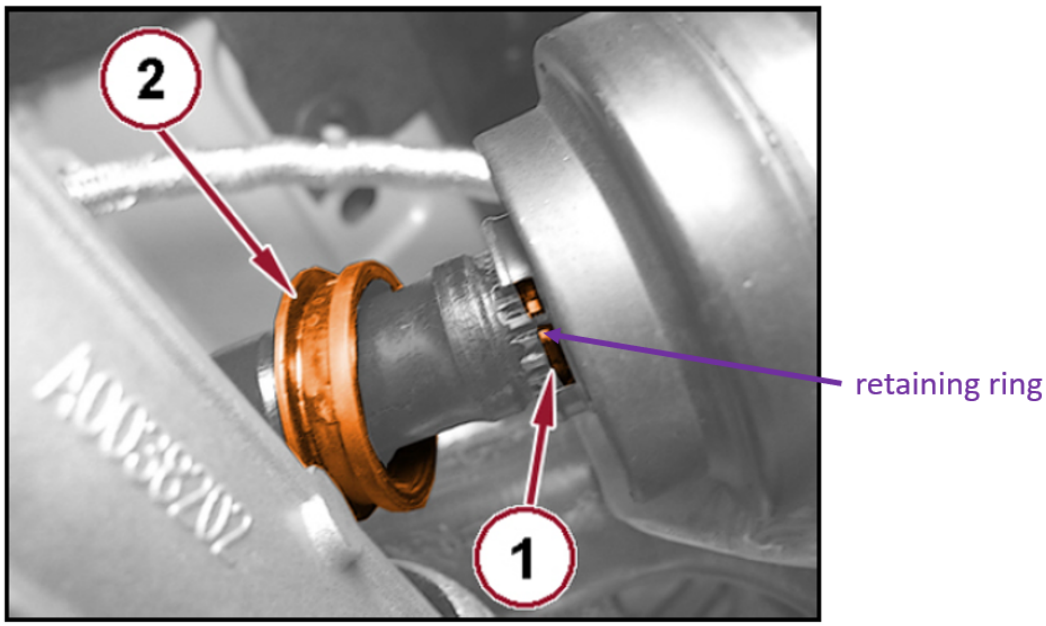
[13d] a retaining ring configured to retain the coupling of the second member to the first member,

333. The Renegade Manual discloses "a retaining ring configured to retain the coupling of the second member to the first member." (Ex. 1001, '958 patent at Claim 13).

334. Limitation [13d] is similar to limitation [1d], which recites "a retaining means configured to retain the coupling of the second member to the first member," except that the "retaining means" of limitation [1d] is a "retaining ring" in limitation [13d]. (Ex. 1001, '958 patent at Claim 1, 13). The Renegade Manual discloses limitation [13d] for the reasons stated above in regard to limitation [1d].

335. In particular, the Renegade Manual discloses the use of an elastic "snap ring," which is a retaining ring numbered "1" in the images from Installation Steps 8 and 11, reproduced below:





(Ex. 1013, Renegade Manual at PET_AAM_1013-0202–0203, Installation Steps 8 (RDU) and 11 (PTU); Ex. 1013, Renegade Manual at PET_AAM_1013-0197–0203, Removal Steps 16, 17, 24, 25, 27, Installation Steps 3 ("Install a NEW snap ring (1) in the drive shaft."), 4 ("Install a NEW snap ring (1) in the Power Transfer Unit (PTU)"), 8, 11; Ex. 1013, Renegade Manual at PET_AAM_1013-0193, Special Tools ("Elastic Ring Spreader")). The snap rings of the joint assemblies retain the coupling of the second member to the first member. (Ex. 1013, Renegade Manual at PET_AAM_1013-0197–0203, Removal Steps 16, 17, 24, 25, 27, Installation Steps 3, 4, 8, 11).

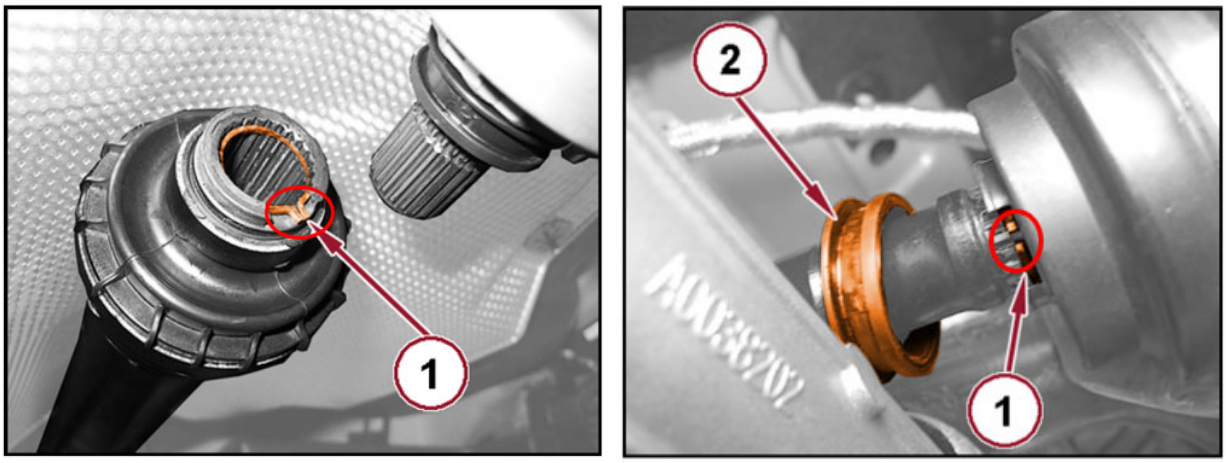
[13d(i)] wherein distal ends of the retaining ring are accessible through the window,

336. The Renegade Manual discloses that, for each joint assembly, "distal ends of the retaining ring are accessible through the window." (Ex. 1001, '958 patent

at Claim 13).

337. Limitation [13d(i)] is similar to limitation [1d(i)], which recites "wherein distal ends of the retaining means are accessible through the window," except that the "retaining means" of limitation [1d(i)] is a "retaining ring" in limitation [13d(i)]. (Ex. 1001, '958 patent at Claim 1, 13). The Renegade Manual discloses limitation [13d(i)] for the reasons stated above in regard to limitation [1d(i)].

338. Images from Installation Steps 8 and 11, for example, depict distal ends of the snap rings ("retaining rings") accessible through windows in the propshaft and PTU:



(Ex. 1013, Renegade Manual at PET_AAM_1013-0202–0203, Installation Steps 8 (RDU) and 11 (PTU); Ex. 1013, Renegade Manual at PET_AAM_1013-0197–0201, Removal Steps 16, 17, 23–27, Installation Steps 3, 4). The Renegade Manual further describes using an "Elastic Ring Spreader" to access and spread the distal ends of

the snap rings to "open propeller shaft snap ring." (Ex. 1013, Renegade Manual at PET_AAM_1013-0197–0199, Removal Step 17, 24; Ex. 1013, Renegade Manual at PET_AAM_1013-0193, Special Tools ("Elastic Ring Spreader")).

[13d(ii)] the first member including an interior surface annular recess and the second member including an exterior surface annular recess,

339. The Renegade Manual discloses that, for each joint assembly, "the first member including an interior surface annular recess and the second member including an exterior surface annular recess." (Ex. 1001, '958 patent at Claim 13).

340. Limitation [13d(ii)] is similar to limitation [1a], which recites "a first member having a first engagement means and an interior surface recess," and limitation [1b], which recites "a second member having a second engagement means and an exterior surface recess." (Ex. 1001, '958 patent at Claim 1, 13). Renegade Manual discloses limitation [13d(ii)] for the reasons stated above in regard to limitations [1a] and [1b].

341. In particular, the propshaft of the joint assembly between the propshaft and the RDU includes a female shaft, which is a "first member." (Ex. 1013, Renegade Manual at PET_AAM_1013-0199–0202, Removal Steps 24, 25, 27, Installation Steps 3, 8). The PTU of the joint assembly between the propshaft and the PTU includes a female shaft, which is a "first member." (Ex. 1013, Renegade Manual at PET_AAM_1013-0197–0203, Removal Steps 17, 19, Installation Steps

4, 11). Each of the first members also have a "groove," an "an interior surface annular recess," for receiving the "snap ring" within the first members (Ex. 1013, Renegade Manual at PET_AAM_1013-0199–0203, Removal Steps 24, 25, 27, Installation Steps 3, 4, 8, 11).

342. The pinion shaft of the RDU of the joint assembly between the propshaft and the RDU includes a male shaft, which is a "second member." Ex. 1013, Renegade Manual at PET_AAM_1013-0199–0202, Removal Steps 24, 25, 27, Installation Steps 1, 8. The propshaft of the joint assembly between the propshaft and the PTU includes a male shaft, which is a "second member." (Ex. 1013, Renegade Manual at PET_AAM_1013-0197–0203, Removal Steps 17, 19, Installation Steps 2, 11). Each of the second members also has a "groove," an "an exterior surface annular recess," for receiving the "snap ring" on the second members. (Ex. 1013, Renegade Manual at PET_AAM_1013-0197–0203, Removal Steps 17, 19, 24, 25, 27, Installation Steps 1, 2, 8 ("verify the snap ring is seated in the groove of the pinion shaft), 11 ("verify the snap ring is (1) seated in the groove of the propeller shaft")).

[13d(iii)] wherein the retaining ring is received partially into each of the interior surface recess of the first member and the exterior surface recess of the second member when the retaining ring retains the coupling of the second member to the first member,

343. The Renegade Manual discloses that, for each joint assembly, "the

retaining ring is received partially into each of the interior surface recess of the first member and the exterior surface recess of the second member when the retaining ring retains the coupling of the second member to the first member." (Ex. 1001, '958 patent at Claim 13).

344. Limitation [13d(iii)] is similar to limitation [1d(iii)], which recites "wherein the retaining means is received partially into each of the interior surface recess of the first member and the exterior surface recess of the second member when the retaining means retains the coupling of the second member to the first member," except that the "retaining means" of limitation [1d(iii)] is a "retaining ring" in limitation [13d(iii)]. (Ex. 1001, '958 patent at Claim 1, 13). As discussed above in regard to limitation [13d], the Renegade Manual discloses the use of an elastic "snap ring," which is a retaining ring, as a retaining means. The Renegade Manual further discloses limitation [13d(iii)] for the reasons stated above in regard to limitation [1d(iii)].

[13d(iv)] and wherein the distal ends of the retaining ring extend in a direction radially outwardly into the window to a point at or radially inwardly from an outer wall of the first member; and

345. The Renegade Manual discloses that, for each joint assembly, "the distal ends of the retaining ring extend in a direction radially outwardly into the window to a point at or radially inwardly from an outer wall of the first member." (Ex. 1001, '958 patent at Claim 13).

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346. Limitation [13d(iv)] is similar to limitation [1d(ii)], which recites "wherein the distal ends of the retaining means extend in a direction radially outwardly into the window to a point at or radially inwardly from an outer wall of the first member," except that the "retaining means" of limitation [1d(ii)] is a "retaining ring" in limitation [13d(iv)]. (Ex. 1001, '958 patent at Claim 1, 13). As discussed above in regard to limitation [13d], the Renegade Manual discloses the use of an elastic "snap ring," which is a retaining ring, as a retaining means. The Renegade Manual further discloses limitation [13d(iv)] for the reasons stated above in regard to limitation [1d(ii)].

[13e] a seal configured to cover the window,

347. Limitation [13e] is the same as limitation [1e]. (Ex. 1001, '958 patent at Claims 1 and 13). The Renegade Manual discloses limitation [13e] for the reasons stated above in regard to limitation [1e].

[13e(i)] the seal coupled to the second member adjacent the open end of the first member,

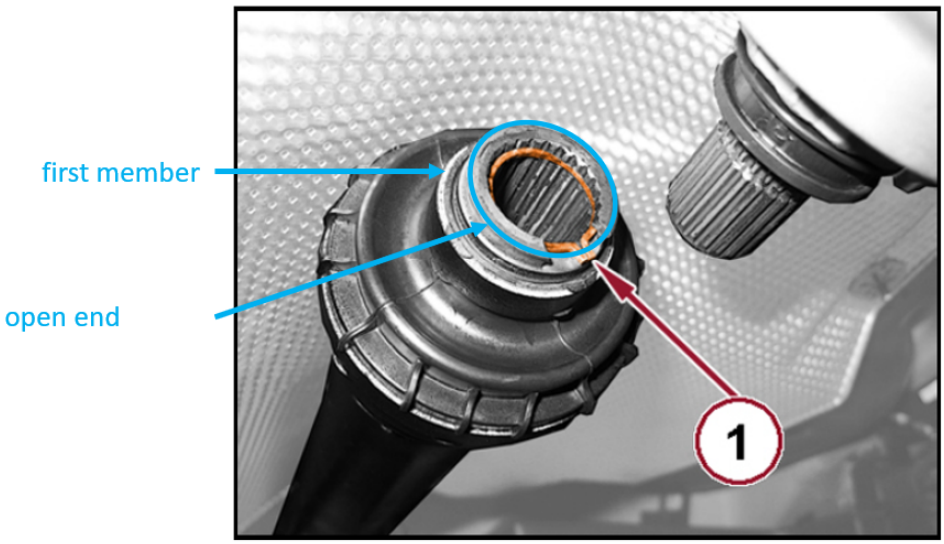
348. The Renegade Manual discloses, for each joint assembly, "the seal coupled to the second member adjacent the open end of the first member." (Ex. 1001, '958 patent at Claim 13).

349. Limitation [13e(i)] is similar to limitation [1e(i)], which recites "the seal coupled to the second member adjacent an end of the first member," except that limitation [13e(i)] recites that the end of the first member is the "open end" of the

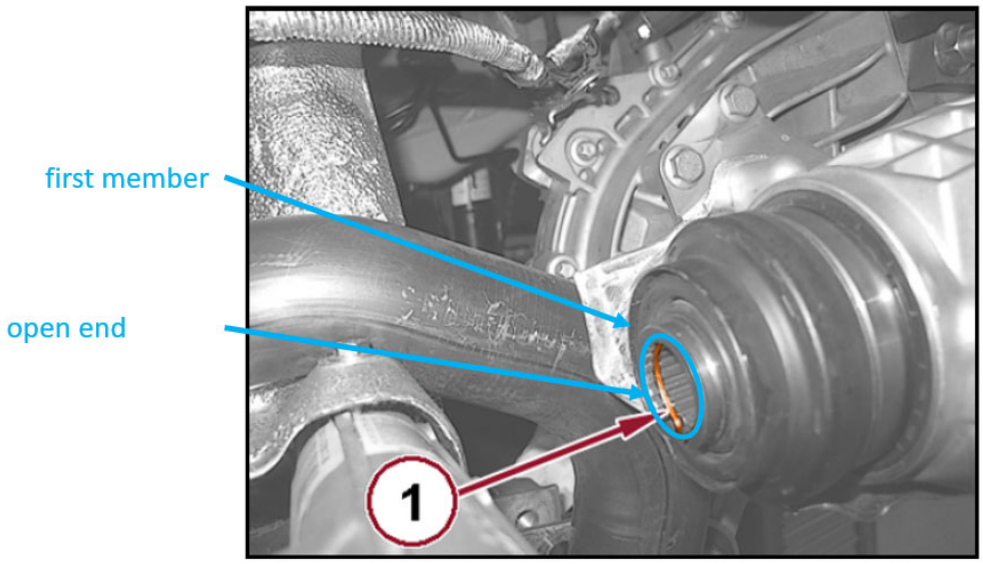
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first member. (Ex. 1001, '958 patent at Claim 1, 13). The Renegade Manual discloses limitation [13e(i)] for the reasons stated above in regard to limitation [1e(i)].

350. In particular, the Renegade Manual discloses that, for each joint assembly, the first member includes an open end.

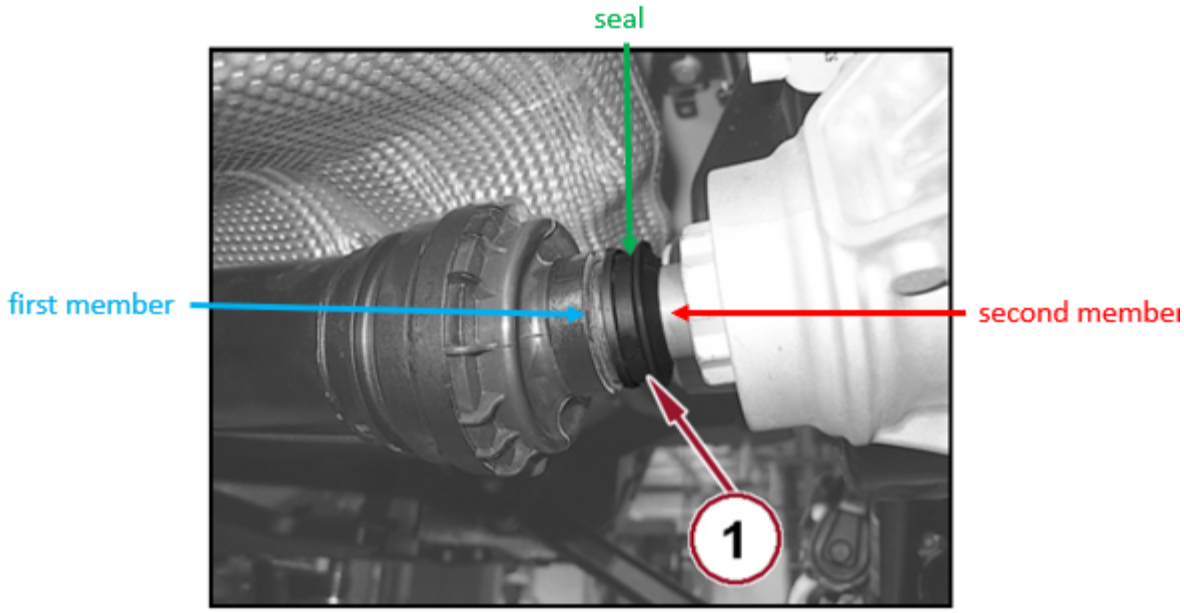


(Ex. 1013, Renegade Manual at PET_AAM_1013-0202, Installation Step 8 (RDU); Ex. 1013, Renegade Manual at PET_AAM_1013-0199–0202, Removal Steps 24, 25, 27, Installation Steps 3, 8, 9).

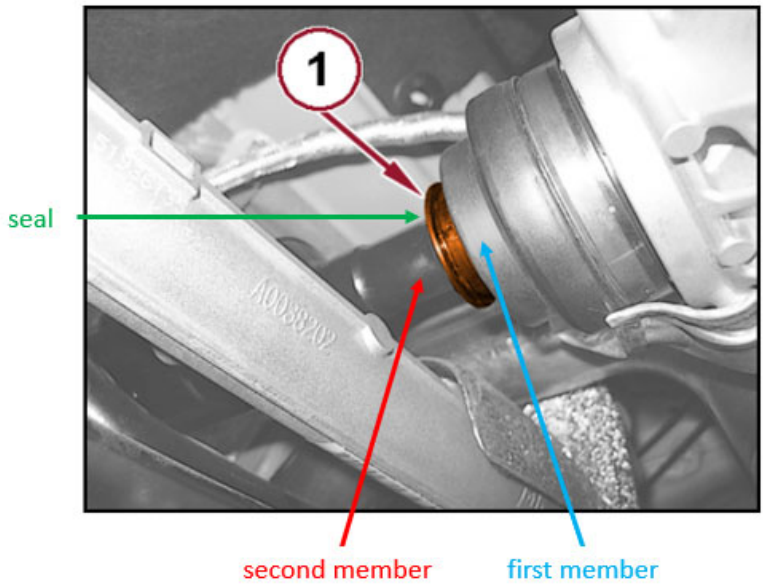


(Ex. 1013, Renegade Manual at PET_AAM_1013-0201, Installation Step 4 (PTU); Ex. 1013, Renegade Manual at PET_AAM_1013-0197–0203, Removal Steps 17, 19, Installation Steps 4, 11).

351. The Renegade Manual further discloses that the seal of each joint assembly, "dust cover" or "dust seal," is "coupled to the second member adjacent the open end of the first member." (Ex. 1001, '958 patent at Claim 13). For example, in the joint assembly between the propshaft (first member) and the pinion shaft of the RDU (second member), the seal is coupled to the pinion shaft of the RDU adjacent an open end of the propshaft, as depicted in Removal Step 23 and Installation Step 9 ("position the new dust cover (1) over the joint at the rear of the propeller shaft"):



(Ex. 1013, Renegade Manual at PET_AAM_1013-0198, Removal Step 23, PET_AAM_1013-0202, Installation Step 9). Similarly, in the joint assembly between the PTU (first member) and propshaft (second member), the seal is coupled to the propshaft adjacent an open end of the PTU, as depicted in Removal Step 16 and Installation Step 12 ("position the new dust cover (2) over the joint at the front of the propeller shaft"):



(Ex. 1013, Renegade Manual at PET_AAM_1013-0197, Removal Step 16, PET_AAM_1013-0203, Installation Step 12; Ex. 1013, Renegade Manual at PET_AAM_1013-0197–0203, Removal Steps 16, 25, 27, Installation Steps 1, 2, 8, 9, 12).

[13e(ii)] the seal coupled to the first member adjacent the window,

352. Limitation [13e(ii)] is the same as limitation [1e(ii)]. (Ex. 1001, '958 patent at Claims 1 and 13). The Renegade Manual discloses limitation [13e(ii)] for the reasons stated above in regard to limitation [1e(ii)].

[13e(iii)] wherein a cylindrical portion of the seal covers the outer wall of the first member along at least a portion of a perimeter of the window,

353. Limitation [13e(iii)] is the same as limitation [1e(iii)]. (Ex. 1001, '958 patent at Claims 1 and 13). The Renegade Manual discloses limitation [13e(iii)] for the reasons stated above in regard to limitation [1e(iii)].

[13e(iv)] wherein the seal further includes a corrugated portion disposed adjacent the cylindrical portion, and

354. Limitation [13e(iv)] is the same as limitation [1e(iv)]. (Ex. 1001, '958 patent at Claims 1 and 13). The Renegade Manual discloses limitation [13e(iv)] for the reasons stated above in regard to limitation [1e(iv)].

[13e(v)] wherein the corrugated portion is spaced radially from each of the first member and the second member.

355. Limitation [13e(v)] is the same as limitation [1e(v)]. Ex. 1001, '958 patent at Claims 1 and 13. Renegade Manual discloses limitation [13e(v)] for the reasons stated above in regard to limitation [1e(v)].

Conclusion for Claim 13

356. In my opinion, Renegade Manual discloses all of the limitations of independent Claim 13 of the '958 patent and, therefore, anticipates Claim 13.

14. Claim 14

The joint assembly of claim 13, further comprising a constant velocity joint coupled to one of the first member and the second member.

357. In my opinion, the Renegade Manual discloses all of the limitations of dependent Claim 14 of the '958 patent and, therefore, anticipates Claim 14.

358. Claim 14 depends from Claim 13. (Ex. 1001, '958 patent at Claim 14). The Renegade Manual discloses every limitation of Claim 13 for the reasons stated above in regard to Claim 13.

359. The Renegade Manual discloses "further comprising a constant

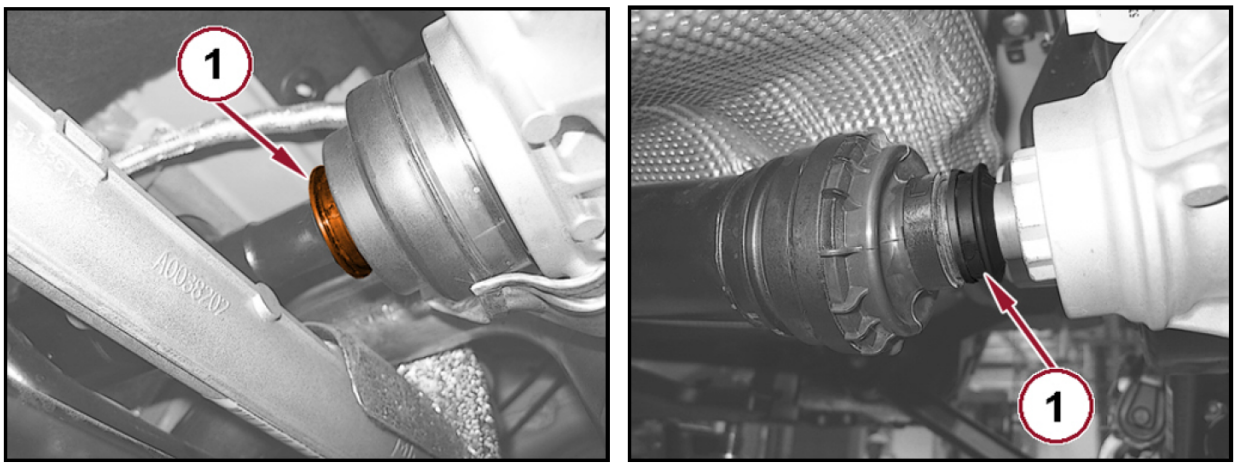
velocity joint coupled to one of the first member and the second member." (Ex. 1001, '958 patent at Claim 14). The limitation of Claim 14 is the same as the limitation of Claim 7. (Ex. 1001, '958 patent at Claims 7, 14.) The Renegade Manual discloses the limitation of Claim 14 for the reasons stated above in regard to Claim 7.

15. Claim 15

360. In my opinion, the Renegade Manual discloses all of the limitations of independent Claim 15 of the '958 patent and, therefore, anticipates Claim 15.

[15P] A method of servicing a joint assembly comprising:

361. The Renegade Manual, which is titled "2016 Jeep® Renegade Service Information Manual," discloses a "method of servicing a joint assembly" (Ex. 1001, '958 patent at Claim 15), including by providing a series of Removal Steps and Installation Steps for servicing a joint assembly between the propshaft and PTU (left) and a joint assembly between the propshaft and the RDU (right).

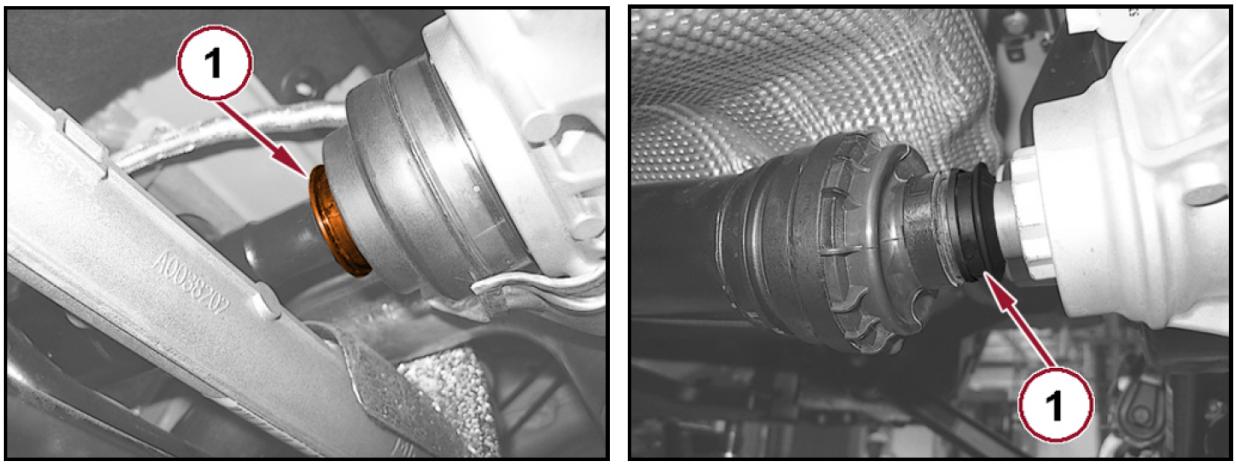


(Ex. 1013, Renegade Manual at PET_AAM_1013-0197–0198, Removal Steps 16

(PTU), 23 (RDU)).

[15-1] providing the joint assembly, the joint assembly including;

362. The Renegade Manual discloses "providing the joint assembly" (Ex. 1001, '958 patent at Claim 15), including providing a joint assembly between the propshaft and PTU (left) and a joint assembly between the propshaft and the RDU (right).



(Ex. 1013, Renegade Manual at PET_AAM_1013-0197–0198, Removal Steps 16 (PTU), 23 (RDU)). As discussed more fully below, for each joint assembly, the Renegade Manual also discloses that "the joint assembly includ[es]" the limitations of [15-1a] through [15-1e(v)].

[15-1a] a first member having a first engagement means and an interior surface recess;

363. Limitation [15-1a] is the same as limitation [1a]. (Ex. 1001, '958 patent at Claims 1 and 15). The Renegade Manual discloses limitation [15-1a] for the reasons stated above in regard to limitation [1a].

[15-1b] a second member having a second engagement means and an exterior surface recess, a portion of the second member disposed within the first member, the second engagement means engaging the first engagement means to provide a coupling of the second member to the first member;

364. Limitation [15-1b] is the same as limitation [1b]. (Ex. 1001, '958 patent at Claims 1 and 15). The Renegade Manual discloses limitation [15-1b] for the reasons stated above in regard to limitation [1b].

[15-1c] a window formed within the first member where the portion of the second member is disposed within the first member;

365. Limitation [15-1c] is the same as limitation [1c]. (Ex. 1001, '958 patent at Claims 1 and 15). The Renegade Manual discloses limitation [15-1c] for the reasons stated above in regard to limitation [1c].

[15-1d] a retaining means configured to retain the coupling of the second member to the first member,

366. Limitation [15-1d] is the same as limitation [1d]. (Ex. 1001, '958 patent at Claims 1 and 15). The Renegade Manual discloses limitation [15-1d] for the reasons stated above in regard to limitation [1d].

[15-1d(i)] wherein distal ends of the retaining means are accessible through the window,

367. Limitation [15-1d(i)] is the same as limitation [1d(i)]. (Ex. 1001, '958 patent at Claims 1 and 15). The Renegade Manual discloses limitation [15-1d(i)] for the reasons stated above in regard to limitation [1d(i)].

[15-1d(ii)] wherein the distal ends of the retaining means extend in a direction radially outwardly into the window to a point at or radially inwardly from an outer wall of the first member, and

368. Limitation [15-1d(ii)] is the same as limitation [1d(ii)]. (Ex. 1001, '958 patent at Claims 1 and 15). The Renegade Manual discloses limitation [15-1d(ii)] for the reasons stated above in regard to limitation [1d(ii)].

[15-1d(iii) wherein the retaining means is received partially into each of the interior surface recess of the first member and the exterior surface recess of the second member when the retaining means retains the coupling of the second member to the first member; and

369. Limitation [15-1d(iii)] is the same as limitation [1d(iii)]. (Ex. 1001, '958 patent at Claims 1 and 15). The Renegade Manual discloses limitation [15-1d(iii)] for the reasons stated above in regard to limitation [1d(iii)].

[15-1e] a seal configured to cover the window,

370. Limitation [15-1e] is the same as limitation [1e]. (Ex. 1001, '958 patent at Claims 1 and 15). The Renegade Manual discloses limitation [15-1e] for the reasons stated above in regard to limitation [1e].

[15-1e(i)] the seal coupled to the second member adjacent an end of the first member,

371. Limitation [15-1e(i)] is the same as limitation [1e(i)]. (Ex. 1001, '958 patent at Claims 1 and 15). The Renegade Manual discloses limitation [15-1e(i)] for the reasons stated above in regard to limitation [1e(i)].

[15-1e(ii)] the seal coupled to the first member adjacent the

window,

372. Limitation [15-1e(ii)] is the same as limitation [1e(ii)]. (Ex. 1001, '958 patent at Claims 1 and 15). The Renegade Manual discloses limitation [15-1e(ii)] for the reasons stated above in regard to limitation [1e(ii)].

[15-1e(iii)] wherein a cylindrical portion of the seal covers the outer wall of the first member along at least a portion of a perimeter of the window,

373. Limitation [15-1e(iii)] is the same as limitation [1e(iii)]. (Ex. 1001, '958 patent at Claims 1 and 15). The Renegade Manual discloses limitation [15-1e(iii)] for the reasons stated above in regard to limitation [1e(iii)].

[15-1e(iv)] wherein the seal further includes a corrugated portion disposed adjacent the cylindrical portion, and

374. Limitation [15-1e(iv)] is the same as limitation [1e(iv)]. (Ex. 1001, '958 patent at Claims 1 and 15). The Renegade Manual discloses limitation [15-1e(iv)] for the reasons stated above in regard to limitation [1e(iv)].

[15-1e(v)] wherein the corrugated portion is spaced radially from each of the first member and the second member;

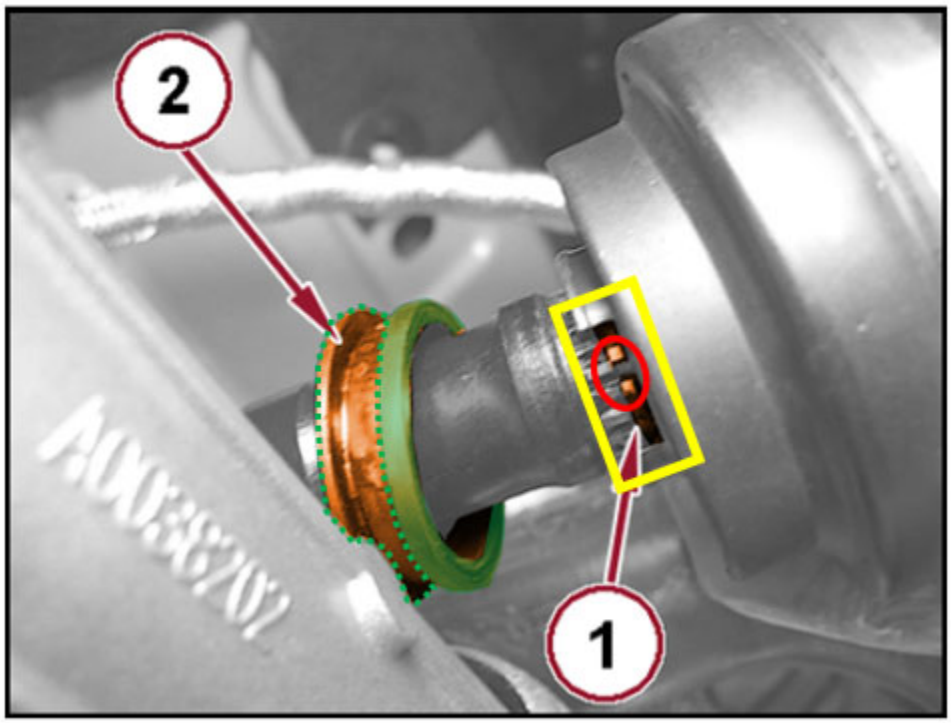
375. Limitation [15-1e(v)] is the same as limitation [1e(v)]. (Ex. 1001, '958 patent at Claims 1 and 15). The Renegade Manual discloses limitation [15-1e(v)] for the reasons stated above in regard to limitation [1e(v)].

[15-2] uncovering the window from the cylindrical portion of the seal to provide access to the distal ends of the retaining means,

376. The Renegade Manual discloses "uncovering the window from the

cylindrical portion of the seal to provide access to the distal ends of the retaining means." (Ex. 1001, '958 patent at Claim 1).

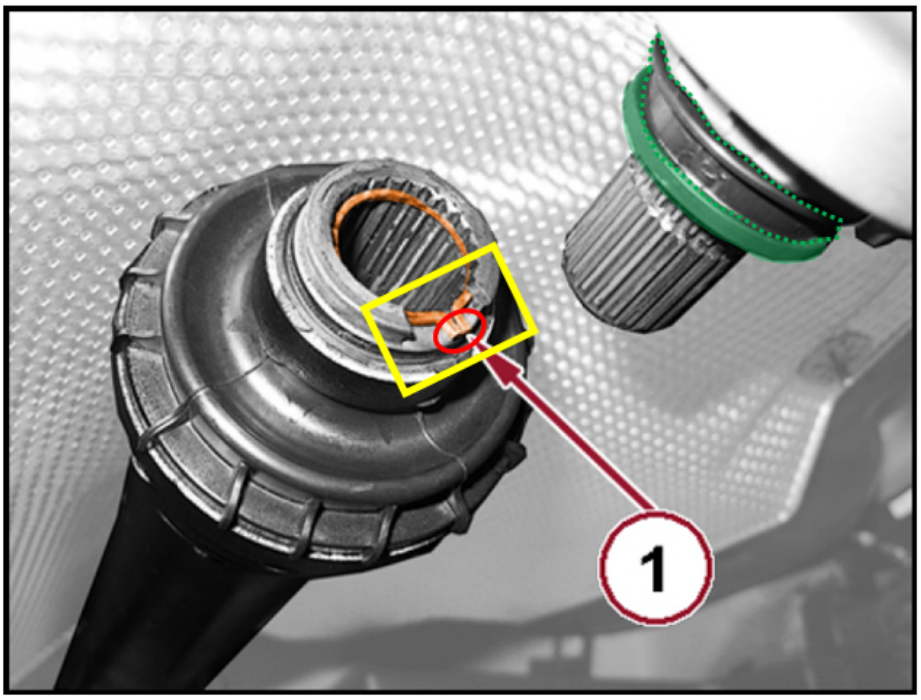
377. In particular, in regard to the joint assembly between the propshaft and PTU, Removal Step 16 instructs: "Slide the dust cover (1) at the front of the propeller shaft away from the Power Transfer Unit (PTU) to access the snap ring." (Ex. 1013, Renegade Manual at Removal Step 16). As depicted below, practicing the step of Removal Step 16 will uncover the window (yellow) from the cylindrical portion of the seal (green) to provide access to the distal ends of the retaining means (red circle).



(Ex. 1013, Renegade Manual at PET_AAM_1013-0203, Installation Step 11).

378. In regard to the joint assembly between the propshaft and RDU,

Removal Step 16 instructs: "Slide the dust cover (1) at the rear of the propeller shaft towards the differential to access the snap ring." (Ex. 1013, Renegade Manual at PET_AAM_1013-0198, Removal Step 23). As depicted below, practicing the step of Removal Step 23 will uncover the window (yellow) from the cylindrical portion of the seal (green) to provide access to the distal ends of the retaining means (red circle).

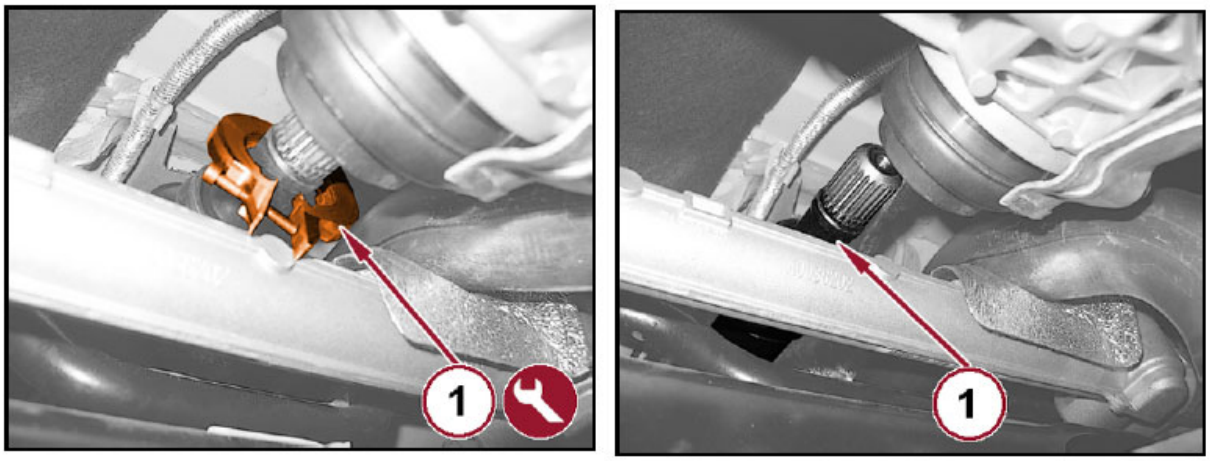


(Ex. 1013, Renegade Manual at PET_AAM_1013-0202, Installation Step 8).

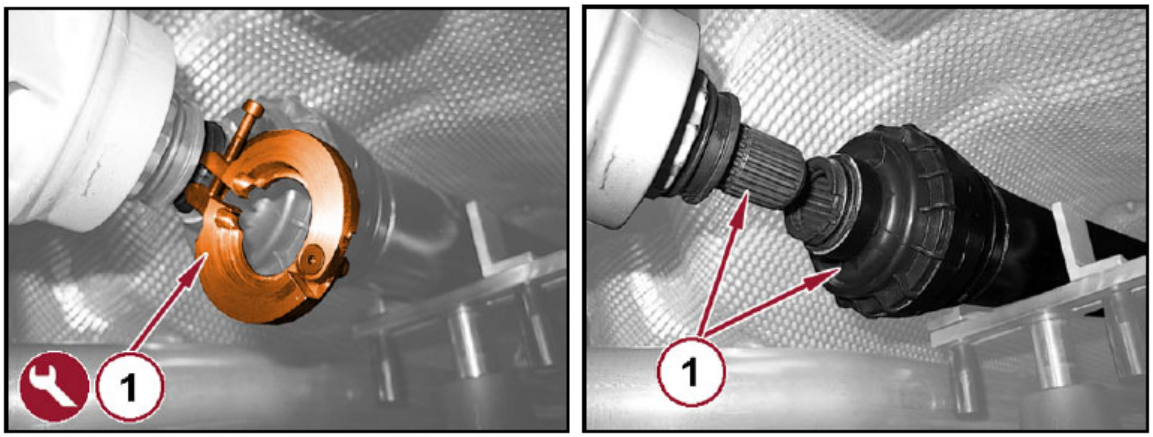
[15-3] manipulating the distal ends of the retaining means through the window to release the coupling of the second member to the first member; and

379. The Renegade Manual discloses "manipulating the distal ends of the retaining means through the window to release the coupling of the second member to the first member." (Ex. 1001, '958 patent at Claim 1).

380. In particular, in regard to the joint assembly between the propshaft and PTU, Removal Step 17 instructs to "Use tool 2019500030 (1)," an "Elastic Ring Spreader," "to open propeller shaft snap ring at the PTU" and Removal Step 18 instructs to "Disconnect the propeller shaft (1) from the PTU."



(Ex. 1013, Renegade Manual at PET_AAM_1013-0197–0198, Removal Steps 17–19). Similarly, in regard to the joint assembly between the propshaft and RDU, Removal Step 24 instructs to "Use tool 2019500030 (1)," an "Elastic Ring Spreader," "to open propeller shaft snap ring at the Rear Driveline Unit (RDU)" and Removal Step 25 instructs to "Disconnect the propeller shaft (1) from the pinion of the RDU (1)."

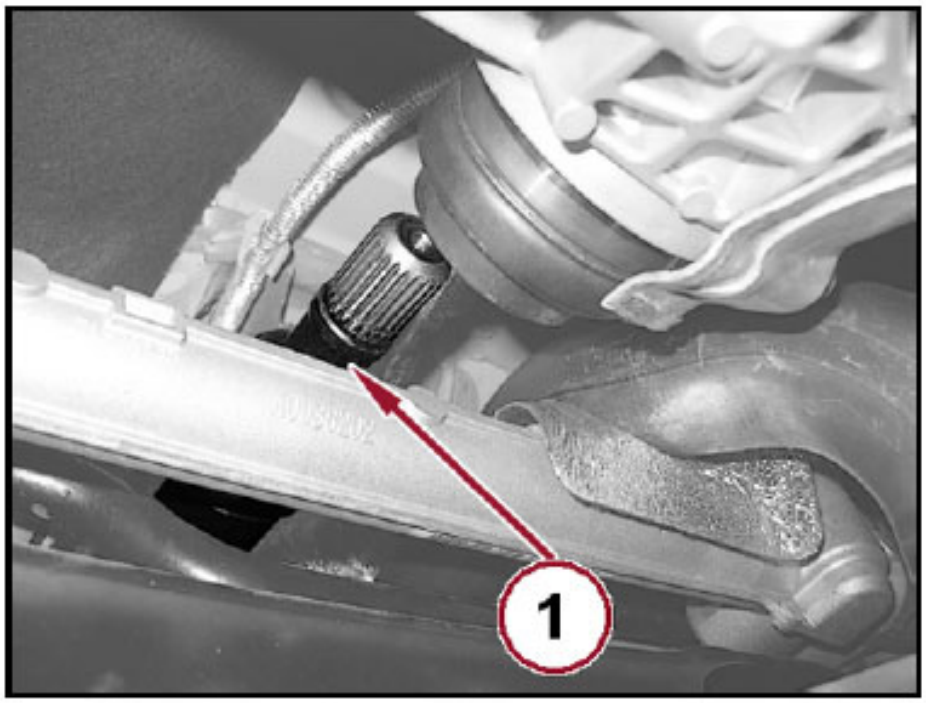


(Ex. 1013, Renegade Manual at PET_AAM_1013-0199, Removal Steps 24 and 25). Practicing the step of Removal Steps 17 and 18 and 24 and 25 will manipulate the distal ends of the retaining means through the window to release the coupling of the second member to the first member.

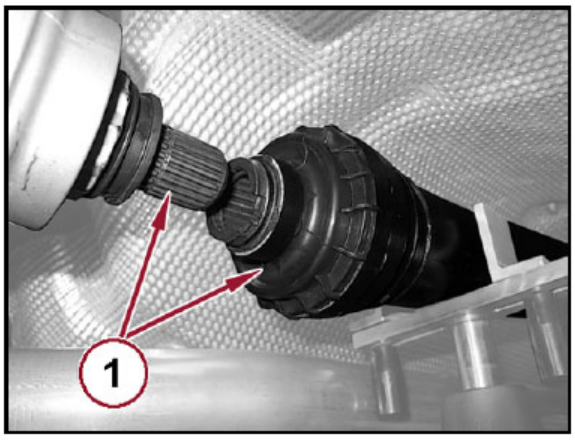
[15-4] separating the first member and the second member by disengaging the second engagement means from the first engagement means.

381. The Renegade Manual discloses "separating the first member and the second member by disengaging the second engagement means from the first engagement means." (Ex. 1001, '958 patent at Claim 1).

382. In particular, in regard to the joint assembly between the propshaft and PTU, Removal Step 18 instructs to "Disconnect the propeller shaft (1) from the PTU."



(Ex. 1013, Renegade Manual at PET_AAM_1013-0197–0198, Removal Steps 18, 19). Similarly, in regard to the joint assembly between the propshaft and RDU, Removal Step 25 instructs to "Disconnect the propeller shaft (1) from the pinion of the RDU (1)."



(Ex. 1013, Renegade Manual at PET_AAM_1013-0199, Removal Step 25). As illustrated in the images of Renegade Manual, including the images for Steps 18 and

25, practicing the steps of Removal Steps 18 and 25 will separate the first member and the second member by disengaging the second engagement means from the first engagement means.

Conclusion for Claim 15

383. In my opinion, the Renegade Manual discloses all of the limitations of independent Claim 15 of the ’958 patent and, therefore, anticipates Claim 15.

16. Claim 16

The method of servicing the joint assembly of claim 15, wherein the joint assembly further comprises a constant velocity joint coupled to one of the first member and the second member.

384. In my opinion, the Renegade Manual discloses all of the limitations of dependent Claim 16 of the ’958 patent and, therefore, anticipates Claim 16.

385. Claim 16 depends from Claim 15. (Ex. 1001, ’958 patent at Claim 16). The Renegade Manual discloses every limitation of Claim 15 for the reasons stated above in regard to Claim 15.

386. The Renegade Manual discloses that “the joint assembly further comprises a constant velocity joint coupled to one of the first member and the second member.” (Ex. 1001, ’958 patent at Claim 16). The limitation of Claim 16 is the same as the limitations of Claims 7 and 14. (Ex. 1001, ’958 patent at Claims 7, 14, 16.) The Renegade Manual discloses the limitation of Claim 16 for the reasons stated above in regard to Claims 7 and 14.

17. Claim 17

The method of servicing the joint assembly of claim 15, further comprising coupling the separated first member with another second member to form another joint assembly.

387. In my opinion, the Renegade Manual discloses all of the limitations of dependent Claim 17 of the ’958 patent and, therefore, anticipates Claim 17.

388. Claim 17 depends from Claim 15. (Ex. 1001, ’958 patent at Claim 17). The Renegade Manual discloses every limitation of Claim 15 for the reasons stated above in regard to Claim 15.

389. The Renegade Manual further discloses the step of “coupling the separated first member with another second member to form another joint assembly.” Ex. 1001, ’958 patent at Claim 17.

390. In regard to the joint assembly between the propshaft and the RDU, the propshaft includes a female shaft, which is a “first member,” and the pinion shaft of the RDU includes a male shaft, which is a “second member.” (Ex. 1013, Renegade Manual at PET_AAM_1013-0199–0202, Removal Steps 24, 25, 27, Installation Steps 3, 8). In Chapter 3, “Differential and Driveline / Rear Driveline Module / Removal and Installation,” the Renegade Manual discloses steps for the removal and installation of the RDU, including several of the same steps for the removal and installation of the propshaft. (Ex. 1013, Renegade Manual at PET_AAM_1013-0242–0249). For example, Removal Step 13 recites: “Disconnect the propeller shaft

from the pinion of the RDU (1)." (Ex. 1013, Renegade Manual at PET_AAM_1013-0244, Removal Step 13). The installation steps describe "replacing the RDU" and "connect[ing] the propeller shaft to the pinion of the RDU." (Ex. 1013, Renegade Manual at PET_AAM_1013-0247–0248, "Note," Installation Steps 7, 13). Replacing and installing the new RDU therefore couples the separated first member (the first female shaft member of propshaft) with another second member (the second male pinion shaft member of the RDU) to form another joint assembly.

391. This is consistent with the understanding of a person of ordinary skill in the art. A person of ordinary skill in the art would understand that Renegade Manual teaches the step of replacing component parts of the 2016 Jeep Renegade, including each of the propshaft, RDU, and PTU. In this regard, a person of ordinary skill in the art would also understand that the Renegade Manual teaches replacing the propshaft during servicing. Thus, for the joint assembly between the propshaft and the PTU, where the PTU includes a female shaft, which is a "first member," and the propshaft includes a male shaft, which is a "second member" (Ex. 1013, Renegade Manual at PET_AAM_1013-0197–0203, Removal Steps 17, 19, Installation Steps 2, 4, 11), replacing and installing the new propshaft also couples the separated first member (the first female shaft member of PTU) with another second member (the second male shaft member of the propshaft) to form another joint assembly.

18. Claim 18

The method of servicing the joint assembly of claim 15, further comprising coupling the separated second member with another first member to form another joint assembly.

392. In my opinion, the Renegade Manual discloses all of the limitations of dependent Claim 18 of the ’958 patent and, therefore, anticipates Claim 18.

393. Claim 18 depends from Claim 15. (Ex. 1001, ’958 patent at Claim 18). The Renegade Manual discloses every limitation of Claim 15 for the reasons stated above in regard to Claim 15.

394. The Renegade Manual further discloses the step of “coupling the separated second member with another first member to form another joint assembly.” (Ex. 1001, ’958 patent at Claim 18).

395. In regard to the joint assembly between the propshaft and PTU, the PTU includes a female shaft, which is a “first member,” and the propshaft includes a male shaft, which is a “second member.” (Ex. 1013, Renegade Manual at PET_AAM_1013-0197–0203, Removal Steps 17, 19, Installation Steps 2, 4, 11). In Chapter 21, “21 - Transmission and Transfer Case / Power Transfer Unit / Removal and Installation,” the Renegade Manual discloses steps for the removal and installation of the PTU. (Ex. 1013, Renegade Manual at PET_AAM_1013-0779–0783). Installation Step 11 discloses “installing a NEW (PTU).” (Ex. 1013, Renegade Manual at PET_AAM_1013-0783, Installation Step 11). Replacing and

installing the new PTU therefore couples the separated second member (the second male shaft member of propshaft) with another first member (the first female shaft member of the PTU) to form another joint assembly.

396. This is consistent with the understanding of a person of ordinary skill in the art. A person of ordinary skill in the art would understand that Renegade Manual teaches the step of replacing component parts of the 2016 Jeep Renegade, including each of the propshaft, RDU, and PTU. In this regard, a person of ordinary skill in the art would also understand that the Renegade Manual teaches replacing the propshaft during servicing. Thus, for the joint assembly between the propshaft and the RDU, where the propshaft includes a female shaft, which is a "first member," and the RDU includes a male pinion shaft, which is a "second member" (Ex. 1013, Renegade Manual at PET_AAM_1013-0197–0203, Removal Steps 24, 25, 27, Installation Steps 1, 3, 8), replacing and installing the new propshaft also couples the separated second member (the second male pinion shaft member of RDU) with another first member (the first female shaft member of the propshaft) to form another joint assembly.

B. Renegade Manual, Krude '422, Sugiyama, and the Knowledge of a Person of Ordinary Skill Obviousness – Claims 1–18

397. I provided a summary of the Renegade Manual (Ex. 1013) above in Section VIII.A, which I incorporate herein by reference. I have provided a summary of Krude '422 above in Section VIII.B, which I incorporate herein by reference. I

have provided a summary of Sugiyama above in Section VIII.C, which I incorporate herein by reference. I have compared Claims 1–18 of the '958 patent to Renegade Manual in view of Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art. In my opinion, Claims 1–18 of the '958 patent would have been obvious over Renegade Manual in view of Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art.

398. As I describe below, the Renegade Manual, Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art disclose every limitation of Claims 1–18. A person of ordinary skill in the art would also have been motivated to modify the teachings of the Renegade Manual in view of Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art, and combine the teachings of the Renegade Manual, Krude '422, and Sugiyama and the knowledge of a person of ordinary skill in the art, with a reasonable expectation of success at arriving at the claimed inventions of Claims 1–18 of the '958 patent.

399. A person of ordinary skill in the art would have been motivated to modify and combine the teachings of the prior art with a reasonable expectation of success of arriving at the claimed inventions because 1) each reference relates to the same well-known technologies, 2) each reference applies substantially similar techniques to achieve similar results, 3) the functionality of the Renegade Manual would not change if its teachings were modified in view of or combined with the

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teachings of Krude ’422, Sugiyama, and the knowledge of a person of ordinary skill in the art, and 4) other reasons as set forth herein.

400. First, the Renegade Manual, Krude ’422, and Sugiyama all relate to well-known technologies related to joint assemblies with retaining rings that are accessible through an access window for servicing. For example, the Renegade Manual, Krude ’422, and Sugiyama each disclose retaining rings to retain the coupling of a first, female splined shaft member and a second, male splined shaft member, and the Renegade Manual and Krude ’422 further disclose that the retaining rings have distal ends that are accessible through an access window in the first, female splined shaft member for servicing. (Ex. 1013, Renegade Manual at PET_AAM_1013-0197–0203, Removal Steps 16, 17, 23–27, Installation Steps 3, 4, 8, 11; Ex. 1008, Krude ’422 at 6:40–43, 7:6–7, 7:13–15, 7:19–34, 7:60–62, 7:66–8:32, Figs. 4a, 5a, 5b, 7–10; Ex. 1007, Sugiyama at Abstract, [0004], [0006], [0007], [0035], [0046], [0051], [0057], [0059]–[0061], [0072]–[0095], Figs. 4–19). A person of ordinary skill in the art would have found it obvious and would have been motivated to combine the teachings of the Renegade Manual, Krude ’422, and Sugiyama since they are in the same field of endeavor with the same well-known technologies. That is, modifying the teachings of the Renegade Manual and Krude ’422, for example, relating to the use of a retaining ring having distal ends that extend in a direction radially outwardly into the window to a point at or radially inwardly

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from an outer wall of the first member, entails the mere use of known solutions to improve similar systems and methods in the same way.

401. Similarly, the Renegade Manual and Sugiyama each disclose seals covering the windows in the first, female splined shaft members, wherein the seals have both a cylindrical portion and a corrugated portion disposed adjacent the cylindrical portion. (Ex. 1013, Renegade Manual at PET_AAM_1013-0197–0203, Removal Steps 16, 23, 25, 27, Installation Steps 1, 2, 8, 9, 12. Ex. 1007, Sugiyama at [0048], [0058], Figs. 3, 7). Again, a person of ordinary skill in the art would have found it obvious and would have been motivated to combine the teachings of the Renegade Manual and Sugiyama since they are in the same field of endeavor with the same well-known technologies. That is, modifying the teachings of the Renegade Manual and Sugiyama, for example, relating to the use of a bellows-type, corrugated boot seal (clamped or unclamped) with a corrugated portion disposed adjacent to a cylindrical portion, entails the mere use of known solutions to improve similar systems and methods in the same way.

402. Second, the Renegade Manual, Krude ’422, and Sugiyama apply substantially similar techniques to achieve similar results. As to the retaining means, each of the Renegade Manual, Krude ’422, and Sugiyama use a retaining ring, and the Renegade Manual and Krude ’422 each use a retaining ring having distal ends that are accessible through an access window in the first, female splined shaft

member for servicing. (Ex. 1013, Renegade Manual at PET_AAM_1013-0197–0203, Removal Steps 16, 17, 23–27, Installation Steps 3, 4, 8, 11; Ex. 1008, Krude '422 at 6:40–43, 7:6–7, 7:13–15, 7:19–34, 7:60–62, 7:66–8:32, Figs. 4a, 5a, 5b, 7–10; Ex. 1007, Sugiyama at Abstract, [0004], [0006], [0007], [0035], [0046], [0051], [0057], [0059]–[0061], [0072]–[0095], Figs. 4–19). And, as to the seal, each of the Renegade Manual and Sugiyama use seals to cover the access windows in the first, female splined shaft and to protect the splined connection from the invasion of dirt, dust, and other contaminants. (Ex. 1013, Renegade Manual at PET_AAM_1013-0197–0203, Removal Steps 16, 23, 25, 27, Installation Steps 1, 2, 8, 9, 12. Ex. 1007, Sugiyama at [0048], [0058], Figs. 3, 7). A person of ordinary skill in the art would have been motivated to use the retaining ring as taught by Krude '422 in the joint assemblies of the Renegade Manual at least to avoid the retaining ring contacting, interfering with, or damaging the seal (and other components of the joint assembly and driveline) during assembly and disassembly, and would have been motivated to use the bellows-type seal as taught by Sugiyama at least "to enable expansion and contraction (telescopically) in the axial direction," which is useful and desirable for assembly, disassembly, and servicing of the joint assemblies. (Ex. 1007, Sugiyama at [0058], Fig. 7). Thus, a person of ordinary skill in the art would have found it obvious to combine the teachings of the Renegade Manual, Krude '422, Sugiyama and knowledge of a person of ordinary skill in the art because they would recognize

that the techniques known and available in the prior art would improve the joint assemblies of the Renegade Manual in the same way and according to their established functions.

403. Third, the intended functionality of the joint assemblies of the Renegade Manual would not change when modified to incorporate the teachings of Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art. For example, a person of ordinary skill in the art would have reasonably expected the retaining ring of the Renegade Manual to retain the coupling of the first, female splined shaft member and second, male splined shaft member, even when the retaining ring is modified as taught by Krude '422 and as known by those skilled in the art to have distal ends that extend in a direction radially outwardly into the window to a point at or radially inwardly from an outer wall of the first member. Indeed, as discussed above, modifying the retaining ring of the Renegade Manual in this manner would prevent damage to the seal during assembly and disassembly. Accordingly, a person of ordinary skill in the art would have had a reasonable expectation of success when modifying the Renegade Manual in view of Krude '422—each relate to the same well-known technologies and both apply substantially similar techniques to achieve similar results.

404. Similarly, a person of ordinary skill in the art would have reasonably expected the seal of the Renegade Manual to cover the access windows of the first,

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female splined shaft member, seal the joint assemblies, and protect the splined connection from the invasion of dirt, dust, and other contaminants, even when the seal is modified as taught by Sugiyama and as known by those skilled in the art to have a cylindrical portion that covers the outer wall of the first member along at least a portion of a perimeter of the window and a corrugated portion disposed adjacent the cylindrical portion. Indeed, as discussed above, modifying the seal of Renegade Manual in this manner would be beneficial and desirable to a person of ordinary skill in the art, including, as taught by Sugiyama, "to enable expansion and contraction (telescopically) in the axial direction," which is useful for assembly, disassembly, and servicing of the joint assemblies. (Ex. 1007, Sugiyama at [0058], Fig. 7). Accordingly, a person of ordinary skill in the art would have had a reasonable expectation of success when modifying the seal of the Renegade Manual in view of Sugiyama—again, each relate to the same well-known technologies and both apply substantially similar techniques to achieve similar results.

405. A person of ordinary skill in the art would have been motivated to modify the teachings of the Renegade Manual in view of Krude '422 and Sugiyama and the knowledge of a person of ordinary skill in the art, and combine the teachings of the Renegade Manual, Krude '422, and Sugiyama and the knowledge of a person of ordinary skill in the art, with a reasonable expectation of success of arriving at the claimed inventions for these and the additional reasons set forth below.

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1. Claim 1

406. As I described above in Section IX.A.1, the Renegade Manual discloses every limitation of Claim 1 and anticipates that claim. In my opinion, Claim 1 would have been obvious over the Renegade Manual in view of Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art for the reasons stated above in regard to anticipation of Claim 1 by the Renegade Manual and the following additional reasons.

[1P] A joint assembly comprising:

407. As I described above in Section IX.A.1, the Renegade Manual discloses limitation [1P].

408. Krude '422 also discloses limitation [1P]. In particular, Krude '422 discloses a joint assembly formed between a first, female splined shaft member, "constant velocity joint 71" with an "outer joint part 72 with a sleeve projection 82" and "inner toothing 75" (blue), and a second, male splined shaft member, "wheel hub 41" with "outer toothing 52" (red).

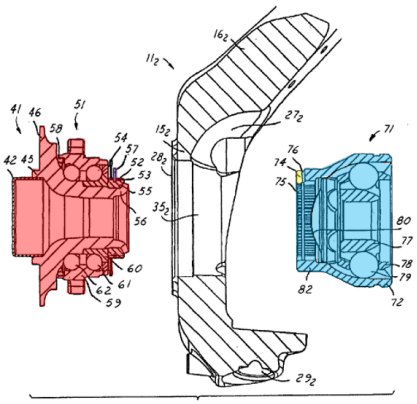


FIG.5a

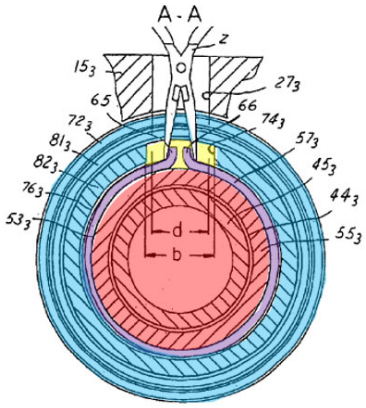
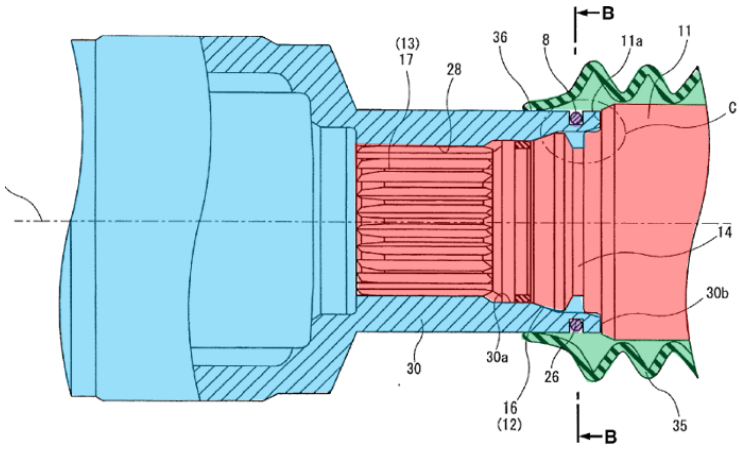


FIG.8

Ex. 1008, Krude '422 at 5:66–6:43, Figs. 1–10.

409. Sugiyama also discloses limitation [1P]. In particular, Sugiyama discloses a joint assembly formed between a first, female shaft member, "cylindrical section 30" of the rear end of J2 (blue), and a second, male shaft member, "output shaft 3" having a "large diameter section 11," "middle diameter section 12," and a "small diameter section 13 integrally disposed on an end section of middle diameter section 12" (red).

FIG.7



Ex. 1007, Sugiyama at [0034], [0049], [0050], Figs. 2, 4 and 7.

[1a] a first member having a first engagement means and an interior surface recess;

410. As I described above in Section IX.A.1, the Renegade Manual discloses limitation [1a].

411. Krude '422 also discloses limitation [1a]. In particular, Krude '422 discloses a first, female splined shaft member, "constant velocity joint 71" with an "outer joint part 72 with a sleeve projection 82." (Ex. 1008, Krude '422 at 6:17–18; Ex. 1008, Krude '422 at 5:54–59, Figs. 1–10). The first member has a first engagement means, "inner toothing 75," and an interior recess, "annular groove 76." (Ex. 1008, Krude '422 at 6:37–43, 7:36–53, Figs. 1–10).

412. Sugiyama also discloses a first, female splined shaft member, "cylindrical section 30" of the rear end of J2. (Ex. 1007, Sugiyama at [0011], Figs. 4, 7; Ex. 1007, Sugiyama at [0041], [0049]–[0051], [0056]–[0058]). The first, female splined shaft member of Sugiyama has a first engagement means, a set of "female splines." (Ex. 1007, Sugiyama at [0045], [0050], Figs. 4–7, 11(a) and (b), 12(a) and (b), and 13(a) and (b)). Sugiyama further discloses "an annular retaining groove 26 which serves to retain circlip (retaining ring) 8 is cutout formed along the peripheral direction in the proximity of a rear end edge of cylindrical section 30." (Ex. 1007, Sugiyama at [0051]; Ex. 1007, Sugiyama at [0052], [0054], [0055], [0057], [0059]–[0063]).

[1b] a second member having a second engagement means and an exterior surface recess, a portion of the second member disposed within the first member, the second engagement means engaging the first engagement means to provide a coupling of the second member to the first member;

413. As I described above in Section IX.A.1, the Renegade Manual discloses limitation [1b].

414. Krude ’422 also discloses limitation [1b]. In particular, Krude ’422 discloses a second, male splined shaft member, “wheel hub 41” with “outer toothing 52.” (Ex. 1008, Krude ’422 at 5:46–46, 5:66–6:1, Figs. 1–10). “Outer toothing 52” of Krude ’422 is a second engagement means having an exterior recess, “an annular groove 53 being turned into said outer toothing 52.” (Ex. 1008, Krude ’422 at 5:59–63, 6:23–24, 6:40–43, 7:6–15, 7:36–53, Figs. 1–10). In Krude ’422, a portion of the second, male splined shaft member is disposed within the first, female splined shaft member. (Ex. 1008, Krude ’422 at Abstract, 7:36–54, Figs. 1–10, Claims 1, 5, 14). The second engagement means, “outer toothing 52,” engages the first engagement means, “inner toothing 75,” to provide a coupling of the second member to the first member. (Ex. 1008, Krude ’422 at Abstract, 6:40–41 (“When the unit is assembled, the inner toothing 75 engages the outer toothing 52 at the wheel hub 41.”), 7:50–52 (“An Inner toothing 75_3 at the sleeve projection 82_3 cooperates with an outer toothing 52_3 at the driving ring 55.”), Figs. 1–10, Claims 1, 5, 14).

415. Sugiyama also discloses limitation [1b]. In particular, Sugiyama

discloses a second, male splined shaft member "output shaft 3" having a "large diameter section 11," "middle diameter section 12," and a "small diameter section 13 integrally disposed on an end section of middle diameter section 12." (Ex. 1007, Sugiyama at [0034], [0049], [0050], Figs. 2, 4 and 7). The second, male splined shaft member has a second engagement means, a set of "male splines 17 of output shaft" (Ex. 1007, Sugiyama at [0050], Figs. 1, 2, 11(a) and (b), 12(a) and (b); Ex. 1007, Sugiyama at [0041], [0045]), and an exterior surface recess, "engagement groove 14." Ex. 1007, Sugiyama at Abstract, [0005], [0035], [0051], [0072], Figs. 2, 7–13). As illustrated in Fig. 7 of Sugiyama, a portion of the second, male splined shaft member is disposed within the first, female splined shaft member, with the second engagement means, "male splines 17 of output shaft," engaging the first engagement means, "female splines," to provide a coupling of the shafts. (Ex. 1007, Sugiyama at [0050] ("A female spline 17 with which male spline 17 of output shaft 3 is engaged from the axial direction is cutout formed along the axial direction at the inner peripheral side of insertion hole 30 a."), Fig. 7).

[1c] a window formed within the first member where the portion of the second member is disposed within the first member;

416. As I described above in Section IX.A.1, the Renegade Manual discloses limitation [1c].

417. Krude '422 also discloses limitation [1c]. In particular, Krude '422

discloses a window, "notch 74" (yellow), formed within the first, female splined shaft member where the portion of the second, male splined shaft member is disposed within the first member.

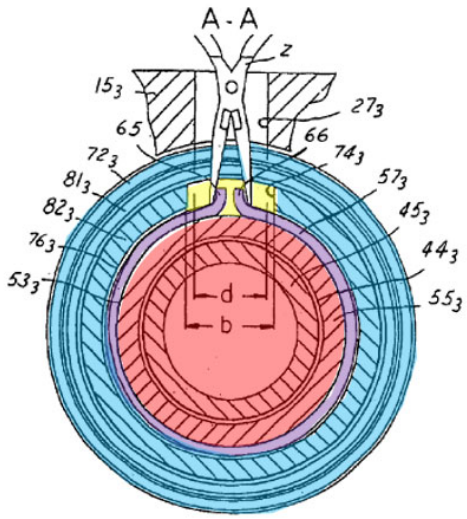


FIG. 8

(Ex. 1008, Krude '422 at 7:19–25, 7:66–8:32, Figs. 2, 7–9). Krude '422 teaches, for example: "Through said notch 74 it is possible to see an outer toothing 52, with an annular groove 53 being turned into said outer toothing 52." (Ex. 1008, Krude '422 at 5:59–63).

418. Sugiyama also discloses limitation [1c]. In particular, Sugiyama discloses windows, "through holes (31, 32)," formed within the first, female splined shaft member where the portion of the second, male splined shaft member is disposed. (Ex. 1007, Sugiyama at Abstract, [0046], [0047], [0051]–[0056], [0059], Figs. 4–7).

[1d] a retaining means configured to retain the coupling of the second member to the first member,

419. As I described above in Section IX.A.1, the Renegade Manual discloses limitation [1d].

420. Krude '422 also discloses limitation [1d]. In particular, Krude '422 teaches a retaining ring, "securing ring 57" (purple), which is a retaining means configured to retain the coupling of the second member to the first member, in particular, for "connecting the wheel hub unit 41 and the constant velocity joint 71."

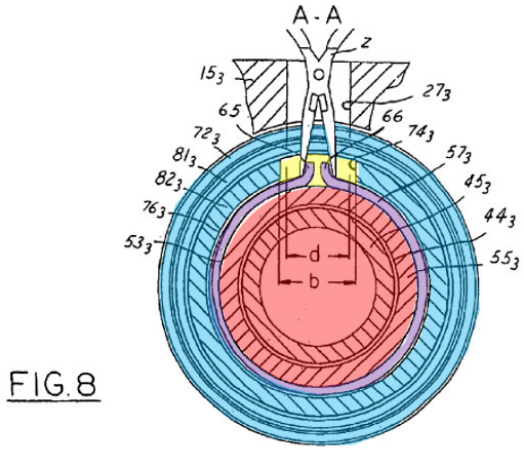


FIG. 8

(Ex. 1008, Krude '422 at 7:26–34; Ex. 1008, Krude '422 at 6:40–43 ("When the unit is assembled, the inner toothing 75 engages the outer toothing 52 at the wheel hub 41, with the annular groove 53 overlapping with the annular groove 76 and with both, jointly, accommodating a securing ring 57."), 7:6–7, 7:13–15, 7:60–62, 7:66–8:15, Figs. 4a, 5a, 5b, 7–10).

421. Sugiyama also discloses limitation [1d]. In particular, Sugiyama

discloses the use of a "circlip (retaining ring) 8" (purple), which is a retaining means configured to retain the coupling of the second member to the first member, in particular, to provide "an engagement stop operation . . . and a security of an appropriate drop-out prevention." (Ex. 1007, Sugiyama at [0074]. Ex. 1007, Sugiyama at Abstract, [0004], [0006], [0007], [0035] ("Middle diameter section 12 includes an annular engagement stop groove (or an engagement groove) 14 into which a circlip (also called a retaining ring) 8 (refer to FIG. 4) which serves as a retainer (or stopper) for input shaft 2 and output shaft 3 during linkages between input shaft 2 and output shaft 3 and first and second constant velocity (universal) joints 31, 32 is engagement stopped and which is cut out formed along the peripheral direction, at large diameter 11 side thereof."), [0046], [0051], [0057], [0059]–[0061], [0072]–[0095], Figs. 4–19).

[1d(i)] wherein distal ends of the retaining means are accessible through the window,

422. As I described above in Section IX.A.1, the Renegade Manual discloses limitation [1d(i)].

423. Krude '422 also discloses limitation [1d(i)]. In particular, the distal end "outwardly bent portions" of the retaining means, "securing ring 57" (purple), "at the ring ends 65, 66" are accessible through a window, "notch 74" (yellow).

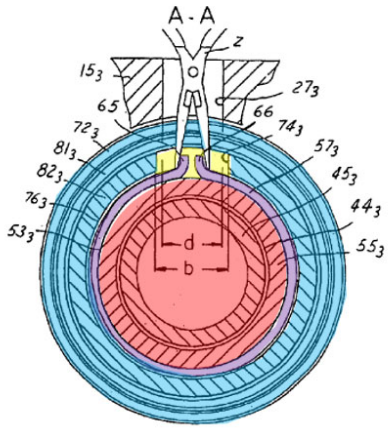


FIG. 8

Ex. 1008, Krude '422 at 7:19–25, 7:66–8:32, Figs. 7–9.

[1d(ii)] wherein the distal ends of the retaining means extend in a direction radially outwardly into the window to a point at or radially inwardly from an outer wall of the first member, and

424. As I described above in Section IX.A.1, the Renegade Manual discloses limitation [1d(ii)].

425. Krude '422 also discloses limitation [1d(ii)]. In particular, as illustrated in Figure 8, the distal ends of the retaining means, "securing ring 57" (purple), extend in a direction radially outwardly into the window, "notch 74" (yellow), to a point at or radially inwardly from an outer wall of the first, female splined shaft member (blue).

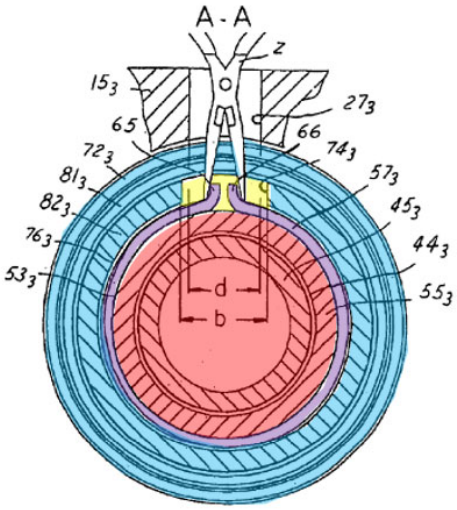


FIG.8

Ex. 1008, Krude '422 at 7:19–25, 7:66–8:32, Figs. 7–9.

426. To the extent that the Renegade Manual does not disclose limitation [1d(ii)] (that is, if the distal ends of the retaining ring of the Renegade Manual extend to a point beyond an outer wall of the first member), it would have been obvious to a person of ordinary skill in the art to modify the teachings of the Renegade Manual in view of the teachings of Krude '422 and the knowledge of a person of ordinary skill in the art, or combine the teachings of the Renegade Manual and Krude '422 and the knowledge of a person of ordinary skill in the art, to arrive at limitation [1d(ii)] and use in the joint assemblies of the Renegade Manual retaining means having distal ends that extend in a direction radially outwardly into the window to a point at or radially inwardly from an outer wall of the first member. Using such retaining means was a known, obvious, and desirable design choice and would lead

to predictable results.

a) A person of ordinary skill in the art would have been motivated to use retaining means having distal ends that extend in a direction radially outwardly into the window to a point at or radially inwardly from an outer wall of the first member.

427. A person of ordinary skill in the art would have been motivated to use retaining means having distal ends that extend in a direction radially outwardly into the window to a point at or radially inwardly from an outer wall of the first member for several reasons:

428. First, retaining means having distal ends that extend in a direction radially outwardly into the window to a point at or radially inwardly from an outer wall of the first member were well known in the art. (Ex. 1008, Krude '422 at 7:19–25, 7:66–8:32, Figs. 7–9; Ex. 1009, Nauer at 3:55–4:4, Figs. 3–5; Ex. 1010, Krude '506 at [0021], [0022], [0025], Fig. 2; Ex. 1017, EP 1 681 477 ("Matsumoto") at [0004], [0005], [0010], [0025]–[0026], Figs. 1–6). Matsumoto, for example, describes Figures 6A and 6B as "conventional snap rings" those like Krude '422 having distal ends that extend in a direction radially outwardly into the window to a point at or radially inwardly from an outer wall of the first member.

FIG. 6A

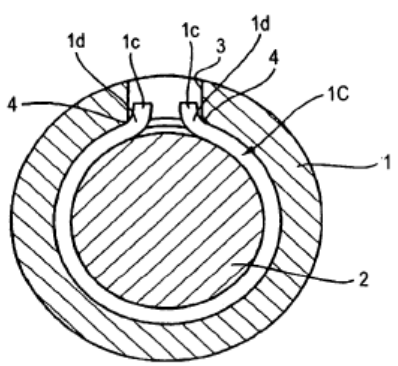
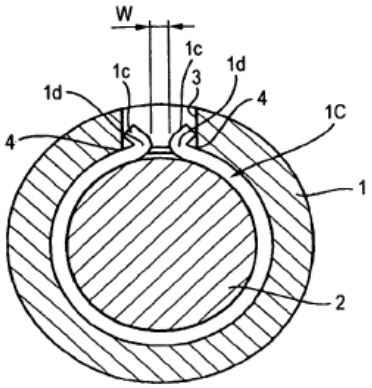


FIG. 6B



(Ex. 1017, Matsumoto at [0019], Figs. 6A and 6B). A person of ordinary skill in the art would have recognized that they could improve the joint assemblies of the Renegade Manual by using the retaining means of Krude '422 and other "conventional snap rings" known in the art in the same way and according to their established functions.

429. Second, a person of ordinary skill in the art would have been motivated to provide discreet means of coupling and uncoupling the first, female splined shaft member and second, male splined shaft member. Using retaining means, such as a retaining ring, with distal ends that do not extend radially to a point beyond the outer wall of the first member achieves a discrete profile of the joint assembly that does not extend beyond the outer wall of the first, female splined shaft member. This discrete profile can help to guide a removal tool into the window so that it engages the distal ends of the retaining ring to facilitate its removal.

430. Third, a person of ordinary skill in the art would have been motivated

to ensure that the retaining means does not interfere with external parts located outside the window. The seal of the Renegade Manual, for example, covers the window and retaining means and, to service the joint assemblies of the Renegade Manual, a user must slide the seal axially over the window and over the retaining means to uncover the window and retaining means. A person of ordinary skill would have been motivated to use a use retaining means having distal ends that extend in a direction radially outwardly into the window to a point at or radially inwardly from an outer wall of the first member to ensure that the distal ends of the retaining means do not contact, interfere with, or damage the seal (and other components of the joint assembly and driveline) during assembly and disassembly.

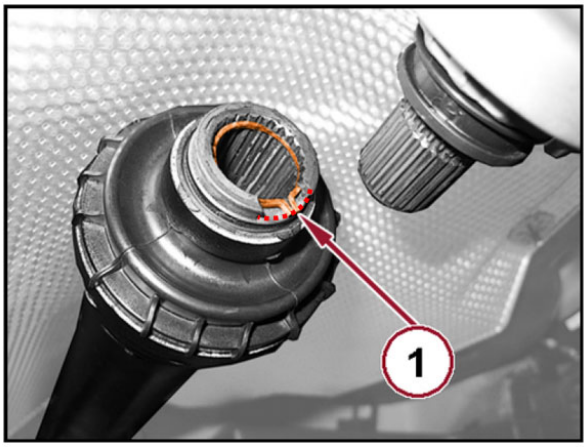
b) A person of ordinary skill in the art would have had a reasonable expectation of success in using retaining means having distal ends that extend in a direction radially outwardly into the window to a point at or radially inwardly from an outer wall of the first member.

431. A person of ordinary skill in the art would have had a reasonable expectation of success in using retaining means having distal ends that extend in a direction radially outwardly into the window to a point at or radially inwardly from an outer wall of the first member for several reasons:

432. First, the disclosures of the prior art, which teach limitation [1d(ii)], would have provided a person of ordinary skill in the art a reasonable expectation of success in using in the joint assemblies of the Renegade Manual retaining means

having distal ends that extend in a direction radially outwardly into the window to a point at or radially inwardly from an outer wall of the first member.

433. Second, as described above, the Renegade Manual already discloses a retaining ring having distal ends that extend in a direction radially outwardly into the window.



(Ex. 1013, Renegade Manual at PET_AAM_1013-0202, Installation Steps 8 (RDU); Ex. 1013, Renegade Manual at PET_AAM_1013-0197–0203, Removal Steps 17, 24, 25, and 27, Installation Steps 3, 4, 8, 12). To the extent that the retaining ring of the Renegade Manual extends to a point beyond the outer wall of the first member (and therefore not to a point at or radially inwardly from an outer wall of the first member, as recited in limitation [1d(ii)]), it clearly does so by only a matter of a few millimeters (a person of ordinary skill would understand this, in the photo above, to be due to the fact that it is pointed downward and is loosely located in the annular recess of the female shaft). A person of ordinary skill in the art would reasonably expect success in modifying the retaining ring of the Renegade Manual without any

impact or change on its intended function.

[1d(iii)] wherein the retaining means is received partially into each of the interior surface recess of the first member and the exterior surface recess of the second member when the retaining means retains the coupling of the second member to the first member; and

434. As I described above in Section IX.A.1, the Renegade Manual discloses limitation [1d(iii)].

435. Krude '422 also discloses limitation [1d(iii)]. In particular, Krude '422 discloses: "When the unit is assembled, the inner toothing 75 engages the outer toothing 52 at the wheel hub 41, with the annular groove 53 overlapping with the annular groove 76 and with both, jointly, accommodating a securing ring 57." (Ex. 1008, Krude '422 at 6:40–43, 7:12–15, 7:66–8:32, Figs. 1–10).

436. Sugiyama also discloses that the retaining means, "circlip (retaining ring) 8," is received partially into the exterior surface recess of the second member, "annular engagement stop groove (or an engagement groove) 14," when the retaining means retains the coupling of the second member to the first member: "Middle diameter section 12 includes an annular engagement stop groove (or an engagement groove) 14 into which a circlip (also called a retaining ring) 8 (refer to FIG. 4) which serves as a retainer (or stopper) for input shaft 2 and output shaft 3 during linkages between input shaft 2 and output shaft 3 and first and second constant velocity (universal) joints." (Ex. 1007, Sugiyama at [0035]; Ex. 1007,

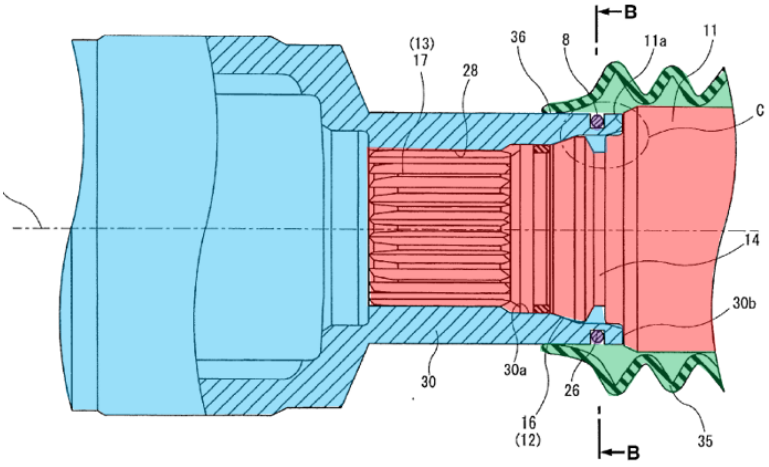
Sugiyama at [0051], [0072], Figs. 2, 7–10).

[1e] a seal configured to cover the window,

437. As I described above in Section IX.A.1, the Renegade Manual discloses limitation [1e].

438. Sugiyama also discloses limitation [1e]. In particular, Sugiyama discloses a seal, "water-proof boot 35" (green), which serves to prevent an invasion of water or dust from first and second through holes 31, 32."

FIG.7



Ex. 1007, Sugiyama at [0058], Fig. 7; Ex. 1007, Sugiyama at [0048], [0094], [0146], Claim 20.

[1e(i)] the seal coupled to the second member adjacent an end of the first member,

439. As I described above in Section IX.A.1, the Renegade Manual discloses limitation [1e(i)].

440. Sugiyama also discloses limitation [1e(i)]. In particular, as depicted in

Figure 7, the seal of Sugiyama, "water-proof boot 35," "is mounted on cylindrical section 30 in a form of extending on and over cylindrical section 30 and output shaft 3 so as to enclose first and second through holes 31, 32." (Ex. 1007, Sugiyama at [0058], Fig. 7; Ex. 1007, Sugiyama at [0048], [0094], [0146], Fig. 3, Claim 20).

441. To the extent that the Renegade Manual does not disclose limitation [1e(i)] (that is, if seal is not coupled to the second member adjacent an end of the first member), it would have been obvious to a person of ordinary skill in the art to modify the teachings of the Renegade Manual in view of the teachings of Sugiyama and the knowledge of a person of ordinary skill in the art, or combine the teachings of the Renegade Manual and Sugiyama and the knowledge of a person of ordinary skill in the art, to arrive at limitation [1e(i)] and use in the joint assemblies of the Renegade Manual a seal coupled to the second member adjacent an end of the first member. Using such a seal would have been a known, obvious, and desirable design choice and would lead to predictable results.

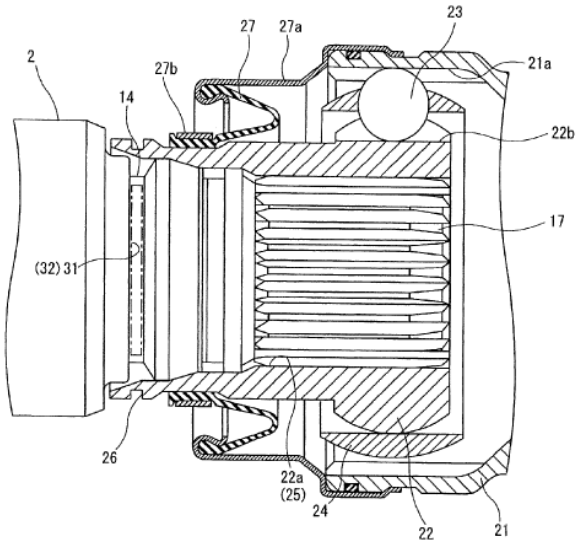
a) A person of ordinary skill in the art would have been motivated to use a seal coupled to the second member adjacent an end of the first member.

442. A person of ordinary skill in the art would have been motivated to use a seal coupled to the second member adjacent an end of the first member for several reasons:

443. First, as I described above in Section VI.D, there are countless different

designs, shapes, and sizes for seals of driveline joint assemblies, all known in the art. As described by the SAE Manual, "[t]he method of sealing employed for a splined connection generally depends on its specific design as well as its application." (Ex. 1012, SAE Manual at 191; Ex. 1012, SAE Manual at 190–192 (describing and illustrating several examples of joint assembly seals)). Seals that are coupled to the second member adjacent an end of the first member were well known in the art. (Ex. 1007, Sugiyama at Figs. 3 and 7, Claim 20; Ex. 1014, Krude '341 at Figs. 1, 3; Ex. 1015, Minel at Figs. 1 and 2; Ex. 1016, Yoshida at Figs. 1, 3, 5; Ex. 1012, SAE Manual at 145, 151, 163, 171). For example, Sugiyama, in the embodiment of Figure 3, teaches the use of a seal, "water proof boot 27," coupled to a second, male shaft member (with balls or rollers) adjacent to an end of a female shaft member "via a well known boot band 27 b."

FIG.3



(Ex. 1007, Sugiyama at [0048], Fig. 3). Sugiyama teaches: "One end side in the

axial direction of this boot 27 is fixed by caulking via a mounting bracket (attachment metal fittings) 27 a onto an outer peripheral surface at a tip side of outer wheel member 21 and the other end of this boot 27 in the axial direction is fixed to the outer peripheral surface of inner wheel member 22 in a tight binding manner via a well known boot band 27 b." (Ex. 1007, Sugiyama at [0048]; Ex. 1015, Minel at Fig. 1 ("collar 9"); Ex. 1016, Yoshida at 151, Figs. 1 and 3; Ex. 1014, Krude '341 at Fig. 1; Ex. 1018, Nicholas at 2:28–38 (describing seal clamped at 56, 58); Ex. 1019, Rabson at 2:43–65 (describing seal having "tubular cylindrical end sections 9 and 10 having inner diameters suitable respectively for sealing to outer surfaces" of the male and female shaft members by "clamping ring 7" or "collar 8"), Figs. 1–5). A person of ordinary skill in the art would have recognized that they could improve the joint assemblies of the Renegade Manual, if needed, by using conventional seals known in the art in the same way and according to their established functions, including boot seals clamped to a second, male shaft member adjacent a first, female shaft member by way of well-known clamps or "boot bands" as taught by Sugiyama.

444. Second, a person of ordinary skill in the art would have been motivated to reduce the size of and, relatedly, the cost the seal, by, for example, coupling the seal to the second member adjacent an end of the first member, as opposed to far from the end of the first member. For example, Sugiyama, in the embodiment of Figure 7, teaches the use of a seal, "water proof boot 35," "in a form of extending

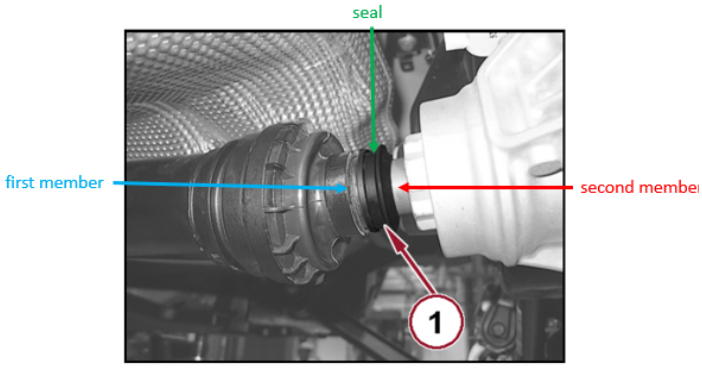
on and over cylindrical section 30 and output shaft 3 so as to enclose first and second through holes 31, 32." (Ex. 1007, Sugiyama at [0058], Fig. 7). A person of ordinary skill in the art would have been motivated to couple "water proof boot 35" to the second, male splined shaft member, "output shaft 3," adjacent an end of the first, female splined shaft member. Coupling adjacent an end of the first female splined member in the joint assemblies of the Renegade Manual would reduce the size and cost of the seal ("water proof boot 35" in Sugiyama), as opposed to coupling at another location, while achieving the function of covering the window and sealing the joint assembly.

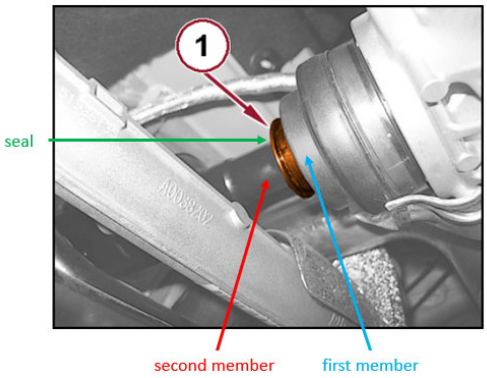
b) A person of ordinary skill in the art would have had a reasonable expectation of success in using a seal coupled to the second member adjacent an end of the first member.

445. A person of ordinary skill in the art would have had a reasonable expectation of success in using a seal coupled to the second member adjacent an end of the first member for several reasons:

446. First, the disclosures of the prior art, which teach limitation [1e(i)], would have provided a person of ordinary skill in the art a reasonable expectation of success in using in the joint assemblies of the Renegade Manual a seal coupled to the second member adjacent an end of the first member.

447. Second, as described above, the Renegade Manual already discloses a seal positioned over the second member adjacent an end of the first member.





(Ex. 1013, Renegade Manual at PET_AAM_1013-0197–0203, Removal Steps 16, 23, Installation Steps 9, 12; Ex. 1013, Renegade Manual at PET_AAM_1013-0197–0203, Removal Steps 16, 25, 27, Installation Steps 1, 2, 8, 9, 12). To the extent that the seal of the Renegade Manual is not coupled to the second member adjacent an end of the first member, clamping the seal of the Renegade Manual or using the seal of Sugiyama clamped to the second member adjacent using a "well known boot band" would have been a known, obvious, and desirable design choice and would lead to predictable results. A person of ordinary skill in the art would reasonably expect success in modifying seal of the Renegade Manual without any impact or change on its intended function, i.e., providing a seal to the joint assemblies.

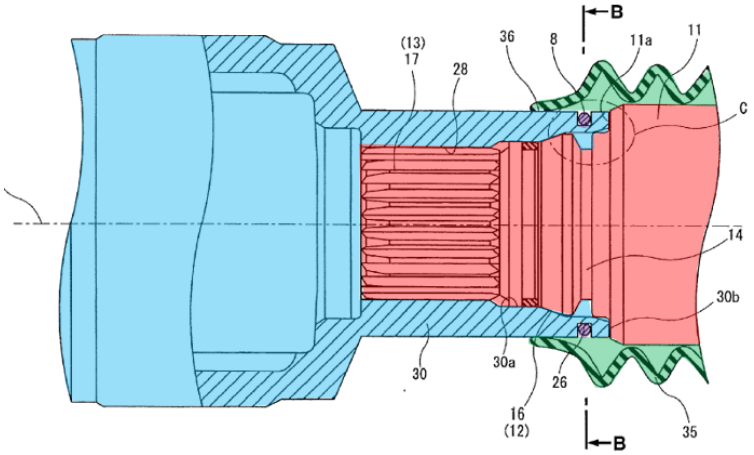
[1e(ii)] the seal coupled to the first member adjacent the window,

448. As I described above in Section IX.A.1, the Renegade Manual discloses limitation [1e(ii)].

449. Sugiyama also discloses limitation [1e(ii)]. In particular, the seal of Sugiyama, "water-proof boot 35" (green), "is mounted on cylindrical section 30 in

a form of extending on and over cylindrical section 30 and output shaft 3 so as to enclose first and second through holes 31, 32."

FIG.7



(Ex. 1007, Sugiyama at [0058], Fig. 7; Ex. 1007, Sugiyama at [0048], [0094], [0146], Claim 20). As depicted in Figure 7, the seal (green) of Sugiyama is coupled to the first, female splined shaft member, "cylindrical section 30" of the rear end of J2" (blue), adjacent the window.

450. To the extent that the Renegade Manual does not disclose limitation [1e(ii)] (that is, if the seal is not coupled to the first member adjacent the window), it would have been obvious to a person of ordinary skill in the art to modify the teachings of the Renegade Manual in view of the teachings of Sugiyama and the knowledge of a person of ordinary skill in the art, or combine the teachings of the Renegade Manual and Sugiyama and the knowledge of a person of ordinary skill in the art, to arrive at limitation [1e(i)] and use in the joint assemblies of the Renegade

Manual a seal coupled to the first member adjacent to the window. Using such a seal would have been a known, obvious, and desirable design choice and would lead to predictable results.

a) A person of ordinary skill in the art would have been motivated to use a seal coupled to the first member adjacent the window.

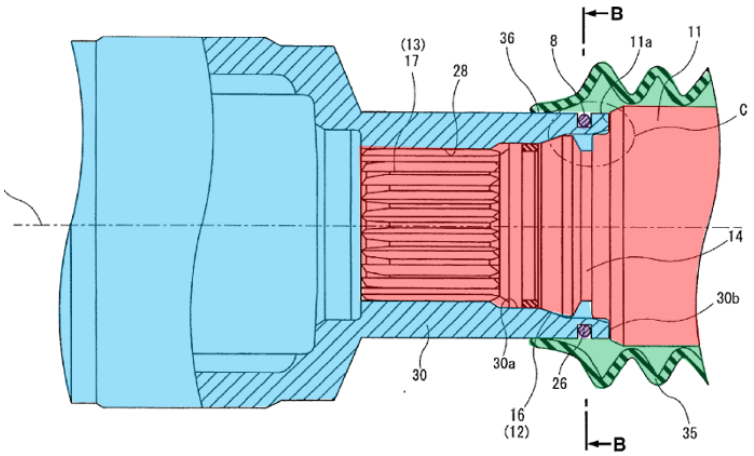
451. A person of ordinary skill in the art would have been motivated to use a seal coupled to the first member adjacent the window for several reasons:

452. First, as I described above in Section VI.D, there are countless different designs, shapes, and sizes for seals of driveline joint assemblies, all known in the art. As described by the SAE Manual, "[t]he method of sealing employed for a splined connection generally depends on its specific design as well as its application." (Ex. 1012, SAE Manual at 191; Ex. 1012, SAE Manual at 190–192 (describing and illustrating several examples of joint assembly seals)). Seals that are coupled to the first member adjacent an end of the first member, and adjacent a window in the first member, were well known in the art. (Ex. 1007, Sugiyama at Figs. 3 and 7; Ex. 1014, Krude '341 at Figs. 1, 3; Ex. 1015, Minel at Figs. 1 and 2; Ex. 1016, Yoshida at Figs. 1, 3, 5; Ex. 1012, SAE Manual at 145, 151, 163, 171). For example, Sugiyama, in the embodiment of Figure 7, teaches the use of a seal, "water-proof boot 35," coupled to a first, female splined shaft adjacent an end of the first member, and adjacent windows in the first member, " to enclose first and second

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through holes 31, 32": "This water-proof boot 35 is attached and fixed to cylindrical section 30 via a boot attachment section 36 disposed at a basic end side of cylindrical section 30 which is opposite to an insertion inlet of output shaft 3. One end side of water-proof boot 35 in the axial direction is located at the outer peripheral side of cylindrical section 30."

FIG.7



(Ex. 1007, Sugiyama at [0058], Fig. 7). A person of ordinary skill in the art would have understood that water-proof boot 35 may be "attached and fixed to cylindrical section 30 via a boot attachment section 36" "via a well known boot band 27 b" as described in the embodiment of Figure 3 and well known in the art. (Ex. 1007, Sugiyama at [0048], Fig. 3; Ex. 1015, Minel at Fig. 1 ("collar 9"); Ex. 1016, Yoshida at 151, Figs. 1 and 3; Ex. 1014, Krude '341 at Fig. 1; Ex. 1018, Nicholas at 2:28–38 (describing seal clamped at 56, 58); Ex. 1019, Rabson at 2:43–65 (describing seal clamped to the male and female shaft members by "clamping ring 7" or "collar 8"),

Figs. 1–5). A person of ordinary skill in the art would have recognized that they could improve the joint assemblies of the Renegade Manual by using conventional seals known in the art in the same way and according to their established functions, including boot seals clamped to a first, female shaft member adjacent the window by way of well-known clamps or "boot bands" as taught by Sugiyama.

453. Second, a person of ordinary skill in the art would have been motivated to reduce the size of and, relatedly, the cost the seal, by coupling the seal to the first member adjacent the window, as opposed to far from the window the seal is intended to cover. Doing so in the joint assemblies of the Renegade Manual would reduce the size and cost of the seal ("water proof boot 35" in Sugiyama) while achieving the function of covering the window (first and second through holes 31, 32 in Sugiyama) and sealing the joint assembly.

b) A person of ordinary skill in the art would have had a reasonable expectation of success in using a seal coupled to the first member adjacent the window.

454. A person of ordinary skill in the art would have had a reasonable expectation of success in using a seal coupled to the first member adjacent the window for several reasons:

455. First, the disclosures of the prior art, which teach limitation [1e(ii)], would have provided a person of ordinary skill in the art a reasonable expectation of success in using in the joint assemblies of the Renegade Manual a seal coupled to

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the first member adjacent the window.

456. Second, as described above, the Renegade Manual already discloses a seal positioned over the first member adjacent the window. (Ex. 1013, Renegade Manual at PET_AAM_1013-0203, Installation Step 12; Ex. 1013, Renegade Manual at PET_AAM_1013-0197–0203, Removal Steps 16 (PTU), 23, 25, 27, Installation Steps 1, 2, 8, 9, 12). To the extent that the seal of the Renegade Manual is not coupled to the first member adjacent the window, clamping the seal of the Renegade Manual to the first member adjacent the window or using the seal of Sugiyama "attached and fixed to [the first member] via a boot attachment section 36" by using, for example, "a well known boot band" would have been a known, obvious, and desirable design choice and would lead to predictable results. A person of ordinary skill in the art would reasonably expect success in modifying the seal of the Renegade Manual without any impact or change on its intended function, i.e., covering the windows in the first, female shaft members and sealing the joint assemblies.

[1e(iii)] wherein a cylindrical portion of the seal covers the outer wall of the first member along at least a portion of a perimeter of the window,

457. As I described above in Section IX.A.1, the Renegade Manual discloses limitation [1e(iii)].

458. Sugiyama also discloses that a cylindrical portion of the seal covers the

outer wall of the first member, "cylindrical section 30." In particular, Sugiyama teaches that "water-proof boot 35," "is mounted on cylindrical section 30" and "is attached and fixed to cylindrical section 30 via a boot attachment section 36 disposed at a basic end side of cylindrical section 30." (Ex. 1007, Sugiyama at [0058], Fig. 7; Ex. 1007, Sugiyama at [0048], [0094], [0146], Claim 20). Given that Sugiyama teaches that a portion of its seal is "mounted" and "attached and fixed" to "cylindrical section 30," a person of ordinary skill in the art would understand that the seal, "water-proof boot 35," also includes a "cylindrical portion," at least along the area of attachment.

459. To the extent that the Renegade Manual does not disclose limitation [1e(iii)] (that is, if the seal does not have a cylindrical portion that covers the outer wall of the first member along at least a portion of a perimeter of the window), it would have been obvious to a person of ordinary skill in the art to modify the teachings of the Renegade Manual in view of the teachings of Sugiyama and the knowledge of a person of ordinary skill in the art, or combine the teachings of the Renegade Manual and Sugiyama and the knowledge of a person of ordinary skill in the art, to arrive at limitation [1e(iii)] and use in the joint assemblies of the Renegade Manual a seal having a cylindrical portion that covers the outer wall of the first member along at least a portion of a perimeter of the window. Using such a seal would have been a known, obvious, and desirable design choice and would lead to

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predictable results.

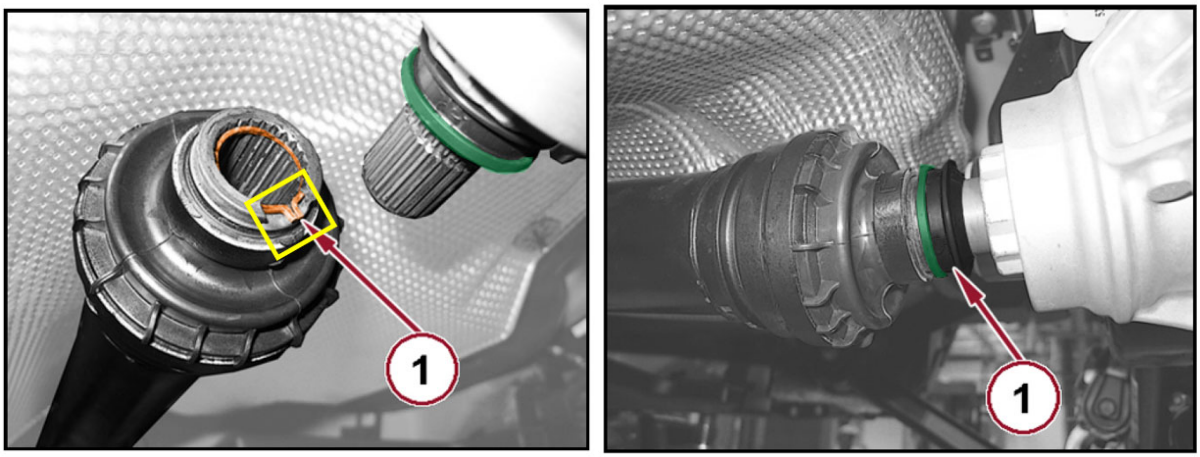
a) A person of ordinary skill in the art would have been motivated to use a seal including a cylindrical portion that covers the outer wall of the first member along at least a portion of a perimeter of the window.

460. A person of ordinary skill in the art would have been motivated to use a seal coupled to the second member adjacent an end of the first member for several reasons:

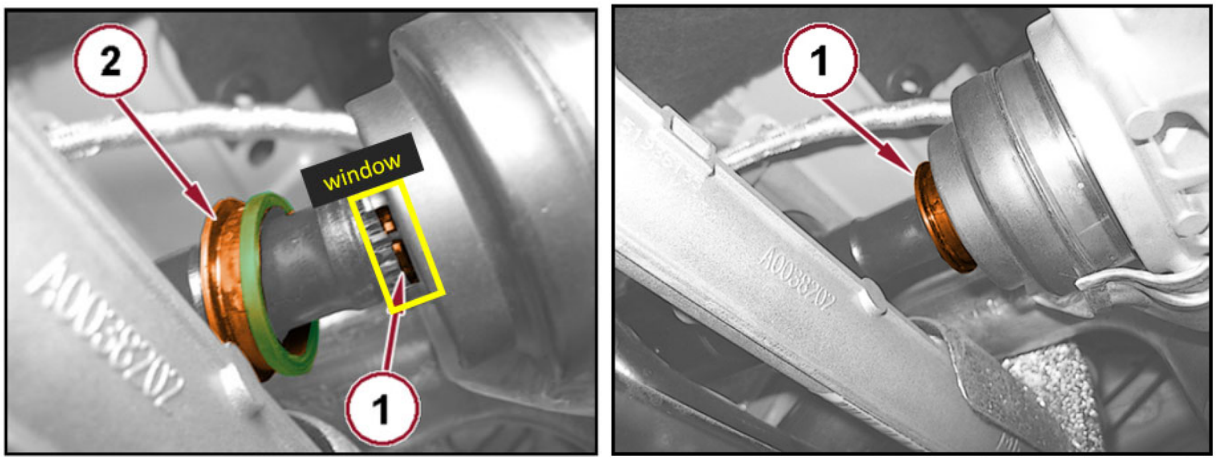
461. First, as I described above in Section VI.D, there are countless different designs, shapes, and sizes for seals of driveline joint assemblies, all known in the art. As described by the SAE Manual, "[t]he method of sealing employed for a splined connection generally depends on its specific design as well as its application." (Ex. 1012, SAE Manual at 191; Ex. 1012, SAE Manual at 190–192 (describing and illustrating several examples of joint assembly seals)). Seals including a cylindrical portion that covers the outer wall of the first member were well known in the art. (Ex. 1007, Sugiyama at [0048], [0058], Figs. 3 and 7, Claim 20; Ex. 1014, Krude '341 at Figs. 1, 3; Ex. 1015, Minel at Figs. 1 and 2; Ex. 1016, Yoshida at 151, Figs. 1, 3, 5; Ex. 1012, SAE Manual at 145, 150, 159, 163, 171; Ex. 1018, Nicholas at 2:28–38, Fig. 1; Ex. 1019, Rabson at 2:43–65 (describing seal having "tubular cylindrical end sections 9 and 10 having inner diameters suitable respectively for sealing to outer surfaces" of the male and female shaft members by "clamping ring 7" or "collar 8"), Figs. 1–5). As I described above in Section IX.A.1,

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the Renegade Manual further teaches a seal having a portion (green) that covers the outer wall of the first member along at least a portion of a perimeter of the window (yellow).



(Ex. 1013, Renegade Manual at PET_AAM_1013-0198, Removal Step 23, PET_AAM_1013-0202, Installation Steps 8, 9; Ex. 1013, Renegade Manual at PET_AAM_1013-0199–0201, Removal Steps 24, 25, 27, Installation Steps 1, 3.



Ex. 1013, Renegade Manual at PET_AAM_1013-0197, Removal Step 16, PET_AAM_1013-0203, Installation Step 11; Ex. 1013, Renegade Manual at PET_AAM_1013-0197–0203, Removal Steps 16, 17, Installation Steps 2, 4, 12). A

person of ordinary skill in the art would have recognized that they could improve the joint assemblies of the Renegade Manual by using conventional seals known in the art in the same way and according to their established functions, including seals with a "cylindrical portion" that covers the outer wall of the first member along at least a portion of a perimeter of the window.

462. Second, persons of ordinary skill in the art would also understand that a "cylindrical portion" of the seal (that is, a closed annular portion of the seal that is extended in an axial direction thereof, and not to a conical, frustoconical, or otherwise tapered shape that is formed by the seal) will have more surface area to engage the shaft members of a joint assembly than conical, frustoconical, or tapered seals. This is likely to provide a better seal. A person of ordinary skill in the art would therefore be motivated to use a seal with "cylindrical portions" covering the outer walls of the first and second shaft members to provide a better seal and protect the splines and other sensitive portions of the joint assemblies from water, dust, or other contaminants.

463. Third, a person of ordinary skill in the art would be motivated to clamp the ends of the seal to each of the first and second shaft members, again, to provide a better seal and protect the splines and other sensitive portions of the joint assemblies from water, dust, or other contaminants. Sugiyama, for example, teaches that boot seals, like "water-proof boot 35," may be fixed "in a tight binding manner

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via a well known boot band." (Ex. 1007, Sugiyama at [0048]; Ex. 1007, Sugiyama at [0058], Figs. 3, 7; Ex. 1016, Yoshida at 151, Figs. 1 and 3; Ex. 1014, Krude '341 at Fig. 1; Ex. 1018, Nicholas at 2:28–38, Fig. 1; Ex. 1012, SAE Manual at 191 ("a boot seal has been employed along with the lip seal to protect it from dust, dirt, and other foreign matter")). And, as known and described in the art, a "cylindrical portion of the seal that covers the outer wall" of each of the first and second shaft members is formed at the portions of the seal that are clamped "in a tight binding manner via a well known boot band." (Ex. 1007, Sugiyama at [0048]; Ex. 1007, Sugiyama at Fig. 3 (illustrating cylindrical portion of the seal that covers the outer wall of shaft members); Ex. 1015, Minel at Fig. 1 (same); Ex. 1016, Yoshida at Figs. 1, 3, and 5 (same); Ex. 1014, Krude '341 at Fig. 1 (same); Ex. 1018, Nicholas at 2:28–38, Fig. 1 (same); Ex. 1019, Rabson at 2:43–65, Figs. 1–5 (same). Rabson, for example, describes forming a seal to have "tubular cylindrical end sections 9 and 10 having inner diameters suitable respectively for sealing to outer surfaces" by a "clamping ring 7" or "collar 8." Ex. 1019, Rabson at 2:43–65, Figs. 1–5). A person of ordinary skill in the art would accept having to perform the routine and conventional step of applying or removing the "well known boot band" during assembly and disassembly in exchange for an improved, robust seal that better protects the joint assembly.

464. Fourth, as to the positioning of the seal so that it covers the outer wall

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of the first member "along at least a portion of a perimeter of the window," this positioning also would have been a known, obvious, and desirable design choice. A person ordinary skill in the art would have understood that windows in the first, female splined shaft member (of the Renegade Manual, for example) expose the splined connections of the joint assemblies. A person of ordinary skill in the art would have been motivated to position the seal over the first member so that the cylindrical portion – which engages and seals the first member – covers the outer wall of the first member along at least a portion of a perimeter of the window at least to ensure that the window is covered and sealed. This is particularly true for a seal with a cylindrical portion that is clamped to the first member because the clamped, cylindrical portion will form a tight seal with the first member at that location. (Ex. 1007, Sugiyama at [0048] (describing clamping ends of a water-proof boot seal "in a tight binding manner via a well known boot band"); Ex. 1007, Sugiyama at Fig. 3 (illustrating cylindrical portion of the seal that covers the outer wall of shaft members); Ex. 1015, Minel at Fig. 1 (same); Ex. 1016, Yoshida at Figs. 1, 3, and 5 (same); Ex. 1014, Krude '341 at Fig. 1 (same); Ex. 1018, Nicholas at 2:28–38, Fig. 1 (same); Ex. 1019, Rabson at 2:43–65 (describing seal having "tubular cylindrical end sections 9 and 10 having inner diameters suitable respectively for sealing to outer surfaces" by a "clamping ring 7" or "collar 8"), Figs. 1–5).

465. Fifth, the window in the first, female splined shaft member of the

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Renegade Manual is positioned at and continuous with an open end of that shaft. A person of ordinary skill in the art would have been motivated to reduce the size of and, relatedly, the cost the seal, by coupling the seal to the first member adjacent the window, as opposed to far from the window the seal is intended to cover. Doing so in the joint assemblies of the Renegade Manual would reduce the size and cost of the seal ("water proof boot 35" in Sugiyama) while achieving the function of covering the window (first and second through holes 31, 32 in Sugiyama) and sealing the joint assembly. It would also result in the seal covering the outer wall of the first member along at least a portion of a perimeter of the window.

b) A person of ordinary skill in the art would have had a reasonable expectation of success in using a seal including a cylindrical portion that covers the outer wall of the first member along at least a portion of a perimeter of the window.

466. A person of ordinary skill in the art would have had a reasonable expectation of success in using a seal including a cylindrical portion that covers the outer wall of the first member along at least a portion of a perimeter of the window:

467. First, the disclosures of the prior art, which teach limitation [1e(iii)], including seals that have cylindrical portions that cover the outer wall of the first member, including along at least a portion of a perimeter of the window, would have provided a person of ordinary skill in the art a reasonable expectation of success in using a seal including a cylindrical portion that covers the outer wall of the first

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member along at least a portion of a perimeter of the window.

468. Second, as described above, the Renegade Manual already discloses a seal with a portion that covers the outer wall of the first member along at least a portion of a perimeter of the window. To the extent that the portion of the seal of the Renegade Manual that covers the outer wall of the first member along at least a portion of a perimeter of the window is not a "cylindrical portion," (i) forming the seal of the Renegade Manual to have a "cylindrical portion," (ii) clamping the seal of the Renegade Manual to the first member, thereby forming a "cylindrical portion" of the seal at the point it is clamped, and (iii) a combination of the above, would have been known, obvious, and desirable design choices and would have led to predictable results. A person of ordinary skill in the art would reasonably expect success in modifying the seal of the Renegade Manual without any impact or change on its intended function, i.e., covering the windows in the first, female shaft members and sealing the joint assemblies.

[1e(iv)] wherein the seal further includes a corrugated portion disposed adjacent the cylindrical portion, and

469. As I described above in Section IX.A.1, the Renegade Manual discloses limitation [1e(iv)].

470. Sugiyama also discloses limitation [1e(iv)]. Sugiyama discloses that the seal, "water-proof boot" has a cylindrical portion, at least at the point that it "is attached and fixed to cylindrical section 30 via a boot attachment section 36 disposed

at a basic end side of cylindrical section 30." (Ex. 1007, Sugiyama at [0058], Fig. 7; Ex. 1007, Sugiyama at [0048], [0094], [0146], Claim 20). Sugiyama also teaches that the "water-proof boot 35" further includes a bellows-shaped corrugated portion: "This water-proof boot 35 has a middle section structured in a substantially bellows shape so that water-proof boot 35 is formed to enable expansion and contraction (telescopically) in the axial direction." (Ex. 1007, Sugiyama at [0058], Fig. 7). As shown in Figure 7 of Sugiyama, the corrugated portion of "water-proof boot 35" is disposed adjacent the cylindrical portion. (Ex. 1007, Sugiyama at Fig. 7).

471. To the extent that the Renegade Manual does not disclose limitation [1e(iv)] (that is, if the seal does not further include a corrugated portion disposed adjacent the cylindrical portion), it would have been obvious to a person of ordinary skill in the art to modify the teachings of the Renegade Manual in view of the teachings of Sugiyama and the knowledge of a person of ordinary skill in the art, or combine the teachings of the Renegade Manual and Sugiyama and the knowledge of a person of ordinary skill in the art, to arrive at limitation [1e(iv)] and use in the joint assemblies of the Renegade Manual a seal that further includes a corrugated portion disposed adjacent the cylindrical portion. Using such a seal would have been a known, obvious, and desirable design choice and would lead to predictable results.

a) A person of ordinary skill in the art would have been motivated to use a seal including a corrugated portion disposed adjacent the cylindrical portion.

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472. A person of ordinary skill in the art would have been motivated to use a seal including a corrugated portion disposed adjacent the cylindrical portion for several reasons:

473. First, as I described above in Section VI.D, there are countless different designs, shapes, and sizes for seals of driveline joint assemblies, all known in the art. As described by the SAE Manual, "[t]he method of sealing employed for a splined connection generally depends on its specific design as well as its application." (Ex. 1012, SAE Manual at 191; Ex. 1012, SAE Manual at 190–192 (describing and illustrating several examples of joint assembly seals)). Seals including a corrugated portion disposed adjacent the cylindrical portion were well known in the art. For example, seals clamped on each end to the first and second shaft members of a joint assembly, for example, by way of a "well known boot band," as taught in Sugiyama (Ex. 1007, Sugiyama at [0048]), typically have corrugated portions disposed adjacent cylindrical portions. (Ex. 1007, Sugiyama at [0048], [0058] ("This water-proof boot 35 has a middle section structured in a substantially bellows shape so that water-proof boot 35 is formed to enable expansion and contraction (telescopically) in the axial direction."), Figs. 3, 7; Ex. 1014, Krude '341 at Figs. 1, 3; Ex. 1015, Minel at 2:3–5, Figs. 1 and 2; Ex. 1016, Yoshida at 151, Figs. 1, 3, 5; Ex. 1012, SAE Manual at 145, 150, 159, 163, 171; Ex. 1018, Nicholas at 2:28–38, Fig. 1; Ex. 1019, Rabson at 2:43–3:19, Figs. 1–5).

Rabson, for example, describes a seal ("bellows 6") having "tubular cylindrical end sections 9 and 10 having inner diameters suitable respectively for sealing to outer surfaces" by "clamping ring 7" or "collar 8" and "joined by a single convolution section 12" or "joined by a convoluted section 14 comprising a plurality of convolutions." (Ex. 1019, Rabson at 2:43–3:19, Figs. 1–5). Unclamped seals having a corrugated portion disposed adjacent the cylindrical portion were also well known in the art. (Ex. 1013, Renegade Manual at PET_AAM_1013-0198, Removal Step 23, PET_AAM_1013-0202, Installation Step 9; Ex. 1013, Renegade Manual at PET_AAM_1013-0199–0202, Removal Steps 24, 25, 27, Installation Steps 1, 8; Ex. 1007, Sugiyama at [0058], Fig. 7). A person of ordinary skill in the art would have recognized that they could improve the joint assemblies of the Renegade Manual by using conventional seals known in the art in the same way and according to their established functions, including seals having a corrugated portion disposed adjacent the cylindrical portion, whether the seal is clamped or unclamped.

474. Second, a person of ordinary skill in the art would also have been motivated to use a seal including a corrugated portion disposed adjacent the cylindrical portion "to enable expansion and contraction (telescopically) in the axial direction," as taught by Sugiyama and known in the art. (Ex. 1007, Sugiyama at [0058]; Ex. 1012, SAE Manual, Ch. 5 at 193, 197; Ex. 1014, Krude '341 at 3:12–16, Figs. 1, 3; Ex. 1015, Minel at 1:4–6; Ex. 1016, Yoshida at 151–152; Ex. 1007,

Sugiyama at [0048], Figs. 1 and 3; Ex. 1018, Nicholas at 2:28–38, Fig. 1; Ex. 1019, Rabson at 1:45–71, 2:43–65, Figs. 1–5). A seal that is able to expand and contract can be readily moved away from the window and splined connection of the joint assembly, even without removing the seal entirely, which is desirable, particularly when assembling, disassembling, and servicing the joint assembly. As taught by Sugiyama, corrugated seals are desirable for joint assemblies that are fixed and do not accommodate relative axial motion, like those of the Renegade Manual and Sugiyama. Ex. 1007, Sugiyama at [0058], Fig. 7.

475. Third, a person of ordinary skill in the art would also have understood that corrugations on the interior of a seal can also create a tighter seal by ensuring that the seal maintains contact with the shaft members to better accommodate joint angles incurred during operation. (Ex. 1026, U.S. Patent No. 9,221,225 ("Idies") at Figs. 1–4 (single-corrugation "dust cover" with inner, corrugated portions disposed adjacent to cylindrical portions); Ex. 1027, U.S. Patent No. 9,863,464 ("Hosen") at Figs. 2, 7 (same); Ex. 1028, U.S. Publication No. 2009/0209353A1 ("Abels") at 1, 4, 5 (multi-corrugation "dust cover" with inner, corrugated portions disposed adjacent to cylindrical portions)).

476. Fourth, a person of ordinary skill in the art would also have understood that corrugations on the exterior of a seal may also provide a useful gripping feature, which, again, helps assembly and disassembly of seal.

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b) A person of ordinary skill in the art would have had a reasonable expectation of success in using a seal including a corrugated portion disposed adjacent the cylindrical portion.

477. First, the disclosures of the prior art, which teach limitation [1e(iv)], would have provided a person of ordinary skill in the art a reasonable expectation of success in using a seal having a corrugated portion disposed adjacent the cylindrical portion.

478. Second, as described above, to the extent that the portion of the seal of the Renegade Manual does not include a "corrugated portion," forming the seal of the Renegade Manual to have a "corrugated portion" or using a seal having a corrugated portion in the joint assemblies of the Renegade Manual, as taught by the prior art and well known to a person of ordinary skill in the art, would have been known, obvious, and desirable design choices and would have led to predictable results. A person of ordinary skill in the art would reasonably expect success in modifying the seal of the Renegade Manual without any impact or change on its intended function, i.e., covering the windows in the first, female shaft members and sealing the joint assemblies.

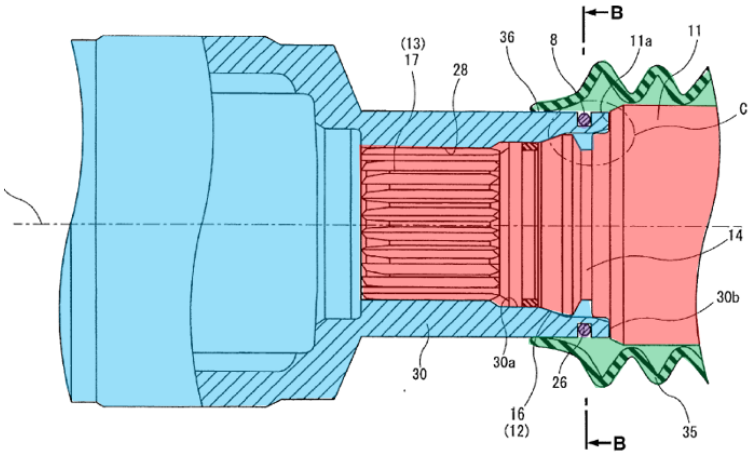
[1e(v)] wherein the corrugated portion is spaced radially from each of the first member and the second member.

479. As I described above in Section IX.A.1, the Renegade Manual discloses limitation [1e(v)].

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480. Sugiyama also discloses limitation [1e(v)]. In particular, as shown in Figure 7 of Sugiyama, the corrugated portion of "water-proof boot 35," "middle section structured in a substantially bellows shape," is spaced radially from each of the first, female splined shaft member, "cylindrical section 30" of the rear end of J2 (blue), and the second, male splined shaft member, output shaft 3" having a "large diameter section 11," "middle diameter section 12," and a "small diameter section 13 integrally disposed on an end section of middle diameter section 12" (red).

FIG.7



Ex. 1007, Sugiyama at Figure 7.

481. To the extent that the Renegade Manual does not disclose limitation [1e(v)] (that is, if the corrugated portion of the seal is not spaced radially from each of the first member and the second member), it would have been obvious to a person of ordinary skill in the art to modify the teachings of the Renegade Manual in view of the teachings of Sugiyama and the knowledge of a person of ordinary skill in the

art, or combine the teachings of the Renegade Manual and Sugiyama and the knowledge of a person of ordinary skill in the art, to arrive at limitation [1e(v)] and use in the joint assemblies of the Renegade Manual a seal having a corrugated portion spaced radially from each of the first member and the second member. Using such a seal would have been a known, obvious, and desirable design choice and would lead to predictable results.

a) A person of ordinary skill in the art would have been motivated to use a seal having a corrugated portion spaced radially from each of the first member and the second member.

482. As I described above, including in Sections VI.D and IX.B.1 ([1e(iv)]), a person of ordinary skill in the art would have been motivated to use in the joint assemblies of the Renegade Manual a traditional, bellows-type boot seal (clamped or unclamped) coupled to the first, female splined shaft member and the second, male splined shaft member, as taught in Sugiyama and several other prior art references. By using a traditional, bellows-type boot seal (clamped or unclamped), or modifying the seal of the Renegade Manual to be a traditional, bellows-type boot seal (clamped or unclamped), a person of ordinary skill in the art would arrive at limitation [1e(v)], a seal having a corrugated portion spaced radially from each of the first member and the second member. Thus, for the reasons stated above in Sections VI.D and IX.B.1 ([1e(iv)]), a person of ordinary skill in the art would have been motivated to modify the teachings of the Renegade Manual in view of the

teachings of Sugiyama and the knowledge of a person of ordinary skill in the art, or combine the teachings of the Renegade Manual and Sugiyama and the knowledge of a person of ordinary skill in the art, to arrive at the limitation of [1e(v)] and use in the joint assemblies of the Renegade Manual a seal having a corrugated portion spaced radially from each of the first member and the second member.

b) A person of ordinary skill in the art would have had a reasonable expectation of success in using a seal having a corrugated portion spaced radially from each of the first member and the second member.

483. As I described above, including in Sections VI.D and IX.B.1 ([1e(iv)]), a person of ordinary skill in the art would have reasonably expected success in using in the joint assemblies of the Renegade Manual a traditional, bellows-type boot seal (clamped or unclamped) coupled to the first, female splined shaft member and the second, male splined shaft member, as taught in Sugiyama and several other prior art references. Again, by using a traditional, bellows-type boot seal (clamped or unclamped), or modifying the seal of the Renegade Manual to be a traditional, bellows-type boot seal (clamped or unclamped), a person of ordinary skill in the art would arrive at limitation [1e(v)], a seal having a corrugated portion spaced radially from each of the first member and the second member. Thus, for the reasons stated above in Sections VI.D and IX.B.1 ([1e(iv)]), a person of ordinary skill in the art would have had a reasonable expectation of success in modifying the teachings of the Renegade Manual in view of the teachings of Sugiyama and the knowledge of a

person of ordinary skill in the art, or combining the teachings of the Renegade Manual and Sugiyama and the knowledge of a person of ordinary skill in the art, to arrive at the limitation of [1e(v)] and use in the joint assemblies of the Renegade Manual a seal having a corrugated portion spaced radially from each of the first member and the second member.

Conclusion for Claim 1

484. In my opinion, Claim 1 would have been obvious over the Renegade Manual in view of Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art.

2. Claim 2

The joint assembly of claim 1, wherein the first member includes an open end and the first engagement means of the first member is formed within the open end.

485. In my opinion, Claim 2 would have been obvious over the Renegade Manual in view of Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art.

486. As I described above in Section IX.A.2, the Renegade Manual discloses every limitation of Claim 2 and anticipates that claim. In my opinion, Claim 2 would have been obvious over the Renegade Manual in view of Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art for the reasons stated above in regard to anticipation of Claim 2 by the Renegade Manual and the following additional reasons.

487. Claim 2 depends from Claim 1. (Ex. 1001, '958 patent at Claim 2). As I described above in Section IX.B.1, the Renegade Manual, Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art render Claim 1 obvious. In my opinion, Claim 2 would have been obvious over the Renegade Manual in view of Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art for the reasons stated above in regard obviousness of Claim 1 by the Renegade Manual, Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art, and the following additional reasons.

488. As I described above in Section IX.A.2, the Renegade Manual discloses the limitation of Claim 2.

489. Krude '422 also discloses the limitation of Claim 2. In particular, as illustrated in Figures 2 and 5a, for example, the first, female splined shaft member, "constant velocity joint 71" with an "outer joint part 72 with a sleeve projection 82," includes an open end and the first engagement means of the first member, "inner toothing 75," is formed within the open end. (Ex. 1008, Krude '422 at 5:66–6:43, Figs. 1–10).

490. Sugiyama also discloses the limitation of Claim 2. In particular, as illustrated in Figures 4 through 7, for example, the first, female splined shaft member, "cylindrical section 30" of the rear end of J2 (blue), includes an open end, "insertion hole 30 a," and the first engagement means of the first member, "female

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splines," are formed within the open end. (Ex. 1007, Sugiyama at [0045], [0050], Figs. 4–7, 11(a) and (b), 12(a) and (b), and 13(a) and (b)). Sugiyama describes that the female splines are "cutout formed along the axial direction at the inner peripheral side of insertion hole 30 a." (Ex. 1007, Sugiyama at [0050]).

3. Claim 3

The joint assembly of claim 2, wherein the portion of the second member disposed within the first member is disposed within the open end and includes the second engagement means.

491. In my opinion, Claim 3 would have been obvious over the Renegade Manual in view of Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art.

492. As I described above in Section IX.A.3, the Renegade Manual discloses every limitation of Claim 3 and anticipates that claim. In my opinion, Claim 3 would have also been obvious over the Renegade Manual in view of Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art for the reasons stated above in regard to anticipation of Claim 3 by the Renegade Manual and the following additional reasons.

493. Claim 3 depends from Claim 2. (Ex. 1001, '958 patent at Claim 3). As I described above in Section IX.B.2, the Renegade Manual, Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art render Claim 2 obvious. In my opinion, Claim 3 would have been obvious over the Renegade Manual in view

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of Krude ’422, Sugiyama, and the knowledge of a person of ordinary skill in the art for the reasons stated above in regard obviousness of Claim 2 by the Renegade Manual, Krude ’422, Sugiyama, and the knowledge of a person of ordinary skill in the art, and the following additional reasons.

494. As I described above in Section IX.A.3, the Renegade Manual discloses the limitation of Claim 3.

495. Krude ’422 also discloses the limitation of Claim 3. In particular, as illustrated in Figs. 2 and 5a, for example, the portion of the second member disposed within the first member is disposed within the open end and includes the second engagement means, “outer toothing 52.” (Ex. 1008, Krude ’422 at 5:46–46, 5:59–6:1, 6:23–24, 6:40–43, 7:6–15, 7:36–53, Figs. 1–10, Claims 1, 5, 14).

496. Sugiyama also discloses the limitation of Claim 3. In particular, Sugiyama discloses that a portion of the second, male splined shaft member, namely the “small diameter section 13” of “output shaft 3,” is disposed within the first, female splined shaft member. (Ex. 1007, Sugiyama at [0034], [0041], [0045] (“A female spline 25 to which male spline 17 of input shaft 2 is engaged.”), [0050] (“A female spline 17 with which male spline 17 of output shaft 3 is engaged from the axial direction is cutout formed along the axial direction at the inner peripheral side of insertion hole 30 a.”), Figs. 1, 2, 4 and 7, 11(a) and (b), 12(a) and (b)). The “small diameter section 13” of the second, male splined shaft member, “output shaft 3,” has

a second engagement means, a set of "male splines 17." (Ex. 1007, Sugiyama at [0050], Figs. 1, 2, 11(a) and (b), 12(a) and (b); Ex. 1007, Sugiyama at [0041], [0045]).

4. Claim 4

The joint assembly of claim 2, wherein the window is continuous with the open end.

497. In my opinion, Claim 4 would have been obvious over the Renegade Manual in view of Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art.

498. As I described above in Section IX.A.4, the Renegade Manual discloses every limitation of Claim 4 and anticipates that claim. In my opinion, Claim 4 would have been obvious over the Renegade Manual in view of Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art for the reasons stated above in regard to anticipation of Claim 4 by the Renegade Manual and the following additional reasons.

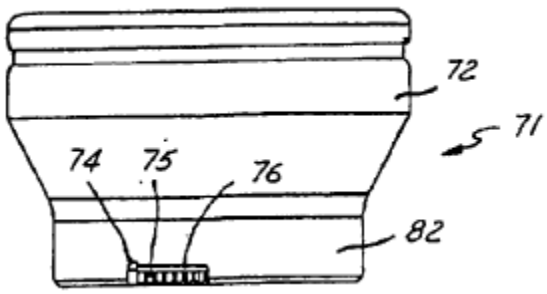
499. Claim 4 depends from Claim 2. (Ex. 1001, '958 patent at Claim 4). As I described above in Section IX.B.2, the Renegade Manual, Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art render Claim 2 obvious. In my opinion, Claim 4 would have been obvious over the Renegade Manual in view of Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art for the reasons stated above in regard to obviousness of Claim 2 by the Renegade

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Manual, Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art, and the following additional reasons.

500. As I described above in Section IX.A.4, the Renegade Manual discloses the limitation of Claim 4.

501. Krude '422 also discloses the limitation of Claim 4. In particular, Figures 2, 4a, 5a, and 7 illustrate that the window, "notch 74," is continuous with the open end of the first, female splined shaft member, "constant velocity joint 71" with an "outer joint part 72 with a sleeve projection 82."



Ex. 1008, Krude '422 at Fig. 2, 4a, 5a, and 7.

5. Claim 5

The joint assembly of claim 1, wherein the first engagement means includes a first plurality of splines and the second engagement means includes a second plurality of splines.

502. In my opinion, Claim 5 would have been obvious over the Renegade Manual in view of Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art.

503. As I described above in Section IX.A.5, the Renegade Manual discloses

every limitation of Claim 5 and anticipates that claim. In my opinion, Claim 5 would also have been obvious over the Renegade Manual in view of Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art for the reasons stated above in regard to anticipation of Claim 5 by the Renegade Manual and the following additional reasons.

504. Claim 5 depends from Claim 1. (Ex. 1001, '958 patent at Claim 5). As I described above in Section IX.B.1, the Renegade Manual, Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art render Claim 1 obvious. In my opinion, Claim 5 would have been obvious over the Renegade Manual in view of Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art for the reasons stated above in regard obviousness of Claim 1 by the Renegade Manual, Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art, and the following additional reasons.

505. As I described above in Section IX.A.5, the Renegade Manual discloses the limitation of Claim 5.

506. Krude '422 also discloses the limitation of Claim 5. In particular, the first engagement means, "inner toothing 75," comprises a first plurality of splines, and second engagement means, "outer toothing 52," comprises a second plurality of splines. (Ex. 1008, Krude '422 at 5:59–63, 6:23–24, 6:37–43, 7:6–15, 7:36–53, Figs. 1–10).

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507. Sugiyama also discloses the limitation of Claim 5. In particular, the first engagement means, "female splines," comprises a first plurality of splines (Ex. 1007, Sugiyama at [0045], [0050], Figs. 4–7, 11(a) and (b), 12(a) and (b), and 13(a) and (b)), and second engagement means, "male spline 17," comprises a second plurality of splines. (Ex. 1007, Sugiyama at [0050], Figs. 1, 2, 7, 11(a) and (b), 12(a) and (b); Ex. 1007, Sugiyama at [0041], [0045]).

6. Claim 6

The joint assembly of claim 1, wherein the retaining means is configured as a retaining ring.

508. In my opinion, Claim 6 would have been obvious over the Renegade Manual in view of Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art.

509. As I described above in Section IX.A.6, the Renegade Manual discloses every limitation of Claim 6 and anticipates that claim. In my opinion, Claim 6 would have been obvious over the Renegade Manual in view of Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art for the reasons stated above in regard to anticipation of Claim 6 by the Renegade Manual and the following additional reasons.

510. Claim 6 depends from Claim 1. (Ex. 1001, '958 patent at Claim 6). As I described above in Section IX.B.1, the Renegade Manual, Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art render Claim 1 obvious.

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In my opinion, Claim 6 would have been obvious over the Renegade Manual in view of Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art for the reasons stated above in regard obviousness of Claim 1 by the Renegade Manual, Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art, and the following additional reasons.

511. As I described above in Section IX.A.6, the Renegade Manual discloses the limitation of Claim 6.

512. Krude '422 also discloses the limitation of Claim 6. In particular, the retaining means of Krude '422, "securing ring 57," is a retaining ring. (Ex. 1008, Krude '422 at 6:40–43, 7:6–7, 7:13–15, 7:26–34, 7:60–62, 7:66–8:15, Figs. 4a, 5a, 5b, 7–10).

513. Sugiyama also discloses the limitation of Claim 6. In particular, the retaining means of Sugiyama, "circlip (retaining ring) 8," is a retaining ring. (Ex. 1007, Sugiyama at [0051]; Ex. 1007, Sugiyama at Abstract, [0004], [0006], [0007], [0035], [0046], [0051], [0053], [0057], [0059]–[0061], [0063], [0065], [0068], [0070], Figs. 4–19).

7. Claim 7

The joint assembly of claim 1, further comprising a constant velocity joint coupled to one of the first member and the second member.

514. In my opinion, Claim 7 would have been obvious over the Renegade

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Manual in view of Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art.

515. As I described above in Section IX.A.7, the Renegade Manual discloses every limitation of Claim 7 and anticipates that claim. In my opinion, Claim 7 would have been obvious over the Renegade Manual in view of Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art for the reasons stated above in regard to anticipation of Claim 7 by the Renegade Manual and the following additional reasons.

516. Claim 7 depends from Claim 1. (Ex. 1001, '958 patent at Claim 7). As I described above in Section IX.B.1, the Renegade Manual, Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art render Claim 1 obvious. In my opinion, Claim 7 would have been obvious over the Renegade Manual in view of Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art for the reasons stated above in regard obviousness of Claim 1 by the Renegade Manual, Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art, and the following additional reasons.

517. As I described above in Section IX.A.7, the Renegade Manual discloses the limitation of Claim 7.

518. Krude '422 also discloses the limitation of Claim 7. In particular, Krude '422 discloses a first, female splined shaft member, "constant velocity joint

71" with an "outer joint part 72 with a sleeve projection 82." (Ex. 1008, Krude '422 at 6:17–18; Ex. 1008, Krude '422 at 5:54–59, Figs. 1–10, Claims 1, 8, 17).

519. Sugiyama also discloses the limitation of Claim 7. In particular, the first, female splined shaft member, "cylindrical section 30" is at the rear end of J2, a constant-velocity joint. (Ex. 1007, Sugiyama at [0050] ("Second constant velocity (universal) joint J2 has a rear end section at which a substantially cylindrically shaped cylindrical section 30 which serves to link second constant velocity (universal) joint J2 to output shaft 3"); Ex. 1007, Sugiyama at [0031], [0035]–[0040], [0042], [0043], [0047], [0049], [0068], Figs. 1, 3).

520. To the extent that Renegade Manual does not disclose the limitation of Claim 7 (that is, if one of the first member and the second member of either joint assembly is not coupled to a constant velocity joint), it would have been obvious to a person of ordinary skill in the art to modify the teachings of the Renegade Manual in view of the teachings of Krude '422, Sugiyama and the knowledge of a person of ordinary skill in the art, or combine the teachings of the Renegade Manual and Krude '422, Sugiyama and the knowledge of a person of ordinary skill in the art, to arrive at the limitation of Claim 7 and couple a constant velocity joint to one of the first member and the second member of the joint assemblies. Coupling a constant velocity joint in this manner would have been a known, obvious, and desirable design choice and would lead to predictable results.

a) A person of ordinary skill in the art would have been motivated to couple a constant velocity joint to one of the first member and the second member.

521. A person of ordinary skill in the art would have been motivated to couple a constant velocity joint to one of the first member and the second member for several reasons:

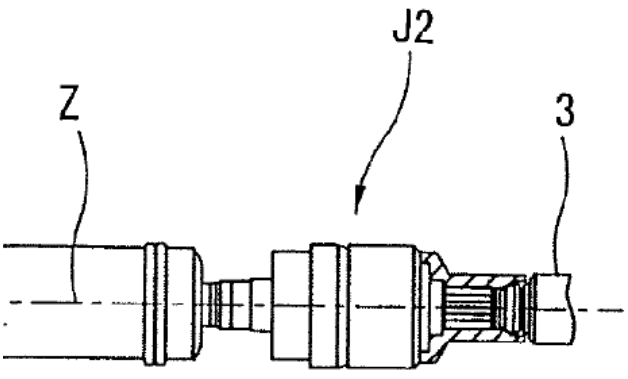
522. First, splined joint assemblies (i) fixed by way of retaining rings, (ii) having seals to cover windows to access the retaining rings and protect the splined connection, and (iii) coupled to a constant velocity joint were well known in the art. The joint assembly of Krude '422, for example, is coupled to "constant velocity joint 71." (Ex. 1008, Krude '422 at 6:17–18; Ex. 1008, Krude '422 at 5:54–59, Figs. 1–10, Claims 1, 8, 17). And, in Sugiyama, the first, female splined shaft member, "cylindrical section 30" is at the rear end of J2, a constant-velocity joint. (Ex. 1007, Sugiyama at [0050] ("Second constant velocity (universal) joint J2 has a rear end section at which a substantially cylindrically shaped cylindrical section 30 which serves to link second constant velocity (universal) joint J2 to output shaft 3"); Ex. 1007, Sugiyama at [0031], [0035]–[0040], [0042], [0043], [0047], [0049], [0068], Figs. 1, 3). A person of ordinary skill in the art would have recognized that they could improve the joint assemblies of the Renegade Manual by coupling the joint assemblies to constant velocity joints in the same way as known in the art and according to their established functions.

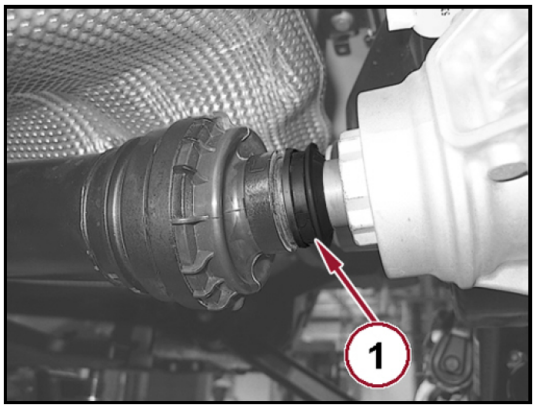
523. Second, a person of ordinary skill in the art would have been motivated to incorporate a constant velocity joint to one of the first member and the second member because they would have known that the rear axle of the Jeep Renegade would articulate about an angle, and incorporating a constant velocity joint into the driveline would allow the driveline to transmit power from the transmission to wheels at a constant velocity. (Ex. 1012, SAE Manual at PET_AAM_1012-0107–0109, PET_AAM_1012-0331; Ex. 1016, Yoshida at 151 ("during power transmission, intermediate shaft 5 freely changes its angle relative to shaft 1a, which is integral with outer race 1"). A person of ordinary skill the art would have been motivated to employ a constant velocity joint, as opposed to non-constant velocity joints such as a cardan joint, because constant velocity joints transmit torque more smoothly, leading to less vehicle vibration than non-constant velocity joints (whose misalignment generates increasing vibrations) and tolerate larger, angular misalignment between the shafts than non-constant velocity joints. This is confirmed by GKN's development a PTU having a "monobloc housing that fully integrates the propshaft's constant velocity joint" for the Jeep Renegade. (Ex. 1033, Autocar Pro; Ex. 1034, Green Car Congress).

524. Third, to the extent that the Renegade Manual, itself, does not teach that a constant velocity joint is integrated into the PTU (Ex. 1033, Autocar Pro; Ex. 1034, Green Car Congress), a person of ordinary skill in the art would have known that,

"[i]nstead of a standard power transfer unit (PTU), GKN developed a monobloc housing that fully integrates the propshaft's constant velocity joint." (Ex. 1033, Autocar Pro; Ex. 1034, Green Car Congress). A person of ordinary skill in the art would have been motivated to couple the propshaft to this type of PTU, thereby coupling a constant velocity joint to one of the first member and the second member, including to "meet the tight packaging targets of a compact SUV and small city car," "sav[e] space," "and optimiz[e] cost and efficiency." (Ex. 1033, Autocar Pro; Ex. 1034, Green Car Congress).

525. Fourth, to the extent that the Renegade Manual, itself, does not teach that a constant velocity joint is coupled to the first, female shaft member of the propshaft-RDU joint assembly, a person of ordinary skill in the art would have understood that the propshaft-RDU joint assembly of the Renegade Manual is similar to that disclosed by Sugiyama, which teaches that "a driven shaft 5 integrally rotatably linked to an output shaft 3 interlinked to a differential (not shown) via a second constant velocity (universal) joint J2."





(Ex. 1007, Sugiyama at [0031], Fig. 1; Ex. 1013, Renegade Manual at PET_AAM_1013-0198–0199, Removal Step 23.) A person of ordinary skill in the art would have been motivated to couple a constant velocity joint to the first member of the propshaft-RDU joint assembly of the Renegade Manual, as taught by Sugiyama, to allow the driveline of the Renegade Manual to transmit power from the transmission to wheels at a constant velocity, and do so more with less vibration and effectively (larger angular misalignment) than using a non-constant velocity joint.

b) A person of ordinary skill in the art would have had a reasonable expectation of success in coupling a constant velocity joint to one of the first member and the second member.

526. A person of ordinary skill in the art would have had a reasonable expectation of success in coupling a constant velocity joint to one of the first member and the second member for several reasons:

527. First, the disclosures of the prior art, which teach the limitation of Claim 7, including coupling a constant velocity joint to one of the first member and the second member, would have provided a person of ordinary skill in the art a reasonable expectation of success in coupling a constant velocity joint to one of the first member and the second member.

528. Second, as described above, it was already known in the art that "[i]nstead of a standard power transfer unit (PTU), GKN developed a monobloc

housing that fully integrates the propshaft's constant velocity joint." (Ex. 1033, Autocar Pro; Ex. 1034, Green Car Congress). To the extent that the first member of the propshaft-PTU joint assembly of the Renegade Manual is not coupled to a constant velocity joint, a person of ordinary skill in the art would reasonably expect success in coupling a constant velocity joint to the first member of the PTU, for example, by way of GKN's monobloc housing PTU as developed by GKN, or to the second member of the propshaft, as was known and understood by those of ordinary skill in the art, including before GKN integrated "the propshaft's constant velocity joint" into the PTU.

529. Third, the Renegade Manual already discloses that the propshaft of the propshaft-RDU joint assembly, which includes a female shaft, which is a "first member" (Ex. 1013, Renegade Manual at PET_AAM_1013-0199–0202, Removal Steps 24, 25, 27, Installation Steps 3, 8), is coupled to a joint that allows for angular displacement. (Ex. 1013, Renegade Manual at PET_AAM_1013-0198–0199, Removal Steps 23, 25; Ex. 1013, Renegade Manual at PET_AAM_1013-0199–0203 (Removal Step 27 and Installation Steps 3, 8, 9.) The use of constant velocity joints to accommodate for angular displacement is well understood in the art. (Ex. 1012, SAE Manual at PET_AAM_1012-0105–PET_AAM_1012-0181; Ex. 1016, Yoshida; Ex. 1015, Minel; Ex. 1018, Nicholas at 3:26–33.) A person of ordinary skill in the art would reasonably expect success in modifying the propshaft of the

propshaft-RDU joint assembly without any impact or change on its intended function, i.e., transmitting power accommodating angular displacement and transmitting power at a constant velocity. Simply put, coupling a constant velocity joint to one of the first member and the second member would have been known, obvious, and a desirable design choice and would have led to predictable results.

8. Claim 8

The joint assembly of claim 1, wherein the cylindrical portion of the seal is disposed directly radially outwardly of the retaining means when the retaining means retains the coupling of the second member to the first member.

530. In my opinion, Claim 8 would have been obvious over the Renegade Manual in view of Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art.

531. As I described above in Section IX.A.8, the Renegade Manual discloses every limitation of Claim 8 and anticipates that claim. In my opinion, Claim 8 would also have been obvious over Renegade Manual in view of Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art for the reasons stated above in regard to anticipation of Claim 8 by the Renegade Manual and the following additional reasons.

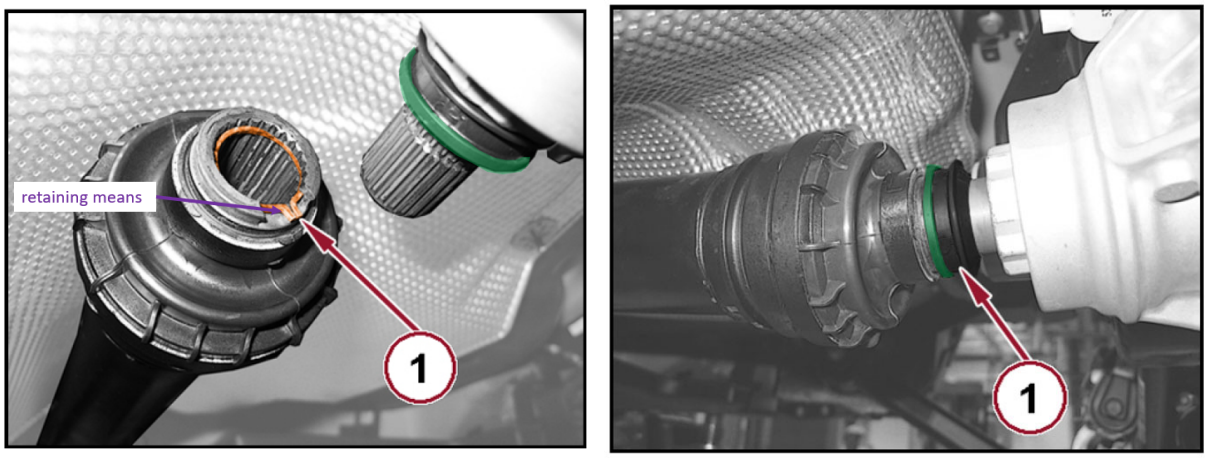
532. Claim 8 depends from Claim 1. (Ex. 1001, '958 patent at Claim 8). As I described above in Section IX.B.1, the Renegade Manual, Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art render Claim 1 obvious.

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In my opinion, Claim 8 would have been obvious over the Renegade Manual in view of Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art for the reasons stated above in regard obviousness of Claim 1 by the Renegade Manual, Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art, and the following additional reasons.

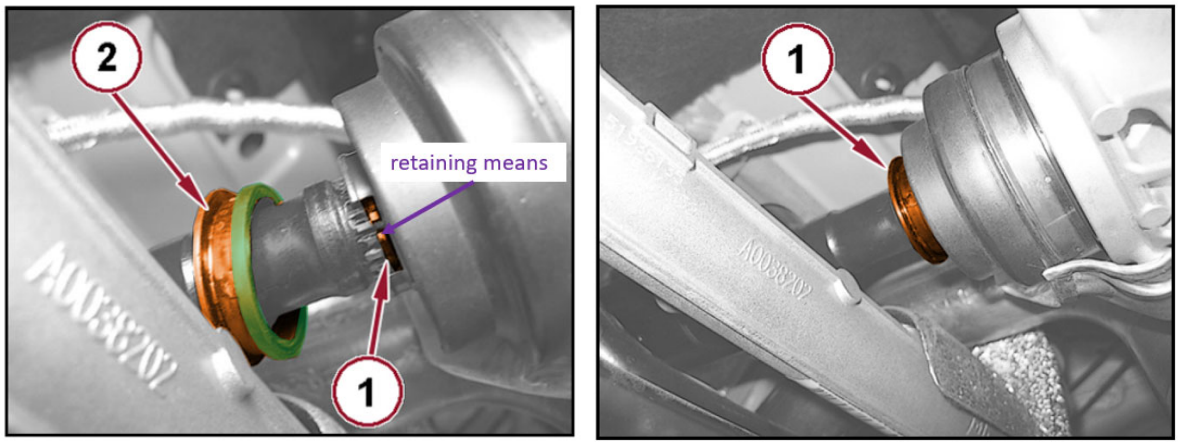
533. As I described above in Section IX.A.8, the Renegade Manual discloses the limitation of Claim 8.

534. Moreover, as described above in Sections IX.A.1 and IX.B.1, as to the seal of the joint assembly between the propshaft and PTU, at least a portion of the seal (green) of the Renegade Manual is disposed directly radially outwardly of the retaining means (retaining ring or snap ring) when the retaining means retains the coupling of the second member (pinion shaft member of RDU) to the first member (female shaft member of propshaft).



(Ex. 1013, Renegade Manual at PET_AAM_1013-0199, Removal Step 23,

PET_AAM_1013-0202, Installation Steps 8, 9; Ex. 1013, Renegade Manual at PET_AAM_1013-0199–0201, Removal Steps 24, 25, 27, Installation Steps 1, 3). And as to the seal of the joint assembly between the propshaft and PTU, at least a portion of the seal (green) of the Renegade Manual is disposed directly radially outwardly of the retaining means (retaining ring or snap ring) when the retaining means retains the coupling of the second member (male shaft member of propshaft) to the first member (female shaft member of PTU).



(Ex. 1013, Renegade Manual at PET_AAM_1013-0197, Removal Step 16, PET_AAM_1013-0203, Installation Step 11; Ex. 1013, Renegade Manual at PET_AAM_1013-0197–0203, Removal Steps 16, 17, Installation Steps 2, 4, 12).

535. To the extent that the portion of the seal of the Renegade Manual that is disposed directly radially outwardly of the retaining means is not a "cylindrical portion," for the reasons stated above in Section IX.B.1, it would have been obvious to a person of ordinary skill in the art to modify that portion of the Renegade Manual

seal to be a "cylindrical portion" or otherwise use a seal having a "cylindrical portion" as taught by Sugiyama and well known by those skilled in the art, thereby achieving the limitation of Claim 8 with a reasonable expectation of success.

9. Claim 9

The joint assembly of claim 1, wherein the window is continuous with an open end of the first member, and wherein the corrugated portion of the seal is disposed directly radially outwardly of the open end of the first member.

536. In my opinion, Claim 9 would have been obvious over the Renegade Manual in view of Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art.

537. As I described above in Section IX.A.9, the Renegade Manual discloses every limitation of Claim 9 and anticipates that claim. In my opinion, Claim 9 would have also been obvious over the Renegade Manual in view of Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art for the reasons stated above in regard to anticipation of Claim 9 by the Renegade Manual and the following additional reasons.

538. Claim 9 depends from Claim 1. (Ex. 1001, '958 patent at Claim 9). As I described above in Section IX.B.1, the Renegade Manual, Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art render Claim 1 obvious. In my opinion, Claim 9 would have been obvious over the Renegade Manual in view

of Krude ’422, Sugiyama, and the knowledge of a person of ordinary skill in the art for the reasons stated above in regard obviousness of Claim 1 by the Renegade Manual, Krude ’422, Sugiyama, and the knowledge of a person of ordinary skill in the art, and the following additional reasons.

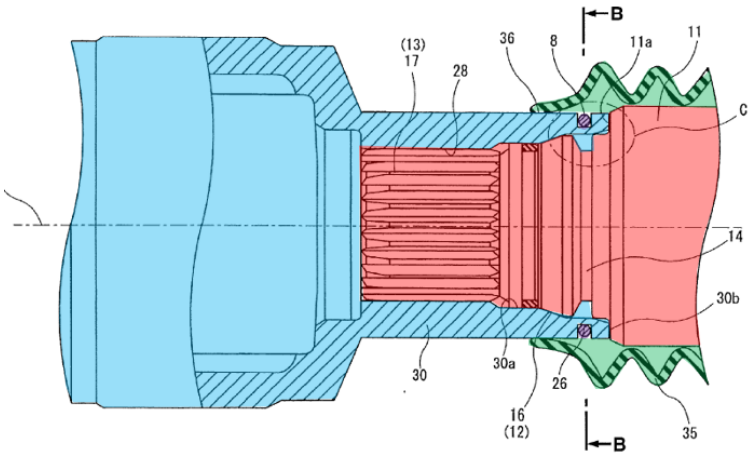
539. As I described above in Section IX.A.9, the Renegade Manual discloses the limitation of Claim 9.

540. As I described above in Section IX.B.4, Krude ’422 discloses that the window is continuous with an open end of the first member.

541. Sugiyama also discloses that the corrugated portion of the seal is disposed directly radially outwardly of the open end of the first member. As illustrated in Figures 4 through 7, for example, the first, female splined shaft member, “cylindrical section 30” of the rear end of J2 (blue), includes an open end, “insertion hole 30 a.” (Ex. 1007, Sugiyama at [0050], [0051], [0057], [0058], Figs. 4–7, 11(a) and (b), 12(a) and (b), and 13(a) and (b)). And, as shown in Figure 7 of Sugiyama, the corrugated portion of “water-proof boot 35,” “middle section structured in a substantially bellows shape,” is disposed directly radially outwardly of the open end of the first member.

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FIG.7



Ex. 1007, Sugiyama at [0058], Figure 7.

542. To the extent that the Renegade Manual does not disclose the limitation of Claim 9 (that is, if the corrugated portion of the seal is not disposed directly radially outwardly of the open end of the first member), it would have been obvious to a person of ordinary skill in the art to modify the teachings of the Renegade Manual in view of the teachings of Sugiyama and the knowledge of a person of ordinary skill in the art, or combine the teachings of the Renegade Manual and Sugiyama and the knowledge of a person of ordinary skill in the art, to arrive at the limitation Claim 9 and use in the joint assemblies of the Renegade Manual a seal having a corrugated portion disposed directly radially outwardly of the open end of the first member. Using such a seal would have been a known, obvious, and desirable design choice and would lead to predictable results.

a) A person of ordinary skill in the art would have been motivated to use a seal including a corrugated portion

disposed directly radially outwardly of the open end of the first member.

543. As I described above, including in Section IX.B.1, a person of ordinary skill in the art would have been motivated to use in the joint assemblies of the Renegade Manual a seal having a corrugated portion spaced radially from each of the first member and the second member. By using such a seal, a person of ordinary skill in the art would arrive at the limitation of Claim 9, a seal having a corrugated portion disposed directly radially outwardly of the open end of the first member. Thus, for the reasons stated above in Section IX.B.1, a person of ordinary skill in the art would have been motivated to modify the teachings of the Renegade Manual in view of the teachings of Sugiyama and the knowledge of a person of ordinary skill in the art, or combine the teachings of the Renegade Manual and Sugiyama and the knowledge of a person of ordinary skill in the art, to arrive at the limitation of Claim 9 and use in the joint assemblies of Renegade Manual a seal having a corrugated portion disposed directly radially outwardly of the open end of the first member.

b) A person of ordinary skill in the art would have had a reasonable expectation of success in using a seal including a corrugated portion disposed directly radially outwardly of the open end of the first member.

544. As I described above, including in Section IX.B.1, a person of ordinary skill in the art would have reasonably expected success in using in the joint assemblies of the Renegade Manual a seal having a corrugated portion spaced

radially from each of the first member and the second member. Again, by using a seal having a corrugated portion spaced radially from each of the first member and the second member, a person of ordinary skill in the art would arrive at the limitation of Claim 9, a seal including a corrugated portion disposed directly radially outwardly of the open end of the first member. Thus, for the reasons stated above in Section IX.B.1, a person of ordinary skill in the art would have had a reasonable expectation of success in modifying the teachings of the Renegade Manual in view of the teachings of Sugiyama and the knowledge of a person of ordinary skill in the art, or combining the teachings of the Renegade Manual and Sugiyama and the knowledge of a person of ordinary skill in the art, to arrive at the limitation of Claim 9 and use in the joint assemblies of the Renegade Manual a seal including a corrugated portion disposed directly radially outwardly of the open end of the first member.

10. Claim 10

The joint assembly of claim 1, wherein the cylindrical portion of the seal is disposed at an end of the seal.

545. In my opinion, Claim 10 would have been obvious over the Renegade Manual in view of Krude ’422, Sugiyama, and the knowledge of a person of ordinary skill in the art.

546. As I described above in Section IX.A.10, the Renegade Manual discloses every limitation of Claim 10 and anticipates that claim. In my opinion, Claim 10 would have also been obvious over the Renegade Manual in view of Krude

’422, Sugiyama, and the knowledge of a person of ordinary skill in the art for the reasons stated above in regard to anticipation of Claim 10 by the Renegade Manual and the following additional reasons.

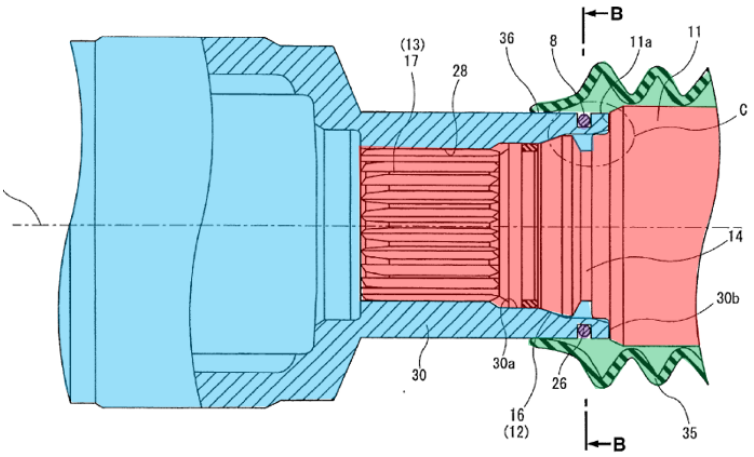
547. Claim 10 depends from Claim 1. (Ex. 1001, ’958 patent at Claim 10). As I described above in Section IX.B.1, the Renegade Manual, Krude ’422, Sugiyama, and the knowledge of a person of ordinary skill in the art render Claim 1 obvious. In my opinion, Claim 10 would have been obvious over the Renegade Manual in view of Krude ’422, Sugiyama, and the knowledge of a person of ordinary skill in the art for the reasons stated above in regard obviousness of Claim 1 by the Renegade Manual, Krude ’422, Sugiyama, and the knowledge of a person of ordinary skill in the art, and the following additional reasons.

548. As I described above in Section IX.A.10, the Renegade Manual discloses the limitation of Claim 10.

549. As I described above in Sections IX.A.1 and IX.B.1, Sugiyama discloses that the seal, “water-proof boot 35,” includes a “cylindrical portion,” at least at the point that the seal is “is attached and fixed to cylindrical section 30 via a boot attachment section 36 disposed at a basic end side of cylindrical section 30.” (Ex. 1007, Sugiyama at [0058], Fig. 7; Ex. 1007, Sugiyama at [0048], [0094], [0146], Claim 20). As illustrated in Figure 7 of Sugiyama, “boot attachment section 36” is located at an end of “water-proof boot 35.”

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FIG.7



Ex. 1007, Sugiyama at Fig. 7.

550. Moreover, to the extent that the seal of the Renegade Manual identified as a "cylindrical portion" disposed at an end of the seal is not a "cylindrical portion," for the reasons stated above in Section IX.B.1, it would have been obvious to a person of ordinary skill in the art to modify that portion of the seal to have a "cylindrical portion" or otherwise use a seal having a "cylindrical portion" as taught by Sugiyama and well known by those skilled in the art, thereby achieving the limitation of Claim 10 with a reasonable expectation of success.

11. Claim 11

A vehicle driveline comprising the joint assembly of claim 1.

551. In my opinion, Claim 11 would have been obvious over the Renegade Manual in view of Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art.

552. As I described above in Section IX.A.11, the Renegade Manual

discloses every limitation of Claim 11 and anticipates that claim. In my opinion, Claim 11 would have also been obvious over the Renegade Manual in view of Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art for the reasons stated above in regard to anticipation of Claim 11 by the Renegade Manual and the following additional reasons.

553. Claim 11 depends from Claim 1. (Ex. 1001, '958 patent at Claim 11). As I described above in Section IX.B.1, Renegade Manual, Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art render Claim 1 obvious. In my opinion, Claim 11 would have been obvious over the Renegade Manual in view of Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art for the reasons stated above in regard obviousness of Claim 1 by the Renegade Manual, Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art, and the following additional reasons.

554. As I described above in Section IX.A.11, the Renegade Manual discloses the limitation of Claim 11.

555. Krude '422 also discloses the limitation of Claim 11. In particular, the joint assembly of Krude '422 is "for supporting a wheel of a motor vehicle and for drivingly connecting the wheel to a driveshaft." (Ex. 1008, Krude '422 at Abstract; Ex. 1008, Krude '422 at 1:7–30, 2:19–23 ("It is the object of the present invention to further develop an assembly of said type in such a way as to facilitate the assembly

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and dismantling of the constant velocity joint and simultaneously to improve the ability to replace driveshafts in motor vehicles."), Claims 1, 8, 17).

556. Sugiyama also discloses the limitation of Claim 11. Sugiyama teaches: "The present invention relates to a power transmission shaft such as a propeller shaft applicable to, for example, an automotive vehicle for transmitting a driving force of a driving source to driving wheels of the vehicle." (Ex. 1007, Sugiyama at [0001]; Ex. 1007, Sugiyama at Abstract, [0005]–[0007], [0027] ("the present invention is applicable to the power transmission shaft (propeller shaft) for an automotive vehicle"), [0031], Fig. 1).

12. Claim 12

A vehicle comprising the joint assembly of claim 1.

557. In my opinion, Claim 12 would have been obvious over the Renegade Manual in view of Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art.

558. As I described above in Section IX.A.12, the Renegade Manual discloses every limitation of Claim 12 and anticipates that claim. In my opinion, Claim 12 would also have been obvious over the Renegade Manual in view of Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art for the reasons stated above in regard to anticipation of Claim 12 by the Renegade Manual and the following additional reasons.

559. Claim 12 depends from Claim 1. (Ex. 1001, '958 patent at Claim 12). As I described above in Section IX.B.1, the Renegade Manual, Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art render Claim 1 obvious. In my opinion, Claim 12 would have been obvious over the Renegade Manual in view of Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art for the reasons stated above in regard obviousness of Claim 1 by the Renegade Manual, Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art, and the following additional reasons.

560. As I described above in Section IX.A.12, the Renegade Manual discloses the limitation of Claim 12.

561. Krude '422 also discloses the limitation of Claim 12. In particular, the joint assembly of Krude '422 is "for supporting a wheel of a motor vehicle and for drivingly connecting the wheel to a driveshaft." (Ex. 1008, Krude '422 at Abstract; Ex. 1008, Krude '422 at 1:7–30, 2:19–23 ("It is the object of the present invention to further develop an assembly of said type in such a way as to facilitate the assembly and dismantling of the constant velocity joint and simultaneously to improve the ability to replace driveshafts in motor vehicles."), Claims 1, 8, 17).

562. Sugiyama also discloses the limitation of Claim 12. Sugiyama teaches: "The present invention relates to a power transmission shaft such as a propeller shaft applicable to, for example, an automotive vehicle for transmitting a driving force of

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a driving source to driving wheels of the vehicle." (Ex. 1007, Sugiyama at [0001]; Ex. 1007, Sugiyama at Abstract, [0005]–[0007], [0027] ("the present invention is applicable to the power transmission shaft (propeller shaft) for an automotive vehicle"), [0031], Fig. 1).

13. Claim 13

563. In my opinion, Claim 13 would have been obvious over the Renegade Manual in view of Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art.

564. As I described above in Section IX.A.13, the Renegade Manual discloses every limitation of Claim 13 and anticipates that claim. In my opinion, Claim 13 would also have been obvious over the Renegade Manual in view of Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art for the reasons stated above in regard to anticipation of Claim 13 by the Renegade Manual and the following additional reasons.

[13P] A joint assembly comprising:

565. Limitation [13P] is the same as limitation [1P]. (Ex. 1001, '958 patent at Claims 1 and 13).

566. As I described above in Sections IX.A.13 and IX.B.1, the Renegade Manual discloses limitation [13P].

567. As I described above in Section IX.B.1, Krude '422 discloses limitation

[13P].

568. As I described above in Section IX.B.1, Sugiyama also discloses limitation [13P].

[13a] a first member having an open end and a first plurality of splines formed within the open end;

569. Limitation [13a] is similar to limitation [1a], which recites "a first member having a first engagement means and an interior surface recess," Claim 2, which depends form Claim 1 and further recites "wherein the first member includes an open end and the first engagement means of the first member is formed within the open end," and Claim 5, which depends from Claim 1 and further recites "wherein the first engagement means includes a first plurality of splines and the second engagement means includes a second plurality of splines. (Ex. 1001, '958 patent at Claims 1, 2, 5).

570. As I described above in Sections IX.A.1, IX.A.2, IX.A.5, and IX.A.13, the Renegade Manual discloses limitation [13a].

571. As I described above in Sections IX.B.1, IX.B.2, and IX.B.5, Krude '422 discloses limitation [1a] and the limitations of Claims 2 and 5 and, for these reasons, Krude '422 discloses limitation [13a].

572. As I set for the above in Sections IX.B.1, IX.B.2, and IX.B.5, Sugiyama discloses a first member having a first engagement means as recited in limitation [1a] and the limitations of Claims 2 and 5 and, for these reasons, Sugiyama discloses

limitation [13a].

> **[13b] a second member having a second plurality of splines formed thereon, a portion of the second member disposed within the first member, the second plurality of splines engaging the first plurality of splines to provide a coupling of the second member to the first member;**

573. Limitation [13b] is similar to limitation [1b], which recites "a second member having a second engagement means and an exterior surface recess, a portion of the second member disposed within the first member, the second engagement means engaging the first engagement means to provide a coupling of the second member to the first member," except that limitation [13b] recites that the "second engagement means" of limitation [1b] is a "second plurality of splines" formed on the second member. (Ex. 1001, '958 patent at Claim 1, 13).

574. As I described above in Sections IX.A.1 and IX.A.13, the Renegade Manual discloses limitation [13b].

575. As I described above in Section IX.B.1, Krude '422 discloses limitation [1b] and, in particular, the second engagement means formed on the second, male splined shaft member is a plurality of male splines, and, for these reasons, Krude '422 discloses limitation [13b].

576. As I described above in Section IX.B.1, Sugiyama discloses limitation [1b] and, in particular, the second engagement means formed on the second, male splined shaft member is a plurality of male splines, and, for these reasons, Sugiyama

discloses limitation [13b].

[13c] a window formed within the first member where the portion of the second member is disposed within the first member;

577. Limitation [13c] is the same as limitation [1c]. (Ex. 1001, '958 patent at Claims 1 and 13).

578. As I described above in Sections IX.A.1 and IX.A.13, the Renegade Manual discloses limitation [13c].

579. As I described above in Section IX.B.1, Krude '422 discloses limitation [13c].

580. As I described above in Section IX.B.1, Sugiyama discloses limitation [13c].

[13d] a retaining ring configured to retain the coupling of the second member to the first member,

581. Limitation [13d] is similar to limitation [1d], which recites "a retaining means configured to retain the coupling of the second member to the first member," except that the "retaining means" of limitation [1d] is a "retaining ring" in limitation [13d]. (Ex. 1001, '958 patent at Claim 1, 13).

582. As I described above in Sections IX.A.1 and IX.A.13, the Renegade Manual discloses limitation [13d], including a retaining ring as the retaining means.

583. As I described above in Section IX.B.1, Krude '422 discloses limitation [13d], including a retaining ring as the retaining means.

584. As I described above in Section IX.B.1, Sugiyama discloses limitation [13d], including a retaining ring as the retaining means.

[13d(i)] wherein distal ends of the retaining ring are accessible through the window,

585. Limitation [13d(i)] is similar to limitation [1d(i)], which recites "wherein distal ends of the retaining means are accessible through the window," except that the "retaining means" of limitation [1d(i)] is a "retaining ring" in limitation [13d(i)]. (Ex. 1001, '958 patent at Claim 1, 13).

586. As I described above in Sections IX.A.1 and IX.A.13, the Renegade Manual discloses limitation [13d(i)], including a retaining ring as the retaining means.

587. As I described above in Section IX.B.1, Krude '422 discloses limitation [13d(i)], including a retaining ring as the retaining means.

[13d(ii)] the first member including an interior surface annular recess and the second member including an exterior surface annular recess,

588. Limitation [13d(ii)] is similar to limitation [1a], which recites "a first member having a first engagement means and an interior surface recess," and limitation [1b], which recites "a second member having a second engagement means and an exterior surface recess." (Ex. 1001, '958 patent at Claim 1, 13).

589. As I described above in Sections IX.A.1 and IX.A.13, the Renegade Manual discloses limitation [13d(ii)].

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590. As I described above in Section IX.B.1, Krude ’422 discloses limitations [1a] and [1b] and, in particular, the first, female splined shaft member of Krude ’422 includes an interior surface annular recess and the second, male splined shaft member includes an exterior surface annular recess, and, for these reasons, Krude ’422 discloses limitation [13d(ii)].

591. As I described above in Section IX.B.1, Sugiyama discloses limitation [1b] and also discloses “an annular retaining groove 26 which serves to retain circlip (retaining ring) 8 is cutout formed along the peripheral direction in the proximity of a rear end edge of cylindrical section 30.” (Ex. 1007, Sugiyama at [0051]; Ex. 1007, Sugiyama at [0052], [0054], [0055], [0057], [0059]–[0063]).

> **[13d(iii)] wherein the retaining ring is received partially into each of the interior surface recess of the first member and the exterior surface recess of the second member when the retaining ring retains the coupling of the second member to the first member,**

592. Limitation [13d(iii)] is similar to limitation [1d(iii)], which recites “wherein the retaining means is received partially into each of the interior surface recess of the first member and the exterior surface recess of the second member when the retaining means retains the coupling of the second member to the first member,” except that the “retaining means” of limitation [1d(iii)] is a “retaining ring” in limitation [13d(iii)]. (Ex. 1001, ’958 patent at Claim 1, 13).

593. As I described above in Sections IX.A.1 and IX.A.13, the Renegade

Manual discloses limitation [13d(iii)], including a retaining ring as the retaining means.

594. As I described above in Section IX.B.1, Krude '422 discloses limitation [13d(iii)], including a retaining ring as the retaining means.

595. As I described above in Section IX.B.1, Sugiyama discloses limitation [13d(iii)], including a retaining ring as the retaining means.

[13d(iv)] and wherein the distal ends of the retaining ring extend in a direction radially outwardly into the window to a point at or radially inwardly from an outer wall of the first member; and

596. Limitation [13d(iv)] is similar to limitation [1d(ii)], which recites "wherein the distal ends of the retaining means extend in a direction radially outwardly into the window to a point at or radially inwardly from an outer wall of the first member," except that the "retaining means" of limitation [1d(ii)] is a "retaining ring" in limitation [13d(iv)]. (Ex. 1001, '958 patent at Claim 1, 13).

597. As I described above in Sections IX.A.1 and IX.A.13, the Renegade Manual discloses limitation [13d(iv)], including a retaining ring as the retaining means.

598. As I described above in Section IX.B.1, Krude '422 discloses limitation [13d(iv)], including a retaining ring as the retaining means.

599. As I described above in Section IX.B.1, a person of ordinary skill in the art would have been motivated to modify the teachings of the Renegade Manual in

view of the teachings of Krude ’422 and the knowledge of a person of ordinary skill in the art, or combine the teachings of the Renegade Manual and Krude ’422 and the knowledge of a person of ordinary skill in the art, to arrive at the limitation of [13d(iv)] and use in the joint assemblies of the Renegade Manual retaining rings where the distal ends of the retaining ring extend in a direction radially outwardly into the window to a point at or radially inwardly from an outer wall of the first member. As I described above in Section IX.B.1, a person of ordinary skill in the art would have had a reasonable expectation of success. Claim 13 would have been obvious over Renegade Manual in view of Krude ’422, Sugiyama, and the knowledge of a person of ordinary skill in the art for the reasons stated above in regard obviousness of Claim 1 by the Renegade Manual, Krude ’422, Sugiyama, and the knowledge of a person of ordinary skill in the art.

[13e] a seal configured to cover the window,

600. Limitation [13e] is the same as limitation [1e]. (Ex. 1001, ’958 patent at Claims 1 and 13).

601. As I described above in Sections IX.A.1 and IX.A.13, the Renegade Manual discloses limitation [13e].

602. As I described above in Section IX.B.1, Sugiyama discloses limitation [13e].

[13e(i)] the seal coupled to the second member adjacent the open end of the first member,

603. Limitation [13e(i)] is similar to limitation [1e(i)], which recites "the seal coupled to the second member adjacent an end of the first member," except that limitation [13e(i)] recites that the end of the first member is the "open end" of the first member. (Ex. 1001, '958 patent at Claim 1, 13).

604. As I described above in Sections IX.A.1 and IX.A.13, the Renegade Manual discloses limitation [13e(i)], including that the seal is coupled to the second, male splined shaft member adjacent the "open end" of the first, female splined shaft member.

605. As I described above in Section IX.B.1, Sugiyama discloses limitation [13e(i)], including that the seal is coupled to the second, male splined shaft member adjacent the "open end" of the first, female splined shaft member. In particular, as illustrated in Figures 4 through 7, for example, the first, female splined shaft member, "cylindrical section 30" of the rear end of J2 (blue), includes an open end, "insertion hole 30 a." (Ex. 1007, Sugiyama at [0045], [0050], Figs. 4–7, 11(a) and (b), 12(a) and (b), and 13(a) and (b)). As depicted in Figure 7, the seal of Sugiyama, "water-proof boot 35," "is mounted on cylindrical section 30 in a form of extending on and over cylindrical section 30 and output shaft 3 so as to enclose first and second through holes 31, 32." (Ex. 1007, Sugiyama at [0058], Fig. 7; Ex. 1007, Sugiyama at [0048], [0094], [0146], Claim 20).

606. As I described above in Section IX.B.1, a person of ordinary skill in the

art would have been motivated to modify the teachings of the Renegade Manual in view of the teachings of Sugiyama and the knowledge of a person of ordinary skill in the art, or combine the teachings of the Renegade Manual and Sugiyama and the knowledge of a person of ordinary skill in the art, to arrive at the limitation of [13e(i)] and use a seal coupled to the second member adjacent the open end of the first member. As I described above in Section IX.B.1, a person of ordinary skill in the art would have had a reasonable expectation of success. Claim 13 would have been obvious over the Renegade Manual in view of Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art for the reasons stated above in regard obviousness of Claim 1 by the Renegade Manual, Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art.

[13e(ii)] the seal coupled to the first member adjacent the window,

607. Limitation [13e(ii)] is the same as limitation [1e(ii)]. (Ex. 1001, '958 patent at Claims 1 and 13).

608. As I described above in Sections IX.A.1 and IX.A.13, the Renegade Manual discloses limitation [13e(ii)].

609. As I described above in Section IX.B.1, Sugiyama discloses limitation [13e(ii)].

610. As I described above in Section IX.B.1, a person of ordinary skill in the art would have been motivated to modify the teachings of the Renegade Manual in

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view of the teachings of Sugiyama and the knowledge of a person of ordinary skill in the art, or combine the teachings of the Renegade Manual and Sugiyama and the knowledge of a person of ordinary skill in the art, to arrive at the limitation of [13e(ii)] and use a seal coupled to the first member adjacent the window. As I described above in Section IX.B.1, a person of ordinary skill in the art would have had a reasonable expectation of success. Claim 13 would have been obvious over the Renegade Manual in view of Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art for the reasons stated above in regard obviousness of Claim 1 by the Renegade Manual, Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art.

[13e(iii)] wherein a cylindrical portion of the seal covers the outer wall of the first member along at least a portion of a perimeter of the window,

611. Limitation [13e(iii)] is the same as limitation [1e(iii)]. (Ex. 1001, '958 patent at Claims 1 and 13).

612. As I described above in Sections IX.A.1 and IX.A.13, the Renegade Manual discloses limitation [13e(iii)].

613. As I described above in Section IX.B.1, Sugiyama also discloses that a cylindrical portion of the seal covers the outer wall of the first member, "cylindrical section 30." In particular, Sugiyama teaches that "water-proof boot 35," "is mounted on cylindrical section 30" and "is attached and fixed to cylindrical section 30 via a

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boot attachment section 36 disposed at a basic end side of cylindrical section 30." (Ex. 1007, Sugiyama at [0058], Fig. 7; Ex. 1007, Sugiyama at [0048], [0094], [0146], Claim 20). Given that Sugiyama teaches that a portion of its seal is "mounted" and "attached and fixed" to "cylindrical section 30," a person of ordinary skill in the art would understand that the seal, "water-proof boot 35," also includes a "cylindrical portion," at least at the area of attachment.

614. As I described above in Section IX.B.1, a person of ordinary skill in the art would have been motivated to modify the teachings of the Renegade Manual in view of the teachings of Sugiyama and the knowledge of a person of ordinary skill in the art, or combine the teachings of the Renegade Manual and Sugiyama and the knowledge of a person of ordinary skill in the art, to arrive at limitation [13e(iii)] and use a seal having a cylindrical portion that covers the outer wall of the first member along at least a portion of a perimeter of the window. As I described above in Section IX.B.1, a person of ordinary skill in the art would have had a reasonable expectation of success. Claim 13 would have been obvious over the Renegade Manual in view of Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art for the reasons stated above in regard obviousness of Claim 1 by the Renegade Manual, Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art.

[13e(iv)] wherein the seal further includes a corrugated portion disposed adjacent the cylindrical portion, and

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615. Limitation [13e(iv)] is the same as limitation [1e(iv)]. (Ex. 1001, '958 patent at Claims 1 and 13).

616. As I described above in Sections IX.A.1 and IX.A.13, the Renegade Manual discloses limitation [13e(iv)].

617. As I described above in Section IX.B.1, Sugiyama discloses limitation [13e(iv)].

618. As I described above in Section IX.B.1, a person of ordinary skill in the art would have been motivated to modify the teachings of the Renegade Manual in view of the teachings of Sugiyama and the knowledge of a person of ordinary skill in the art, or combine the teachings of the Renegade Manual and Sugiyama and the knowledge of a person of ordinary skill in the art, to arrive at limitation [13e(iv)] and use a seal that includes a corrugated portion disposed adjacent the cylindrical portion. As I described above in Section IX.B.1, a person of ordinary skill in the art would have had a reasonable expectation of success. Claim 13 would have been obvious over the Renegade Manual in view of Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art for the reasons stated above in regard obviousness of Claim 1 by the Renegade Manual, Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art.

[13e(v)] wherein the corrugated portion is spaced radially from each of the first member and the second member.

619. Limitation [13e(v)] is the same as limitation [1e(v)]. (Ex. 1001, '958

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patent at Claims 1 and 13).

620. As I described above in Sections IX.A.1 and IX.A.13, the Renegade Manual discloses limitation [13e(v)].

621. As I described above in Section IX.B.1, Sugiyama discloses limitation [13e(v)].

622. As I described above in Section IX.B.1, a person of ordinary skill in the art would have been motivated to modify the teachings of the Renegade Manual in view of the teachings of Sugiyama and the knowledge of a person of ordinary skill in the art, or combine the teachings of the Renegade Manual and Sugiyama and the knowledge of a person of ordinary skill in the art, to arrive at limitation [13e(v)] and use a seal that includes a corrugated portion spaced radially from each of the first member and the second member. As I described above in Section IX.B.1, a person of ordinary skill in the art would have had a reasonable expectation of success. Claim 13 would have been obvious over the Renegade Manual in view of Krude ’422, Sugiyama, and the knowledge of a person of ordinary skill in the art for the reasons stated above in regard obviousness of Claim 1 by the Renegade Manual, Krude ’422, Sugiyama, and the knowledge of a person of ordinary skill in the art.

Conclusion for Claim 13

623. 467. In my opinion, Claim 13 would have been obvious over the Renegade Manual in view of Krude ’422, Sugiyama, and the knowledge of a person

of ordinary skill in the art.

14. Claim 14

The joint assembly of claim 13, further comprising a constant velocity joint coupled to one of the first member and the second member.

624. In my opinion, Claim 14 would have been obvious over the Renegade Manual in view of Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art.

625. As I described above in Sections IX.A.7 and IX.A.14, the Renegade Manual discloses every limitation of Claim 14 and anticipates that claim. In my opinion, Claim 14 would have also been obvious over the Renegade Manual in view of Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art for the reasons stated above in regard to anticipation of Claim 14 by the Renegade Manual and the following additional reasons.

626. Claim 14 depends from Claim 13. (Ex. 1001, '958 patent at Claim 14). As I described above in Section IX.B.13, the Renegade Manual, Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art render Claim 13 obvious. In my opinion, Claim 14 would have been obvious over the Renegade Manual in view of Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art for the reasons stated above in regard obviousness of Claim 13 by the Renegade Manual, Krude '422, Sugiyama, and the knowledge of a person of

ordinary skill in the art, and the following additional reasons.

627. As I described above in Sections IX.A.7 and IX.A.14, the Renegade Manual discloses the limitation of Claim 14.

628. As I described above in Section IX.B.7, Krude ’422 discloses the limitation of Claim 14.

629. As I described above in Section IX.B.7, Sugiyama discloses the limitation of Claim 14.

630. As I described above in Section IX.B.7 regarding Claim 7 (which also recites the limitation of Claim 14, “a constant velocity joint coupled to one of the first member and the second member”), a person of ordinary skill in the art would have been motivated modify the teachings of the Renegade Manual in view of the teachings of Krude ’422 and Sugiyama and the knowledge of a person of ordinary skill in the art, or combine the teachings of the Renegade Manual and the teachings of Krude ’422 and Sugiyama and the knowledge of a person of ordinary skill in the art, to arrive at the limitation of Claim 14 and couple a constant velocity joint to one of the first member and the second member of the Renegade Manual with a reasonable expectation of success. Claim 14 would have been obvious over the Renegade Manual in view of Krude ’422, Sugiyama, and the knowledge of a person of ordinary skill in the art for the reasons stated above in regard obviousness of Claim 7 by the Renegade Manual, Krude ’422, Sugiyama, and the knowledge of a person

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of ordinary skill in the art.

15. Claim 15

631. In my opinion, Claim 15 would have been obvious over the Renegade Manual in view of Krude ’422, Sugiyama, and the knowledge of a person of ordinary skill in the art.

632. As I described above in Section IX.A.15, the Renegade Manual discloses every limitation of Claim 15 and anticipates that claim. In my opinion, Claim 15 would have been obvious over the Renegade Manual in view of Krude ’422, Sugiyama, and the knowledge of a person of ordinary skill in the art for the reasons stated above in regard to anticipation of Claim 15 by the Renegade Manual and the following additional reasons.

[15P] A method of servicing a joint assembly comprising:

633. As I described above in Section IX.A.15, the Renegade Manual discloses limitation [15P].

634. Krude ’422 also discloses limitation [15P]. In particular, Krude ’422 teaches: “It is an object of the present invention to further develop an assembly of said type in such a way as to facilitate the assembly and dismantling of the constant velocity joint and simultaneously to improve the ability to replace driveshafts in motor vehicles.” (Ex. 1008, Krude ’422 at 2:19–23; Ex. 1008, Krude ’422 at 2:19–3:29, 4:11–23, 4:49–63, 7:35–8:40, Figs. 7–10). A person of ordinary skill in the art

would understand that, by disclosing methods to "dismantle" and "assemble" constant velocity joints and "replace driveshafts," Krude '422 teaches methods of servicing of servicing a joint assembly as recited in limitation [15P].

635. Sugiyama also discloses limitation [15P]. In particular, Sugiyama teaches providing the joint assembly with "jig engagement surfaces 44 a, 45 a to which jig 40 which serves to remove circlip (retaining ring) 8 is engaged." (Ex. 1007, Sugiyama at [0086]). "In this way, since jig engagement surfaces 44 a, 45 a are provided, the improvement in operability of a removal operation of circlip (retaining ring) 8 can be achieved." (Ex. 1007, Sugiyama at [0086]; Ex. 1007, Sugiyama at [0106], [0119], [0138], Claim 13). A person of ordinary skill in the art would understand that, by teaching to "remove" "circlip (retaining ring) 8," which, as described herein, serves to retain shafts of the joint assembly, Sugiyama teaches methods of servicing of servicing a joint assembly as recited in limitation [15P].

636. Moreover, servicing a joint assembly in an automotive driveline would have been obvious to a person of ordinary skill in the art. OEMs, like Chrysler for the 2016 Jeep Renegade, distribute information on how customers, automotive dealerships, and others may service their vehicles, including the joint assemblies within the driveline of the vehicles. (Ex. 1013, Renegade Manual). A person of ordinary skill in the art would have been motivated to service a joint assembly, at least to repair damage, prevent damage and avoid and costly repairs, and to improve

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the overall life of the joint assembly. A person of ordinary skill in the art would have had a reasonable expectation of success in servicing a joint assembly because doing so was a known, obvious, and desirable thing to do and would lead to predictable results, a repaired and improved joint assembly.

[15-1] providing the joint assembly, the joint assembly including;

637. As I described above in Sections IX.A.1 and IX.A.15, the Renegade Manual discloses limitation [15-1].

638. As I described above in Sections IX.B.1, Krude '422 discloses limitation [15-1].

639. As I described above in Section IX.B.1, Sugiyama discloses limitation [15-1].

[15-1a] a first member having a first engagement means and an interior surface recess;

640. Limitation [15-1a] is the same as limitation [1a]. (Ex. 1001, '958 patent at Claims 1 and 15).

641. As I described above in Sections IX.A.1 and IX.A.15, the Renegade Manual discloses limitation [15-1a].

642. As I described above in Section IX.B.1, Krude '422 discloses limitation [15-1a].

643. As I described above in Section IX.B.1, Sugiyama discloses limitation

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[15-1a].

[15-1b] a second member having a second engagement means and an exterior surface recess, a portion of the second member disposed within the first member, the second engagement means engaging the first engagement means to provide a coupling of the second member to the first member;

644. Limitation [15-1b] is the same as limitation [1b]. (Ex. 1001, '958 patent at Claims 1 and 15).

645. As I described above in Sections IX.A.1 and IX.A.15, the Renegade Manual discloses limitation [15-1b].

646. As I described above in Section IX.B.1, Krude '422 discloses limitation [15-1b].

647. As I described above in Section IX.B.1, Sugiyama discloses limitation [15-1b].

[15-1c] a window formed within the first member where the portion of the second member is disposed within the first member;

648. Limitation [15-1c] is the same as limitation [1c]. (Ex. 1001, '958 patent at Claims 1 and 15).

649. As I described above in Sections IX.A.1 and IX.A.15, the Renegade Manual discloses limitation [15-1c].

650. As I described above in Section IX.B.1, Krude '422 discloses limitation [15-1c].

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651. As I described above in Section IX.B.1, Sugiyama discloses limitation [15-1c].

[15-1d] a retaining means configured to retain the coupling of the second member to the first member,

652. Limitation [15-1d] is the same as limitation [1d]. (Ex. 1001, '958 patent at Claims 1 and 15).

653. As I described above in Sections IX.A.1 and IX.A.15, the Renegade Manual discloses limitation [15-1d].

654. As I described above in Section IX.B.1, Krude '422 discloses limitation [15-1d].

655. As I described above in Section IX.B.1, Sugiyama discloses limitation [15-1d].

[15-1d(i)] wherein distal ends of the retaining means are accessible through the window,

656. Limitation [15-1d(i)] is the same as limitation [1d(i)]. (Ex. 1001, '958 patent at Claims 1 and 15).

657. As I described above in Sections IX.A.1 and IX.A.15, the Renegade Manual discloses limitation [15-1d(i)].

658. As I described above in Section IX.B.1, Krude '422 discloses limitation [15-1d(i)].

[15-1d(ii)] wherein the distal ends of the retaining means extend in a direction radially outwardly into the window to a

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point at or radially inwardly from an outer wall of the first member, and

659. Limitation [15-1d(ii)] is the same as limitation [1d(ii)]. (Ex. 1001, '958 patent at Claims 1 and 15).

660. As I described above in Sections IX.A.1 and IX.A.15, the Renegade Manual discloses limitation [15-1d(ii)].

661. As I described above in Section IX.B.1, Krude '422 discloses limitation [15-1d(ii)].

662. As I described above in Section IX.B.1, a person of ordinary skill in the art would have been motivated to modify the teachings of the Renegade Manual in view of the teachings of Krude '422 and the knowledge of a person of ordinary skill in the art, or combine the teachings of the Renegade Manual and Krude '422 and the knowledge of a person of ordinary skill in the art, to arrive at the limitation of [15-1d(ii)] and use in the joint assemblies of the Renegade Manual retaining means having distal ends that extend in a direction radially outwardly into the window to a point at or radially inwardly from an outer wall of the first member with a reasonable expectation of success. As I described above in Section IX.B.1, a person of ordinary skill in the art would have had a reasonable expectation of success. Claim 15 would have been obvious over the Renegade Manual in view of Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art for the reasons stated above in regard obviousness of Claim 1 by the Renegade Manual, Krude '422, Sugiyama, and

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the knowledge of a person of ordinary skill in the art.

> **[15-1d(iii)] wherein the retaining means is received partially into each of the interior surface recess of the first member and the exterior surface recess of the second member when the retaining means retains the coupling of the second member to the first member; and**

663. Limitation [15-1d(iii)] is the same as limitation [1d(iii)]. (Ex. 1001, '958 patent at Claims 1 and 15).

664. As I described above in Sections IX.A.1 and IX.A.15, the Renegade Manual discloses limitation [15-1d(iii)].

665. As I described above in Section IX.B.1, Krude '422 discloses limitation [15-1d(iii)].

666. As I described above in Section IX.B.1, Sugiyama also discloses that the retaining means, "circlip (retaining ring) 8," is received partially into the exterior surface recess of the second member, "annular engagement stop groove (or an engagement groove) 14," when the retaining means retains the coupling of the second member to the first member: "Middle diameter section 12 includes an annular engagement stop groove (or an engagement groove) 14 into which a circlip (also called a retaining ring) 8 (refer to FIG. 4) which serves as a retainer (or stopper) for input shaft 2 and output shaft 3 during linkages between input shaft 2 and output shaft 3 and first and second constant velocity (universal) joints." (Ex. 1007, Sugiyama at [0035]; Ex. 1007, Sugiyama at [0051], [0072], Figs. 2, 7–10).

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[15-1e] a seal configured to cover the window,

667. Limitation [15-1e] is the same as limitation [1e]. (Ex. 1001, '958 patent at Claims 1 and 15).

668. As I described above in Sections IX.A.1 and IX.A.15, the Renegade Manual discloses limitation [15-1e].

669. As I described above in Section IX.B.1, Sugiyama discloses limitation [15-1e].

[15-1e(i)] the seal coupled to the second member adjacent an end of the first member,

670. Limitation [15-1e(i)] is the same as limitation [1e(i)]. (Ex. 1001, '958 patent at Claims 1 and 15).

671. As I described above in Sections IX.A.1 and IX.A.15, the Renegade Manual discloses limitation [15-1e(i)].

672. As I described above in Section IX.B.1, Sugiyama discloses limitation [15-1e(i)].

673. As I described above in Section IX.B.1, a person of ordinary skill in the art would have been motivated to modify the teachings of the Renegade Manual in view of the teachings of Sugiyama and the knowledge of a person of ordinary skill in the art, or combine the teachings of the Renegade Manual and the teachings of Sugiyama and the knowledge of a person of ordinary skill the art, to arrive at the limitation of [15-1e(i)] and use in the joint assemblies of the Renegade Manual a

seal coupled to the second member adjacent an end of the first member. As I described above in Section IX.B.1, a person of ordinary skill in the art would have had a reasonable expectation of success. Claim 15 would have been obvious over the Renegade Manual in view of Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art for the reasons stated above in regard obviousness of Claim 1 by the Renegade Manual, Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art.

[15-1e(ii)] the seal coupled to the first member adjacent the window,

674. Limitation [15-1e(ii)] is the same as limitation [1e(ii)]. (Ex. 1001, '958 patent at Claims 1 and 15).

675. As I described above in Sections IX.A.1 and IX.A.15, the Renegade Manual discloses limitation [15-1e(ii)].

676. As I described above in Section IX.B.1, Sugiyama discloses limitation [15-1e(ii)].

677. As I described above in Section IX.B.1, a person of ordinary skill in the art would have been motivated to modify the teachings of the Renegade Manual in view of the teachings of Sugiyama and the knowledge of a person of ordinary skill in the art, or combine the teachings of the Renegade Manual and the teachings of Sugiyama and the knowledge of a person of ordinary skill the art, to arrive at the limitation of [15-1e(ii)] and use in the joint assemblies of the Renegade Manual a

seal coupled to the first member adjacent the window. As I described above in Section IX.B.1, a person of ordinary skill in the art would have had a reasonable expectation of success. Claim 15 would have been obvious over the Renegade Manual in view of Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art for the reasons stated above in regard obviousness of Claim 1 by the Renegade Manual, Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art.

[15-1e(iii)] wherein a cylindrical portion of the seal covers the outer wall of the first member along at least a portion of a perimeter of the window,

678. Limitation [15-1e(iii)] is the same as limitation [1e(iii)]. (Ex. 1001, '958 patent at Claims 1 and 15).

679. As I described above in Sections IX.A.1 and IX.A.15, the Renegade Manual discloses limitation [15-1e(iii)].

680. As I described above in Section IX.B.1, Sugiyama also discloses that a cylindrical portion of the seal covers the outer wall of the first member, "cylindrical section 30." (Ex. 1007, Sugiyama at [0058], Fig. 7; Ex. 1007, Sugiyama at [0048], [0094], [0146], Claim 20).

681. As I described above in Section IX.B.1, a person of ordinary skill in the art would have been motivated to modify the teachings of the Renegade Manual in view of the teachings of Sugiyama and the knowledge of a person of ordinary skill

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in the art, or combine the teachings of the Renegade Manual and the teachings of Sugiyama and the knowledge of a person of ordinary skill the art, to arrive at the limitation of [15-1e(iii)] and use in the joint assemblies of the Renegade Manual a seal having a cylindrical portion that covers the outer wall of the first member along at least a portion of a perimeter of the window. As I described above in Section IX.B.1, a person of ordinary skill in the art would have had a reasonable expectation of success. Claim 15 would have been obvious over the Renegade Manual in view of Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art for the reasons stated above in regard obviousness of Claim 1 by the Renegade Manual, Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art.

[15-1e(iv)] wherein the seal further includes a corrugated portion disposed adjacent the cylindrical portion, and

682. Limitation [15-1e(iv)] is the same as limitation [1e(iv)]. (Ex. 1001, '958 patent at Claims 1 and 15).

683. As I described above in Sections IX.A.1 and IX.A.15, the Renegade Manual discloses limitation [15-1e(iv)].

684. As I described above in Section IX.B.1, Sugiyama discloses limitation [15-1e(iv)].

685. As I described above in Section IX.B.1, a person of ordinary skill in the art would have been motivated to modify the teachings of the Renegade Manual in

view of the teachings of Sugiyama and the knowledge of a person of ordinary skill in the art, or combine the teachings of the Renegade Manual and the teachings of Sugiyama and the knowledge of a person of ordinary skill the art, to arrive at the limitation of [15-1e(iv)] and use in the joint assemblies of the Renegade Manual a seal that includes a corrugated portion disposed adjacent the cylindrical portion. As I described above in Section IX.B.1, a person of ordinary skill in the art would have had a reasonable expectation of success. Claim 15 would have been obvious over the Renegade Manual in view of Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art for the reasons stated above in regard obviousness of Claim 1 by the Renegade Manual, Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art.

[15-1e(v)] wherein the corrugated portion is spaced radially from each of the first member and the second member;

686. Limitation [15-1e(v)] is the same as limitation [1e(v)]. (Ex. 1001, '958 patent at Claims 1 and 15).

687. As I described above in Sections IX.A.1 and IX.A.15, the Renegade Manual discloses limitation [15-1e(v)].

688. As I described above in Section IX.B.1, Sugiyama discloses limitation [15-1e(v)].

689. As I described above in Section IX.B.1, a person of ordinary skill in the art would have been motivated to modify the teachings of the Renegade Manual in

view of the teachings of Sugiyama and the knowledge of a person of ordinary skill in the art, or combine the teachings of the Renegade Manual and the teachings of Sugiyama and the knowledge of a person of ordinary skill the art, to arrive at the limitation of [15-1e(v)] and use in the joint assemblies of the Renegade Manual a seal that includes a corrugated portion spaced radially from each of the first member and the second member. As I described above in Section IX.B.1, a person of ordinary skill in the art would have had a reasonable expectation of success. Claim 15 would have been obvious over the Renegade Manual in view of Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art for the reasons stated above in regard obviousness of Claim 1 by the Renegade Manual, Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art.

[15-2] uncovering the window from the cylindrical portion of the seal to provide access to the distal ends of the retaining means,

690. As I described above in Section IX.A.15, the Renegade Manual discloses limitation [15-2].

691. Sugiyama also discloses uncovering the window from the cylindrical portion of the seal to provide access to the retaining means. In particular, Sugiyama teaches providing the joint assembly with "jig engagement surfaces 44 a, 45 a to which jig 40 which serves to remove circlip (retaining ring) 8 is engaged." (Ex. 1007, Sugiyama at [0086]). "In this way, since jig engagement surfaces 44 a, 45 a

are provided, the improvement in operability of a removal operation of circlip (retaining ring) 8 can be achieved." (Ex. 1007, Sugiyama at [0086]; Ex. 1007, Sugiyama at [0106], [0119], [0138], Claim 13). A person of ordinary skill in the art would understand that, by teaching to "remove" "circlip (retaining ring) 8," which, as described herein, serves to retain shafts of the joint assembly, Sugiyama teaches uncovering the window from the cylindrical portion of the seal to provide access to the circlip for removal as recited in limitation [15-2].

692. Moreover, as I described above, servicing a joint assembly in an automotive driveline would have been obvious to a person of ordinary skill in the art. Persons of ordinary skill in the art would have been motivated to uncover the window from the cylindrical portion of the seal to provide access to the distal ends of the retaining means in order to service the joint assembly and would have reasonably expected success in doing so, at least because doing so was a known, obvious, and desirable thing to do that is a simple part of automotive assembly and disassembly that is known in the art. Uncovering the window from the cylindrical portion of the seal to provide access to the distal ends of the retaining means would lead to predictable results, namely a partially disassembled joint assembly with access to the retaining means for servicing and repair.

[15-3] manipulating the distal ends of the retaining means through the window to release the coupling of the second member to the first member; and

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693. As I described above in Section IX.A.15, the Renegade Manual discloses limitation [15-3].

694. As I described above in Sections VI.C and IX.B.1, Krude '422 discloses limitation [15-1d]. In particular, Krude '422 discloses in reference to Figure 8: "At the securing ring, it is possible to see the ends 65_3 and 66_3 which are gripped and moved together by the pliers Z through the bore 27_3, so that the securing ring 57_3 leaves the inner groove 76_3 in the sleeve projection 82_3 at the outer joint part and the outer joint part can be removed from the wheel hub in a non-destructive way."

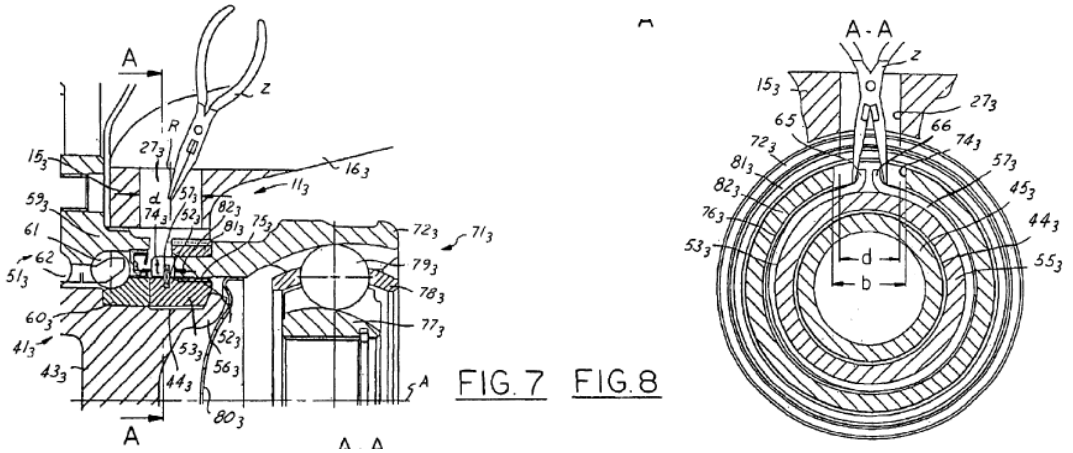


FIG. 7 FIG. 8

Ex. 1008, Krude '422 at 8:8–14, Fig. 8; Ex. 1008, Krude '422 at 7:66–8:40, Figs. 7, 9, 10, Claims 1, 8, 17.

695. As I described above in Sections VI.C and IX.B.1, Sugiyama also discloses providing the joint assembly with "jig engagement surfaces 44 a, 45 a to which jig 40 which serves to remove circlip (retaining ring) 8 is engaged." (Ex. 1007, Sugiyama at [0086]). "In this way, since jig engagement surfaces 44 a, 45 a are provided, the improvement in operability of a removal operation of circlip

(retaining ring) 8 can be achieved." (Ex. 1007, Sugiyama at [0086]; Ex. 1007, Sugiyama at [0106], [0119], [0138], Claim 13).

[15-4] separating the first member and the second member by disengaging the second engagement means from the first engagement means.

696. As I described above in Section IX.A.15, the Renegade Manual discloses limitation [15-4].

697. Krude '422 also discloses limitation [15-4]. In particular, Krude '422 discloses in reference to Figure 8: "At the securing ring, it is possible to see the ends 65_3 and 66_3 which are gripped and moved together by the pliers Z through the bore 27_3, so that the securing ring 57_3 leaves the inner groove 76_3 in the sleeve projection 82_3 at the outer joint part and the outer joint part can be removed from the wheel hub in a non-destructive way." (Ex. 1008, Krude '422 at 8:8–14, Fig. 8; Ex. 1008, Krude '422 at 7:66–8:40, Figs. 7, 9, 10, Claims 1, 8, 17). This teaching of Krude '422 allows it to achieve an object of the invention, "to further develop an assembly of said type in such a way as to facilitate the assembly and dismantling of the constant velocity joint and simultaneously to improve the ability to replace driveshafts in motor vehicles." (Ex. 1008, Krude '422 at 2:19–23; Ex. 1008, Krude '422 at 2:19–3:29, 4:11–23, 4:49–63, 7:35–8:40, Figs. 7–10). To dismantle the constant velocity joint and remove "the outer joint part . . . from the wheel hub" – a joint assembly coupled by the engagement of the first engagement means of the first, female splined

shaft member and the second engagement means of the second, male splined shaft member – a person of ordinary skill in the art would understand to disengage the second engagement means from the first engagement means.

698. Sugiyama also discloses limitation [15-4]. In particular, Sugiyama teaches providing the joint assembly with "jig engagement surfaces 44 a, 45 a to which jig 40 which serves to remove circlip (retaining ring) 8 is engaged." (Ex. 1007, Sugiyama at [0086]). "In this way, since jig engagement surfaces 44 a, 45 a are provided, the improvement in operability of a removal operation of circlip (retaining ring) 8 can be achieved." (Ex. 1007, Sugiyama at [0086]; Ex. 1007, Sugiyama at [0106], [0119], [0138], Claim 13). A person of ordinary skill in the art would understand that, by teaching to "remove" "circlip (retaining ring) 8," which, as described herein, serves to retain the first, female splined shaft member and second, male splined shaft member of the joint assembly, Sugiyama teaches separating the first member and the second member. And, because Sugiyama discloses that the first member and second member are coupled by way of a first and second engagement means as I describe above in Section IX.B.1, a person of ordinary skill in the art would understand to disengage the second engagement means from the first engagement means to separate the first member and the second member.

Conclusion for Claim 15

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699. In my opinion, Claim 15 would have been obvious over the Renegade Manual in view of Krude ’422, Sugiyama, and the knowledge of a person of ordinary skill in the art.

16. Claim 16

The method of servicing the joint assembly of claim 15, wherein the joint assembly further comprises a constant velocity joint coupled to one of the first member and the second member.

700. In my opinion, Claim 16 would have been obvious over the Renegade Manual in view of Krude ’422, Sugiyama, and the knowledge of a person of ordinary skill in the art.

701. As I described above in Sections IX.A.7, IX.A.14, and IX.A.16, the Renegade Manual discloses every limitation of Claim 16 and anticipates that claim. In my opinion, Claim 16 would have also been obvious over the Renegade Manual in view of Krude ’422, Sugiyama, and the knowledge of a person of ordinary skill in the art for the reasons stated above in regard to anticipation of Claim 16 by the Renegade Manual and the following additional reasons.

702. Claim 16 depends from Claim 15. (Ex. 1001, ’958 patent at Claim 16). As I described above in Sections IV.B.1 and IV.B.15, the Renegade Manual, Krude ’422, Sugiyama, and the knowledge of a person of ordinary skill in the art render Claim 15 obvious. In my opinion, Claim 16 would have been obvious over the Renegade Manual in view of Krude ’422, Sugiyama, and the knowledge of a person

of ordinary skill in the art for the reasons stated above in regard obviousness of Claim 15 by the Renegade Manual, Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art, and the following additional reasons.

703. As I described above in Sections IX.A.7, IX.A.14, and IX.A.16, the Renegade Manual discloses the limitation of Claim 16.

704. As I described above in Sections IX.B.7 and IX.B.14, Krude '422 also discloses the limitation of Claim 16.

705. As I described above in Section IX.B.7 and IX.B.14, Sugiyama also discloses the limitation of Claim 16.

706. As I described above in Section IX.B.7 regarding Claim 7 (which also recites the limitation of Claim 16, "a constant velocity joint coupled to one of the first member and the second member"), a person of ordinary skill in the art would have been motivated modify the teachings of the Renegade Manual in view of the teachings of Krude '422 and Sugiyama and the knowledge of a person of ordinary skill in the art, or combine the teachings of the Renegade Manual and the teachings of Krude '422 and Sugiyama and the knowledge of a person of ordinary skill in the art, to arrive at the limitation of Claim 16 and couple a constant velocity joint to one of the first member and the second member of the Renegade Manual with a reasonable expectation of success. As I described above in Section IX.B.7, a person of ordinary skill in the art would have had a reasonable expectation of success.

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Claim 16 would have been obvious over the Renegade Manual in view of Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art for the reasons stated above in regard obviousness of Claim 7 by the Renegade Manual, Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art.

17. Claim 17

The method of servicing the joint assembly of claim 15, further comprising coupling the separated first member with another second member to form another joint assembly.

707. In my opinion, Claim 17 would have been obvious over the Renegade Manual in view of Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art.

708. As I described above in Section IX.A.17, the Renegade Manual discloses every limitation of Claim 17 and anticipates that claim. In my opinion, Claim 17 would have also been obvious over the Renegade Manual in view of Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art for the reasons stated above in regard to anticipation of Claim 17 by the Renegade Manual and the following additional reasons.

709. Claim 17 depends from Claim 15. (Ex. 1001, '958 patent at Claim 17). As I described above in Sections IX.B.1 and IX.B.15, the Renegade Manual, Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art render Claim 15 obvious. In my opinion, Claim 17 would have been obvious over the

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Renegade Manual in view of Krude ’422, Sugiyama, and the knowledge of a person of ordinary skill in the art for the reasons stated above in regard obviousness of Claim 15 by the Renegade Manual, Krude ’422, Sugiyama, and the knowledge of a person of ordinary skill in the art, and the following additional reasons.

710. As I described above in Section IX.A.17, the Renegade Manual discloses the limitation of Claim 17.

711. Krude ’422 also discloses that an object of its invention is to “to further develop an assembly of said type in such a way as to facilitate the assembly and dismantling of the constant velocity joint and simultaneously to improve the ability to replace driveshafts in motor vehicles.” (Ex. 1008, Krude ’422 at 2:19–23; Ex. 1008, Krude ’422 at 2:19–3:29, 4:12–21).

712. A person of ordinary skill in the art would have been motivated to modify the teachings of the Renegade Manual in view of the teachings of Krude ’422 and the knowledge of a person of ordinary skill in the art, or combine the teachings of the Renegade Manual and the teachings of Krude ’422 and the knowledge of a person of ordinary skill in the art, to arrive at the limitation of Claim 17 and couple the separated first member with another second member to form another joint assembly. For example, a person of ordinary skill in the art would have been motivated to service the joint assemblies of the Renegade Manual and replace the driveshaft (propshaft), RDU, and PTU at least to repair damage to the propshaft,

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prevent damage and avoid and other costly repairs, and to improve the overall life of the propshaft and driveline. A person of ordinary skill in the art would have a reasonable expectation of success in replacing these component parts at least because doing so is a typical part automotive repair and, in fact, automotive manufacturers provide after-market service replacement parts for their vehicles and service information, such as service manuals, that teach how to replace parts and service the vehicles. Replacing component parts would also lead to predictable results, namely a joint assembly with new or improved component parts.

713. As to Claim 17, a person of ordinary skill in the art would have been motivated to replace the RDU of the Renegade Manual, which includes the male, pinion shaft as a "second member" of the joint assembly between the propshaft and RDU (Ex. 1013, Renegade Manual at PET_AAM_1013-0199–0202, Removal Steps 24, 25, 27, Installation Steps 3, 8), as taught by the Renegade Manual and known in the art. A person of ordinary skill in the art would also have been motivated to replace the driveshaft (propshaft) of the Renegade Manual, which includes a "second member" of the joint assembly between the propshaft and PTU (Ex. 1013, Renegade Manual at PET_AAM_1013-0197–0203, Removal Steps 17, 19, Installation Steps 2, 4, 11), as taught by Renegade Manual and Krude '422 and known in the art. Replacing these parts, the RDU of the joint assembly between the propshaft and RDU and the propshaft of the joint assembly between the propshaft and PTU

provides "another second member" and practices the limitation of Claim 17.

18. Claim 18

The method of servicing the joint assembly of claim 15, further comprising coupling the separated second member with another first member to form another joint assembly.

714. In my opinion, Claim 18 would have been obvious over the Renegade Manual in view of Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art.

715. As I described above in Section IX.A.18, the Renegade Manual discloses every limitation of Claim 18 and anticipates that claim. In my opinion, Claim 18 would have been obvious over the Renegade Manual in view of Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art for the reasons stated above in regard to anticipation of Claim 18 by the Renegade Manual and the following additional reasons.

716. Claim 18 depends from Claim 15. (Ex. 1001, '958 patent at Claim 18). As I described above in Sections IX.B.1 and IX.B.15, the Renegade Manual, Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art render Claim 15 obvious. In my opinion, Claim 18 would have been obvious over the Renegade Manual in view of Krude '422, Sugiyama, and the knowledge of a person of ordinary skill in the art for the reasons stated above in regard obviousness of Claim 15 by the Renegade Manual, Krude '422, Sugiyama, and the knowledge of a person

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of ordinary skill in the art, and the following additional reasons.

717. As I described above in Section IX.A.18, the Renegade Manual discloses the limitation of Claim 18.

718. Krude '422 also discloses that an object of its invention is "to further develop an assembly of said type in such a way as to facilitate the assembly and dismantling of the constant velocity joint and simultaneously to improve the ability to replace driveshafts in motor vehicles." (Ex. 1008, Krude '422 at 2:19–23; Ex. 1008, Krude '422 at 2:19–3:29, 4:12–21).

719. A person of ordinary skill in the art would have been motivated to modify the teachings of the Renegade Manual in view of the teachings of Krude '422 and the knowledge of a person of ordinary skill in the art, or combine the teachings of the Renegade Manual and the teachings of Krude '422 and the knowledge of a person of ordinary skill in the art, to arrive at the limitation of Claim 18 and couple the separated second member with another first member to form another joint assembly. For example, a person of ordinary skill in the art would have been motivated to service the joint assemblies of the Renegade Manual and replace the driveshaft (propshaft), RDU, and PTU at least to repair damage to the propshaft, prevent damage and avoid and other costly repairs, and to improve the overall life of the propshaft and driveline. A person of ordinary skill in the art would have a reasonable expectation of success in replacing these component parts at least

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because doing so is a typical part automotive repair and, in fact, automotive manufacturers provide after-market service replacement parts for their vehicles and service information, such as service manuals, that teach how to replace parts and service the vehicles. Replacing component parts would also lead to predictable results, namely a joint assembly with new or improved component parts.

720. As to Claim 18, a person of ordinary skill in the art would have been motivated to replace the PTU of the Renegade Manual, which includes a female shaft as a "first member" of the joint assembly between the propshaft and PTU (Ex. 1013, Renegade Manual at PET_AAM_1013-0197–0203, Removal Steps 17, 19, Installation Steps 2, 4, 11), as taught by the Renegade Manual and known in the art. A person of ordinary skill in the art would also have been motivated to replace the driveshaft (propshaft) of Renegade Manual, which includes a "first member" of the joint assembly between the propshaft and RDU (Ex. 1013, Renegade Manual at PET_AAM_1013-0199–0202, Removal Steps 24, 25, 27, Installation Steps 3, 8), as taught by Renegade Manual and Krude '422 and known in the art. Replacing these parts, the PTU of the joint assembly between the propshaft and PTU and the propshaft of the joint assembly between the propshaft and RDU provides "another first member" and practices the limitation of Claim 18.

X. SECONDARY CONSIDERATIONS OF NON-OBVIOUSNESS

721. As discussed above, I understand that "objective indicia of non-

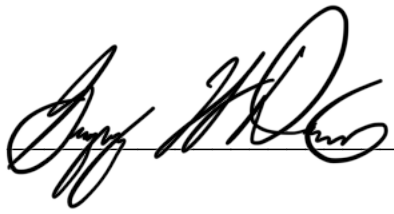
obviousness," also known as "secondary considerations," are also to be considered when assessing obviousness of the claims, if such factors present. These include commercial success of the claimed invention; long felt but unresolved needs; failure of others to solve the problem that the inventor solved; unexpected results; copying of the invention by others; and industry recognition or expressions of disbelief by experts in the field of the claimed invention. I also understand that objective indicia of non-obviousness must be commensurate in scope with the claimed subject matter.

722. In my opinion, the '958 patent did not resolve any long-felt need. Rather, the '958 patent presented known options for joint assemblies with retaining rings that are accessible through an access window for servicing. For the same reasons, I am not aware of any failure of others to solve the problem identified by the inventor; any unexpected results resulting from the chosen solution, which was known in the art; or any industry recognition or praise regarding this particular claimed invention. In fact, others succeeded in designing the joint assemblies described by the '958 patent well before the inventors of the '958 patent. I am also not aware of any other secondary considerations that weigh against the obviousness of the claims, for example, commercial success or copying. Even if evidence of secondary considerations existed, in my opinion, it would be insufficient to overcome the clear obviousness of 1–18 of the '958 patent.

XI. CONCLUSION

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723. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further 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.

Date: 11/14/2024 

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