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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte GEORGE PERRY HAYNES

Appeal 2018-007419¹
Application 15/136,118
Technology Center 3600

Before LINDA E. HORNER, DANIEL S. SONG, and
ALYSSA A. FINAMORE, *Administrative Patent Judges*.

FINAMORE, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Pursuant to 35 U.S.C. § 134(a), Appellant² appeals from the Examiner's decision to reject claims 1, 3, and 5–10. We have jurisdiction under 35 U.S.C. § 6(b). We AFFIRM.

¹ The citations herein refer to the Specification filed April 22, 2016 (“Spec.”), Final Office Action mailed August 10, 2017 (“Final Act.”), Appeal Brief filed February 12, 2018 (“Appeal Br.”), Claims Appendix filed March 13, 2018 (“Claims App.”), Examiner’s Answer mailed May 18, 2018 (“Ans.”), and Reply Brief filed July 10, 2018 (“Reply Br.”).

² “Appellant” refers to “applicant” as defined in 37 C.F.R. § 1.42. Appellant identifies the real party in interest as “KAYDON RING & SEAL, INC.”
Appeal Br. 1.

SUBJECT MATTER ON APPEAL

The invention “relates to seals, or more particularly to contact circumferential seals for sealing about rotatable shafts.” Spec. 1:5–6. Claims 1 and 10 are independent. Claims App. Independent claim 1 is illustrative of the claimed subject matter, and reproduced below, emphasizing the limitation at issue.

1. A circumferential shaft seal assembly for sealing about a shaft rotatable about a central axis, the shaft having an outer circumferential surface, the seal assembly comprising:

at least two generally arcuate bodies coupleable together to form a generally annular seal disposeable about the shaft outer surface, each arcuate body having opposing female and male circumferential ends, each female end including a recess defined at least partially by a radially-inner arm and a radially-outer arm each extending generally circumferentially from a remainder of the arcuate body, each male end including a projection extending circumferentially from the remainder of the arcuate body and sized to be disposeable within the recess of an adjacent arcuate body to couple the arcuate body with the adjacent arcuate body, the female end inner arm of each arcuate body being disposed radially between the shaft outer surface and at least a portion of the male end projection of the adjacent arcuate body when the arcuate body is coupled with the adjacent arcuate body;

wherein each arcuate body has at least one lift recess extending radially outwardly from the body inner circumferential surface and configured to generate a radially outwardly directed force to bias the arcuate body from the shaft outer surface during rotation of the shaft and *the inner arm of each arcuate body female end is configured to generally prevent radially-inward displacement of the male end of the adjacent arcuate body coupled with the arcuate body toward the outer surface of the shaft during rotation.*

Id. (emphasis added).

REJECTION

Claims Rejected	35 U.S.C. §	References/Basis
1, 3, 5–10	103	Vasagar, ³ Iliffe ⁴

ANALYSIS

Independent claims 1 and 10

Appellant argues independent claims 1 and 10 as a group. Appeal Br. 3–6; Reply Br. We select independent claim 1 as representative, and independent claim 10 stands or falls with independent claim 1. 37 C.F.R. § 41.37(c)(1)(iv).

In rejecting independent claim 1, the Examiner finds Vasagar discloses the invention substantially as claimed. Final Act. 3. Vasagar discloses circumferential seal ring segments for creating a seal around a rotating shaft. Vasagar 1:26–31, 2:40–44. Vasagar’s Figures 9a and 9b, reproduced below, show a seal ring segment.

³ Vasagar et al., US 8,074,995 B2, issued Dec. 13, 2011 (“Vasagar”).

⁴ Iliffe, US 2,412,734, issued Dec. 17, 1946.

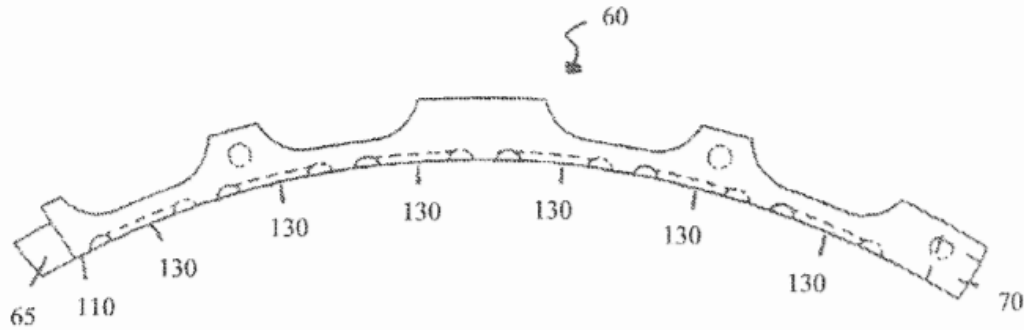


Fig. 9a

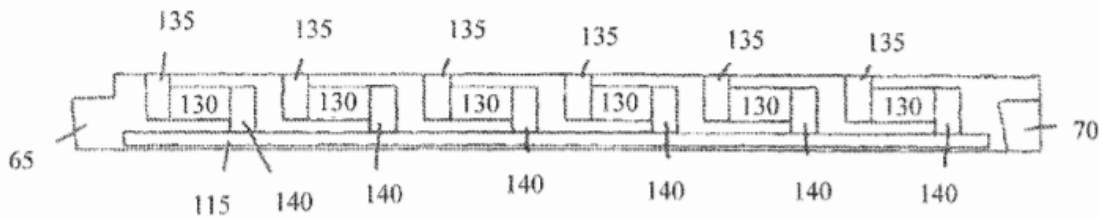


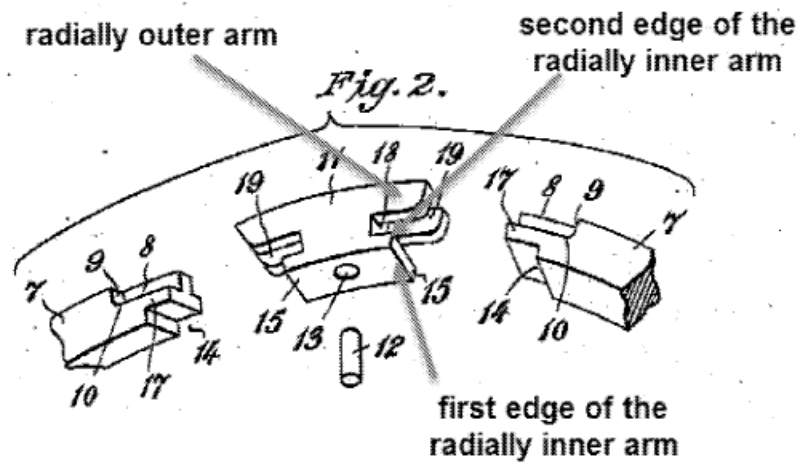
Fig. 9b

Figure 9a is an axial view of seal ring segment 60, and Figure 9b is a view of the radially-inward surface of the seal ring segment. *Id.* at 5:64–6:3. As shown in these figures, and as noted by the Examiner, seal ring segment 60 includes tongue 65 at one end and socket 70 at the opposing end. *Id.* at 7:64–8:2; Final Act. 3. Socket 70 of one seal ring segment is adapted to receive tongue 65 of an adjacent segment so that the seal ring segments fit together around the circumference of shaft 40. Vasagar 7:64–8:2. Seal ring segment 60 also includes pockets 130. *Id.* at 12:1–6.

The Examiner acknowledges Vasagar does not disclose that the female end has a radially-outer arm and radially-inner arm, as recited in independent claim 1. Final Act. 3–4. The Examiner finds Iliffe’s segmental member 11 includes a female end having radially-outer and radially-inner

arms. *Id.* at 4–5. The Examiner determines it would have been obvious to replace Vasagar’s female end with the configuration of Iliffe’s segmental member to provide better retention of the segments together. *Id.*

The Examiner provides an annotated version of Iliffe’s Figure 2, reproduced below, identifying the radially-outer and radially-inner arms of the segmental member. *Id.* at 5.



Iliffe’s Figure 2 is a perspective view showing the ends of piston ring 7 and segmental member 11 positioned between the ends. Iliffe 1:24–25. The ends of piston ring 7 include tenons 8 that are adapted to fit into slots 19 of segmental member 11. *Id.* at 2:8–9. The ends of piston ring 7 also include portions 17 that fit into slots 18 of segmental member 11. *Id.* at 2:15–17. In the annotated figure, the Examiner identifies the portion of segmental member 11 defining the upper end of slot 18 as the radially-outer arm and the portion defining the lower end of slot 18, namely projection 15, as the radially-inner arm.

Appellant argues that there would have been no motivation to combine the teachings of Vasagar and Iliffe as the Examiner proposes because Iliffe’s projection 15 serves a completely different purpose from

that of the claimed invention. Appeal Br. 5–6; Reply Br. 2. According to Appellant, Iliffe’s projection 15 prevents radially-outward movement of segmental member 11, not radially-inward displacement of the male end, i.e., end of piston ring 7, as claimed. Appeal Br. 5–6; Reply Br. 2.

The Examiner’s reason for combining the teachings of the prior art, however, need not be the same as Appellant’s purpose for the claimed invention. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 419 (2007) (“In determining whether the subject matter of a patent claim is obvious, neither the particular motivation nor the avowed purpose of the patentee controls.”). The Examiner reasons that it would have been obvious to replace Vasagar’s female end with that of Iliffe “to provide better retention of the segments together by providing multiple slots 14, 18, 19 for the corresponding projections.” Final Act. 5. Both Vasagar’s seal and Iliffe’s piston ring are formed from a plurality of segments connected together. Vasagar 7:64–8:2, Figs. 4a, 6; Iliffe 1:35–40; Figs. 1, 2. Vasagar’s seal ring segments 60 are connected by tongue 65 of one segment received in socket 70 of an adjacent segment, whereas Iliffe’s segmental member 11 is connected the ends of piston ring 7 via a plurality of projections and corresponding grooves. *Id.* Vasagar and Iliffe disclose different connections, and the Examiner proposes to substitute one type of connection for another. *See KSR*, 550 U.S. at 416 (“[W]hen a patent claims a structure already known in the prior art that is altered by the mere substitution of one element for another known in the field, the combination must do more than yield a predictable result.”). Furthermore, Vasagar’s seal ring components must be securely connected to form a seal around the rotating shaft. Iliffe teaches the ends of piston ring 7 and segmental member 11 are specifically designed to retain the segmental

member between the ends of the ring. Iliffe 2:17–21 (teaching that the arrangement of segmental member 11, including projection 15, “provid[es] means for retaining the segmental member 11, which is freely mounted on the bar 12 *in position in the ends of the piston ring 7*, in the event of the piston ring being withdrawn from the cylinder” (emphasis added)). Based on these teachings, a person of ordinary skill in the art would have appreciated that modifying Vasagar’s seal ring components to include the Iliffe’s connection arrangement, as the Examiner proposes, would improve Vasagar’s seal by providing a better connection between the seal ring components. Final Act. 4–5; *see also KSR*, 550 U.S. at 417 (“[I]f a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill.”). For these reasons, Appellant does not apprise us of error in the Examiner’s reasoning for combining the teachings of Vasagar and Iliffe.

Appellant also argues Vasagar and Iliffe, considered alone or in combination, do not teach a radially-inner arm “configured to generally prevent radially-inward displacement of the male end of the adjacent arcuate body coupled with the arcuate body toward the outer surface of the shaft during rotation,” as recited in independent claim 1. Appeal Br. 4–6; Reply Br. In particular, Appellant contends Iliffe’s projection 15, which the Examiner considers the radially-inner arm, does not function to prevent radial-inward displacement of the male member to avoid contact with a rotating shaft because Iliffe’s piston ring displaces linearly along a piston without any relative angular movement. Appeal Br. 5–6; Reply Br. 2.

Appellant also contends tenons 8 of the ends of Iliffe's piston ring 7 are not even capable of contacting the surface of the piston groove. Appeal Br. 6; Reply Br. 2.

Appellant's argument is not convincing because the Examiner is not relying solely on Iliffe for disclosing the recited radially-inner arm. Rather, the Examiner determines the combination of Vasagar and Iliffe would have resulted in a radially-inner arm that is configured to prevent radially-inward displacement of the male end. Ans. 9 ("The combination of Vasagar and Iliffe teaches the seal ring that prevents linear displacement and also prevents radial displacement of the seal ring of Vasagar due to the inner radial arm of Iliffe.").

According to Appellant's Specification:

[D]ue to positioning of and sizing of the inner arm 20, any radially-inward biasing on the male end 16 of an arcuate body 12, such as arising from fluid pressure, inertia and/or spring force on the outer surface of the body 12, is prevented from displacing the male end 16 inwardly toward the shaft outer surface 2.

Spec. 4:14–17. Figure 5, reproduced below, shows the position and size of inner arm 20.

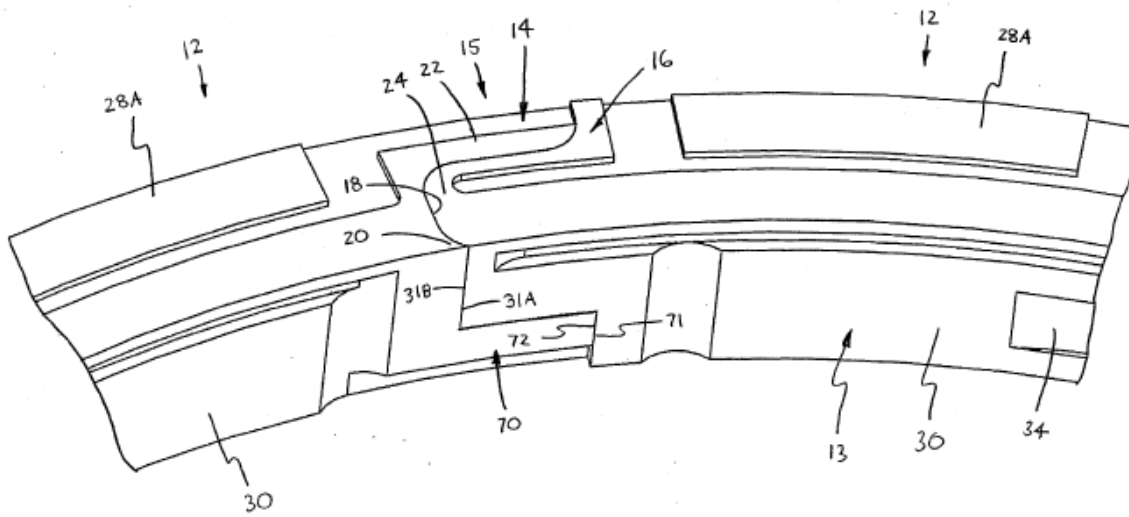


FIG. 5

Figure 5 is a side plan view of a joint between female end 14 of a first arcuate member 12 and male end 16 of an adjacent arcuate member 12. *Id.* at 2:23–24. Female end 14 includes recess 18 defined at least partially by radially-inner arm 20 and radially-outer arm 22. *Id.* at 4:2–4. Male end 16 includes projection 24 that is sized and shaped to be disposeable within recess 18 of adjacent arcuate body 12 to form joint 15 and couple the accurate bodies. *Id.* at 4:4–8. Radially-inner arm 20 of female end 14 is disposed radially between shaft outer surface 2 and at least a portion of projection 24 of male end 16. *Id.* at 4:9–11.

The Examiner proposes to replace Vasagar’s female end with Iliffe’s segmental member. Final Act. 4–5. In the proposed combination, projection 15 of Iliffe’s segmental member 11 would be disposed radially between the shaft and at least a portion of the male member received within slot 18 of segmental member 11. As projection 15 would be positioned and sized similarly to Appellant’s radially-inner arm 20, Appellant does not

persuade us of error in the Examiner’s determination that the combination of Vasagar and Iliffe would have resulted in a radially-inner arm that is “configured to generally prevent radially-inward displacement of the male end of the adjacent arcuate body coupled with the arcuate body toward the outer surface of the shaft during rotation,” as recited in independent claim 1.

In view of the foregoing, Appellant does not apprise us of error in the rejection of independent claim 1. We, therefore, sustain the rejection of independent claim 1, with independent claim 10 falling therewith.

Claims 3 and 5–9

Appellant argues claims 3 and 5–9 are allowable for the same reasons as independent claim 1. Appeal Br. 6; Reply Br. As set forth above, Appellant does not apprise us of error in the rejection of independent claim 1, and we similarly sustain the rejection of claims 3 and 5–9.

CONCLUSION

We sustain the rejection of independent claims 1 and 10. We likewise sustain the rejection of claims 3 and 5–9.

DECISION SUMMARY

Claims Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
1, 3, 5–10	103	Vasagar, Iliffe	1, 3, 5–10	

Appeal 2018-007419
Application 15/136,118

TIME PERIOD FOR RESPONSE

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a). 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED