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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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*Ex parte* RICARDO REVES, SATISH KUMAR and LINE BERGMAN

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Appeal 2020-000344
Application 15/039,146
Technology Center 3700

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Before JOHN C. KERINS, DANIEL S. SONG, and LISA M. GUIJT, *Administrative Patent Judges*.

GUIJT, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Appellant[1] seeks our review under 35 U.S.C. § 134(a) of the rejection of claims 20, 21, and 23–38. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

[1] We use the word "Appellant" to refer to "applicant" as defined in 37 C.F.R. § 1.42. Appellant identifies Welltec Oilfield Solutions AG as the real party in interest. Appeal Br. 3.

## THE INVENTION

Appellant's invention relates to "a downhole production casing string for insertion in a borehole in a reservoir." Spec. 1:3–4. Claim 20, reproduced below as the sole independent claim on appeal, is illustrative of the subject matter on appeal.

> 20. A downhole production casing string for insertion in a borehole in a reservoir, the downhole production casing string having a first end nearest a top of the borehole and a second end furthest away from the top, the downhole production casing string extending along a longitudinal axis and comprising:
>
> - at least one opening which during production allows hydrocarbon-containing fluid from the reservoir into the downhole production casing string,
>
> - a plurality of casing parts having end sections and a base section between the end sections, the base section having an outer diameter, and
>
> - at least one annular projecting element having an outer face and at least one helical groove arranged in or on the outer face and having an overall outer diameter which is larger than the outer dimeter of the base section,
>
> wherein the downhole production casing further comprises at least one fluid-expandable annular barrier, the annular projecting element being positioned in front of the annular barrier closer to the second end of the casing string, and
>
> wherein a diameter of the annular projecting element is larger than a diameter of the annular barrier before expansion of the annular barrier, so as to protect the annular barrier against damage when the annular projecting element and the annular barrier are together inserted into the borehole.

THE REJECTIONS

The Examiner relies upon the following as evidence in support of the rejections:

| NAME | REFERENCE | DATE |
|---|---|---|
| Baldridge | US 5,697,442 | Dec. 16, 1997 |
| Le | US 2005/0092527 A1 | May 5, 2005 |
| Valenti | US 2005/0230105 A1 | Oct. 20, 2005 |
| Hallundbaek | US 2011/0266004 A1 | Nov. 3, 2011 |
| Ravensbergen | US 2011/0308817 A1 | Dec. 22, 2011 |
| Hofman | US 2012/0152523 A1 | June 21, 2012 |

The following rejections are before us for review:

I. Claims 20, 21, 23–26, and 28–31 stand rejected under 35 U.S.C. § 103 as being unpatentable over Ravensbergen, Hofman, and Hallundbaek.

II. Claim 27 stands rejected under 35 U.S.C. § 103 as being unpatentable over Ravensbergen, Hofman, Hallundbaek, and Valenti.

III. Claims 32–34 stand rejected under 35 U.S.C. § 103 as being unpatentable over Ravensbergen, Hofman, Hallundbaek, and Baldridge.

IV. Claims 35–38 stand rejected under 35 U.S.C. § 103 as being unpatentable over Ravensbergen, Hofman, Hallundbaek, and Le.

OPINION

*Rejection I*

*Claims 20, 21, 23–26, and 29–31*

Appellants argue claims 20, 21, 23–26, and 29–31 as a group. Appeal Br. 7–11. We select independent claim 20 as representative, and claims 21, 23–26, and 29–31 stand or fall therewith. *See* 37 C.F.R. § 41.37(c)(1)(iv).

Regarding independent claim 20, the Examiner finds, *inter alia*, that Ravensbergen discloses a downhole production casing string with casing parts (i.e., collars 110), an annular projecting element (i.e., centralizer 116), and a fluid-expandable annular barrier (i.e., packer 111), as claimed. Non-Final Act. 6 (citing Ravensbergen ¶ 64, Figs. 4, 5).

The Examiner determines that Ravensbergen does not disclose a helical groove arranged on the outer face of the annular projecting element and relies on Hofman for disclosing a helical groove on the outer face of the middle section 76 of a centralizer 70. *Id.* at 6–7 (citing Hofman, Figs. 5, 6). The Examiner also finds that Hofman's helical groove is "described as urging rotation of the centralizer," and reasons that "[b]y urging rotation of the casing string[,] the centralizer reduces the amount of force needed to overcome friction between the casing and the borehole, which reduces the amount of torque needed to rotate the string." Ans. 4–5 (citing Hofman ¶¶ 30, 32). Additionally, the Examiner finds that "it is well known in the art that helical/spiral configurations of stabilizer/centralizer blades induce rotation of the stabilizer/centralizer and/or string (depending on attachment type) as evidenced by Hofman." *Id.* at 6 (citing Hofman ¶¶ 30, 32).[2] The

[2] The Examiner also cites additional references as evidence that it is well known to use a helical groove in or on a centralizer, as claimed. *See* Ans. 6–7.

Examiner reasons that it would have been obvious to modify Ravensbergen's annular projecting element (i.e., centralizer 116) to include a helical groove, as taught by Hofman, "to reduce friction/torque during run-in by urging rotation of the centralizer and attached tubing." Non-Final Act. 7 (Hofman ¶¶ 24, 30).

The Examiner also finds that Ravensbergen fails to disclose that the annular projecting element (i.e., centralizer 116) has an overall outer diameter that is larger than the outer diameter of the base section of the casing parts, as claimed,[3] and relies on Hofman for teaching that annular

[3] Notably, claim 20 requires casing parts having a base section between end sections, for example, casing part 8 having base section 10. *See, e.g.*, Spec. 6:21 ("casing parts have end sections 9 and a base section 10 between the end sections forming one pipe section"), Figs. 1, 2, 4a. Thus, the structures in Ravensbergen that correspond to the claimed casing parts are pipe sections 106A–C. *See*, *e.g.*, Ravensbergen ¶ 41 (disclosing, with reference to Figures 2 and 3, that "casing 104 can include multiple casing lengths 106A, 106B, and 106C that can be connected by one or more collars, such as collars 108 and 110"); *id.* ¶ 42 ("[c]ollar 110 can include one or more fracture ports 112 . . . which can be positioned longitudinally in centralizers 116"). A preponderance of the evidence supports a finding that the base section of Ravensbergen's casing parts (i.e., the portion of pipe sections 106A-C between the ends) correspond to the claimed casing parts having a base section, and also that Ravensbergen's annular projecting element (i.e., centralizer 116) has an overall outer diameter larger than the outer diameter of such base sections. *See,* Ravensbergen, Figs. 2, 3. Moreover, Baldridge discloses that it is generally known that "centralizers . . . are connected [to] a part of the casing string or disposed thereabout at desired intervals [and] have outwardly extending parts to engage the well bore," such that the overall outer diameter of centralizers (or annular projecting elements) are known to be larger than the outer diameter of the base section of the casing parts. Baldridge 1:65–2:2.

projecting element (i.e., "near 76") has an overall outer diameter larger than the outer diameter of the base section (i.e., "between 80/74"). Non-Final Act. 7 (citing Hofman, Fig. 5).

The Examiner further finds that although Ravensbergen discloses an annular barrier (i.e., packer 111), Ravensbergen fails to disclose a fluid-expandable annular barrier, wherein the diameter of the projecting element (i.e., centralizer 116) is larger than the diameter of the annular barrier before expansion, so as to protect the annular barrier against damage when the casing string is inserted into the borehole, as claimed. Non-Final Act. 7. The Examiner relies on Hallundbaek for disclosing a fluid-expandable annular barrier (i.e., annular barrier 1) with a projecting element (i.e., "near 21/22") having the claimed diameter. *Id.* at 8 (citing Hallundbaek, Fig. 1). The Examiner reasons that it would have obvious to modify Ravensbergen, as modified by Hofman, "to have used the known annular barrier of Hallundbaek, . . . as Ravensbergen teaches a generic annular barrier and using the known annular barrier of Hallundbaek yields the predictable result of allowing the operator [to] form an annular seal at a desired location within the borehole." *Id.* Notably, where "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." *See KSR Int'l Co. v. Teleflex, Inc*., 550 U.S. 398, 416 (2007).

Appellant argues that "there is no reason" to modify Ravensbergen's centralizer 116 to have Hofman's helical groove, because "the cited paragraphs [from Hofman] say nothing about reducing friction/torque during

run-in." Appeal Br. 8 (citing ¶¶ 24, 30). Appellant submits that, instead, Hofman discloses that

> centralizer 70 and sleeve 90 are freely rotatable relative to the casing string above swivel sub 20. As such, when the centralizer engages the ground surface 202 . . . , the sleeve 90 begins to rotate. Once sleeve 90 rotates such that a flat surface 119 engages the ground, the centralizer also stops rotating. At that point, neither centralizer 70 nor sleeve 90 rotates, and the casing string is moved ("dragged straight") further down the lateral . . ., i.e., without rotating. Because centralizer 70 and sleeve 90 stop rotating upon encountering the bottom side of the wellbore, due to the connection 40 allowing free relative rotation, it is clear that the centralizer does not reduce friction/torque – it only freely rotates when there are no obstructions. Moreover, because it stops rotating and is dragged/pushed through the wellbore upon contacting the wellbore, the centralizer 70 is not fixedly rotatable with the casing string so the groove functions as screw to help advance the casing string into the borehole, per claim 20.[4]

*Id.*; *see also* Reply Br. 1. Appellant also argues that, in Hofman, the rotation of centralizer 70 is very limited so as to only function to open ports, and therefore, Hofman does not teach rotation of helical flutes to reduce friction or torque. Reply Br. 2. Appellant submits that the Examiner impermissibly picks and chooses elements from the prior art (*id.*) and impermissibly relies on hindsight (Appeal Br. 9).

Regarding the Examiner's reliance on additional references in support of the Examiner's finding that helical grooves on centralizers are well known, as set forth *supra*, Appellant argues that "[t]hese references are not relevant because they are not part of the rejection," and "even if they were

[4] Notably, as set forth *supra*, claim 1 requires the annular projecting element to have "at least one helical groove arranged in or on the outer face," but does *not* require the helical groove to advance the casing string into the borehole.

part of the rejection, they do not change the operation of Hofman." Reply Br. 2.

We are not persuaded by Appellant's argument. A preponderance of the evidence supports the Examiner's finding that Hofman discloses that a helical flute on a centralizer urges rotation of the centralizer: "[w]hen the centralizer 70 engages with the ground surface, fluted middle section 76 engages the low side of the wellbore and *urges rotation of the centralizer and attached tubing*, including the ported sleeve 90, in the direction of the flutes 78." Hofman ¶ 90 (emphasis added). Although Hofman discloses, as argued by Appellant, that "rotation of the ported sleeve 90 will continue until [engagement surface 119 contacts low side 202 of wellbore 204]," wherein "frictional engagement of the engagement surface 119 [of sleeve 90] is sufficient to resist the rotational urging caused by the fluted centralizer 70," the Examiner's modification, as set forth *supra*, does not include incorporating Hofman's ported sleeve 90 to limit rotation of the centralizer urged on by the helical flutes, or a swivel sub 20. Hofman ¶¶ 31, 32; *see* Ans. 8 ("Hofman was not relied upon to teach the attachment mechanism, the centralizer itself, swivel sub, sleeve, or engagement surface on the sleeve," rather, "Hofman was relied upon to teach using helical grooves on the outer face of the centralizer"). "It is well-established that a determination of obviousness based on teachings from multiple references does not require an actual, physical substitution of elements." *In re Mouttet*, 686 F.3d 1322, 1332 (Fed. Cir. 2012); *see also* Ans. 8. Appellant also does not provide sufficient argument or evidence to dispute the Examiner's reasoning that urging rotation of Ravensburgen's casing string via the

modified, helically grooved centralizer, results in reducing the torque necessary to set the casing string in the well hole.

Although not necessary in view of Hofman's factual disclosure in support of the Examiner's reasoning as discussed *supra*, the Examiner cites additional references, which are consistent with Hofman, as evidence that "it is well known in the art that helical/spiral configurations of stabilizer/centralizer blades induce rotation of the stabilizer/centralizer and/or string." Non-Final Act. 6 (citing, *e.g.*, Fiasseler[5] ¶ 73 (disclosing, with reference to Figure 3, that "[t]he profile of the centralizing section is similar to a conventional spiral-blade stabilizer in order to . . . reduce torque and drag")). We are not persuaded by Appellant's argument that the Examiner erred by relying on prior art not specifically relied upon in the rejection as evidence that certain subject matter is well known in the art. *See Randall Mfg. v. Rea*, 733 F.3d 1355, 1362–63 (Fed. Cir. 2013) (prior art of record not specifically relied upon in the rejection considered as evidence of the state of the art, common knowledge, and common sense of one of ordinary skill in the art). Further, an artisan must be presumed to know something about the art apart from what the references disclose. *See In re Jacoby*, 309 F.2d 513, 516 (CCPA 1962).

Appellant also argues that "[b]oth the Ravensbergen centralizer and the Hofman centralizer are not designed to protect an annular barrier during the insertion process," and further, "Hofman teaches no annular barrier to protect." *Id.* 8–9; *see also id.* at 10 (alternatively, arguing that Hofman's "centralizer 70 does not appear to have a diameter that is larger than the sleeve 90"). Appellant submits that Ravensbergen's packer 111 is depicted

[5] US 2005/0109538 A1; published May 26, 2005.

in Figure 8 as having *a larger* diameter than Ravensbergen's centralizer 116, and that Ravensbergen "does not teach that [packer 111] has a diameter that is less than the centralizer." *Id.* at 9; *see also id.* at 9–10 (arguing that, with respect to Ravesnbergen's "packers plus-like system" or swellable, mechanical packers, "Ravensbergen is silent as to the diameter of the projecting element being larger than the diameter of the annular barrier before its expansion"). Appellant submits that the Examiner improperly relies on hindsight. *Id.* at 9.

However, as set forth *supra*, the Examiner relies on Hallundbaek, not Ravensbergen or Hofman, for disclosing a fluid-expandable annular barrier, which, when incorporated into Ravensbergen's downhole production casing string, is protected, when unexpanded, by Ravensbergen's annular projecting element during insertion. In other words, the Examiner neither relies on Hofman's centralizer 70, nor Hofman's sleeve 90 for disclosing the claimed annular projecting element or fluid-expandable annular barrier. *See* Ans. 10 ("Hofman is not used to teach a sleeve in addition to the centralizer of Ravensbergen"). As set forth *supra*, the Examiner relies on Ravensbergen's centralizer 116 as disclosing the claimed annular projecting element, and proposes modifying Ravensbergen's packer 111 to be a fluid-expandable annular barrier, as disclosed with reference to Hallundbaek's annular barrier 1. Thus, Appellant's argument does not apprise us of error in the Examiner's rejection.

Appellant further argues that "the skilled person would not be motivated when starting from Ravensbergen to adjust the main barrier packer of Ravensbergen with another packer design of Hallundbaek to protect such 'upper packer' by an 'annular projecting element' . . . since

such 'upper packer' does not need protection." Appeal Br. 11. However, Ravensbergen discloses packers 111 "positioned between the inner diameter of the wellbore 107 and the outer diameter of the case 104, as illustrated in FIG. 8," *on either side* of Ravensbergen's annular projecting element (i.e., centralizer 116), such that we are not persuaded by Appellant's argument that Ravensbergen's packer 111 does not need protection. Ravensbergen ¶ 50, Fig. 8 (depicting packers 111 on either side of centralizer 116 along the downhole production casing string). In other words, we are not apprised of error in the Examiner's reasoning that the proposed substitution of Hallundbaek's fluid-expandable annular barrier for Ravensbergen's packers 111 would result in the packer following annular projecting element (i.e., centralizer 116) to be protected by the annular projecting element.

Finally, Appellant argues that Hofman fails to disclose that the annular projecting element (i.e., Hofman's centralizer 70) has an overall outer diameter which is larger than the diameter of a base section (i.e., Hofman's sleeve 90). Appeal Br. 9. However, Appellant's argument does not address the Examiner's finding *supra* that Hofman's annular projecting element (i.e., "near 76," wherein reference numeral 76 refers to the middle section of centralizer 70) has an overall outer diameter larger than the outer diameter of the base section (i.e., "between 80/74," wherein reference numeral 80 refers to an annular front surface of middle section 76 and 74 generally indicates a pipe section of centralizer 70), as depicted in Figures 5, 6. In other words, the Examiner does not rely on Hofmans' sleeve 90, and therefore, Appellant's argument does not apprise us of error in the Examiner's findings.

Accordingly, we sustain the Examiner's rejection of independent claim 20 and claims 20, 21, 23–26, and 29–31 fall therewith.

*Claim 28*

Claim 28, which depends from independent claim 20, recites, in relevant part, "wherein the helical groove has a cutting edge." Appeal Br. 14 (Claims App.). The Examiner finds, *inter alia*, that "[i]t is known in the art that sharp edges on centralizers cut / scrape into the formation during rotation." Non-Final Act. 12 (citing, as evidence, Wheeler[6] ¶ 28).

Appellant argues that "front edge 80 of [Hofman's] centralizer is not likely able to form a cutting edge due to its angular orientation," and also that the Examiner's reliance on Wheeler, as evidence that a cutting edge on a helical groove of a centralizer is well known, is "improper." Appeal Br. 11.

We are not persuaded by Appellant's argument, which lacks sufficient evidence. Moreover, Wheeler discloses that "centralizing blades 20 rotate across and against the bore hole with a bruising (glancing impact) not in a digging or direct impact as would occur with a profile including sharp edges." Wheeler ¶ 28. As discussed *supra*, it is not improper for the Examiner to refer to prior art, which is of record but not specifically relied upon in the rejection, as evidence of common knowledge, for example, as here, as evidence that it is well known for the edges of helical grooves (or spiral blades) on centralizers to be intentionally *cutting* edges.

Accordingly, we sustain the Examiner's rejection of claim 28.

[6] US 2007/0163778 A1 (published July 19, 2007).

*Rejections II–IV*

Appellant does not present arguments for the patentability of claims 27 and 32–38 apart from the arguments presented in Rejection I *supra*. Appeal Br. 7–12. Therefore, for essentially the same reasons as presented *supra*, we also sustain the Examiner's rejection of claims 27 and 32–38.

## CONCLUSION

In summary:

| Claims Rejected | 35 U.S.C. § | Reference(s) | Affirmed | Reversed |
|---|---|---|---|---|
| 20, 21, 23–26, 28–31 | 103 | Ravensbergen, Hofman, Hallundbaek | 20, 21, 23–26, 28–31 | |
| 27 | 103 | Ravensbergen, Hofman, Hallundbaek, Valenti | 27 | |
| 32–34 | 103 | Ravensbergen, Hofman, Hallundbaek, Baldridge | 32–34 | |
| 35–38 | 103 | Ravensbergen, Hofman, Hallundbaek, Le | 35–38 | |
| **Overall Outcome** | | | 20, 21, 23–38 | |

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

AFFIRMED