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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte CORNELIA ADRIANA DEWOLF, HISHAM NASR-EL-DIN,
ESTEVAO DE OLIVEIRA BARRA, EDWIN RUDOLF ANTONY BANG,
and THEODOR JOHANNES STANITZEK

Appeal 2019-003200
Application 14/406,706
Technology Center 3600

Before EDWARD A. BROWN, MICHELLE R. OSINSKI, and
CARL M. DeFRANCO, *Administrative Patent Judges*.

BROWN, *Administrative Patent Judge*.

DECISION ON APPEAL
STATEMENT OF THE CASE

Appellant¹ seeks review under 35 U.S.C. § 134(a) of the Examiner's decision rejecting claims 1–15. We have jurisdiction under 35 U.S.C. § 6(b).

We reverse.

¹ We use the word “Appellant” to refer to “applicant” as defined in 37 C.F.R. § 1.42. Appellant identifies Akzo Nobel Chemicals International B.V. as the real party in interest. Appeal Br. 2.

CLAIMED SUBJECT MATTER

Claim 1, reproduced below, is the sole independent claim on appeal.

1. A two-step process to produce oil or gas from a subterranean formation, wherein in a first matrix acidizing and/or fracturing step the subterranean formation is treated with an aqueous composition having a pH in the range of 2–6 and containing a chelating agent selected from the group consisting of glutamic acid N,N-diacetic acid or a salt thereof (GLDA), aspartic acid N,N-diacetic acid or a salt thereof (ASDA), methylglycine N,N-diacetic acid or a salt thereof (MGDA), and N-hydroxyethyl ethylenediamine N,N',N'-triacetic acid or a salt thereof (HEDTA) to promote the production of oil or gas from the subterranean formation as an outlet stream from said subterranean formation, the outlet stream comprising (i) an aqueous phase comprising at least some of said aqueous composition containing said chelating agent, and (ii) a non-aqueous phase comprising said produced oil or gas, and wherein, in a next step the aqueous phase of said outlet stream is separated from the non-aqueous phase.

Appeal Br. 13 (Claims App.).

REJECTIONS ON APPEAL

Claims 1–7 and 12–15 are rejected under 35 U.S.C. § 103(a) as unpatentable over Welton (US 2008/0277112 A1, published Nov. 13, 2008) and Simon (US 5,965,029, issued Oct. 12, 1999).

Claims 8 and 9 are rejected under 35 U.S.C. § 103(a) as unpatentable over Welton, Simon, Qu (US 2002/0023752 A1, published Feb. 28, 2002), and Collins (US 2012/0279711 A1, published Nov. 8, 2012).

Claims 10 and 11 are rejected under 35 U.S.C. § 103(a) as unpatentable over Welton, Simon, and Collins.

ANALYSIS

Rejection of claims 1–7 and 12–15 over Welton and Simon

As to claim 1, the Examiner finds that Welton discloses a process to produce oil or gas from a subterranean formation, wherein in a first matrix acidizing step (Abstract, ¶¶ 4, 11) and/or fracturing step the subterranean formation is treated with an aqueous composition that has “a less than strongly acidic pH” (¶¶ 14–16, “either greater than 2, greater than 5, or in the range of 6–12”) and contains a chelating agent as claimed (¶ 18), to promote the production of oil or gas from the subterranean formation as an outlet stream from the subterranean formation (Abstract, ¶¶ 4, 11, “the acid enhances the flow of hydrocarbons”), and the outlet stream comprising (i) an aqueous phase comprising at least some of the aqueous composition containing the chelating agent and (ii) a non-aqueous phase comprising the produced oil or gas. Final Act. 5–6. According to the Examiner, “the purpose of the matrix acidizing treatment, i.e. to enhance formation fluid production, this treatment resulting in a combination of at least oil/hydrocarbons and water (the original aqueous portion of the treatment fluid and possibly formation water), either initially or as the flow back takes place.” *Id.* at 6 (bold face omitted).

The Examiner finds that Welton does not specifically describe that the aqueous composition has a pH in the range of 2–6, as claimed. Final Act. 6. The Examiner determines, however, that it would have been obvious to one of ordinary skill in the art to modify Welton’s range to match the claimed range, which is within Welton’s disclosed range, because “where the general conditions of a claim are disclosed in the prior art, discovering the optimum

or workable range involves only routine skill in the art.” *Id.* (citing *In re Aller*, 220 F.2d 454 (CCPA 1955); MPEP § 2144.05).

The Examiner also concedes that Welton does not explicitly disclose that, in a next step, an aqueous phase of an outlet stream is separated from a non-aqueous phase, as claimed. Final Act. 6. To address this omission, the Examiner relies on Simon as teaching the separation of an aqueous phase from a non-aqueous phase for streams returning from a subterranean reservoir after an acid treatment. *Id.* at 6–7. The Examiner concludes that it would have been obvious to one of ordinary skill in the art to modify Welton’s process to include the separation method of Simon to separate the aqueous phase (at least water) from the non-aqueous phase (at least oil), which “would . . . achieve[] the predictable result that the oil could be stored for sale without inappropriate amounts of water, spent acid, etc. remaining in the oil.” *Id.* at 7.

Appellant contends that, in contrast to the claimed process, Welton fails to disclose a matrix acidizing step, or a fracturing step, that results in an outlet stream containing an aqueous phase and a non-aqueous phase comprising produced oil or gas. Appeal Br. 6; Reply Br. 1. Appellant contends that Welton discloses a method of treating a matrix of a subterranean formation in a pre-existing fracture or perforation to increase permeability and enhance production. Appeal Br. 4–5 (citing Welton ¶ 4). Welton uses an aqueous treatment fluid comprising a chelating agent to dissolve carbonates from the matrix of the subterranean formation or proppant pack, adding a viscosity-increasing agent to the treatment fluid to improve placement or diversion (delivery) of the chelating agent to the formation. *Id.* at 5 (citing Welton ¶ 7).

Appellant points out that Welton discloses that its treatment methods are expected to be effective in applications associated with well completion and remediation, not in a matrix acidizing step. Appeal Br. 6 (citing Welton ¶¶ 8, 10); Reply Br. 1. Appellant states, “[c]ompletion’ of a well takes place before hydrocarbon production has commenced, and ‘remediation’ takes place after hydrocarbon production has ceased, such that *these are not steps in which hydrocarbons are produced from a well.*” Appeal Br. 6 (citing Second Declaration of Cornelia De Wolf under 37 C.F.R. § 1.132 (herein, “Second De Wolf Declaration” or “Sec. De Wolf Decl.”) ¶ 8, Ex. A (*Schlumberger Oilfield Glossary* – meaning of “completion”), B (APPEA – meaning of “remediation”)).

According to the Examiner, “both of these activities [i.e., completion and remediation] are known to persons of ordinary skill in the art to include matrix acidizing at least at the beginning and during the producing life of the well.” Ans. 10. As to “remediation,” the Examiner refers to an article that “explicitly deems acidizing as a remedial well treatment to enhance production.” *Id.* at 11. However, as noted by Appellant, the Examiner states that the rejection does not rely on this article. *Id.*; Reply Br. 5. As to “completion,” the Examiner submits, “[p]ersons of ordinary skill in the art recognize that the ‘completion’ of a well includes the initial perforations and also treating such perforations using many techniques, with acidizing and fracturing being very common.” Ans. 11. In support, the Examiner refers to an article entitled “Acidizing” from the American Petroleum Institute (hereafter, “API article”).” *Id.* However, as also noted by Appellant, the Examiner also does not rely on this article in the rejection. *Id.*; Reply Br. 5.

Appellant contends that, in Welton’s process, the fluid that flows back is the carbonate treatment fluid after its viscosity has been broken. Appeal Br. 6 (citing Welton ¶ 30). Appellant asserts, “Welton does not disclose that this recovered treatment fluid contains any oil or other hydrocarbon, and does not teach or suggest that any hydrocarbon is to be recovered from that fluid.” *Id.* (citing Sec. De Wolf Decl. ¶ 8). Appellant further contends that Welton does not suggest that the described treatment results in an outlet stream comprising an aqueous phase containing an aqueous composition with the chelating agent, and a non-aqueous phase comprising produced oil or gas, as claimed, and, in fact, Welton’s process would not result in such outlet stream, either initially or as flow back takes place. *Id.* To the contrary, Appellant contends, “the absence of hydrocarbon in the returning workover fluids is consistent with Welton’s stated use of the fluids for well completion and remediation, steps which occur when no hydrocarbon is being produced. Reply Br. 6–7.

We are persuaded that the Examiner has not established with sufficient evidence that Welton discloses a *matrix acidizing* step that results in an outlet stream comprising (i) an aqueous phase containing the chelating agent used in the treatment fluid, and (ii) a *non-aqueous phase comprising produced oil or gas*, let alone where the treatment fluid has a pH in the range of 2–6, as required by claim 1. Nor does the Examiner establish with sufficient evidence that Welton discloses a *fracturing* step that results in an outlet stream comprising a *non-aqueous phase comprising produced oil or gas*, let alone where the treatment fluid has a pH in the range of 2–6, as required by claim 1. As discussed, the Examiner relies on the Abstract and paragraphs 4 and 11 of Welton as support for the finding that Welton

discloses the first step of claim 1. Ans. 4. However, these portions of Welton do not describe that the introduction of the chelating agent-containing treatment fluid into a subterranean formation results in an outlet stream comprising, in part, a *non-aqueous phase comprising produced oil or gas*. As the Examiner does not show that Welton expressly discloses these claimed features, we understand that the Examiner's position is based on inherency. Even assuming, however, this outlet stream is a possible result of introducing the chelating agent-containing treatment fluid into a subterranean formation in Welton's process, this is still insufficient as "[i]nherency . . . may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient." *In re Robertson*, 169 F.3d 743, 745 (Fed. Cir. 1999) (citations and internal quotation marks omitted). The Examiner does not establish with sufficient evidence that the recited outlet stream is necessarily (i.e., inherently) produced by practicing the method disclosed in Welton.

The Examiner also relies on the same portions of Welton's disclosure as support for the finding that "the acid enhances the flow of hydrocarbons." Final Act. 5-6; Ans. 4 (emphasis omitted). However, we are unable to find support for this finding as the cited portions of Welton do not describe an "acid," or any treatment that necessarily uses an acid.

The mere general description in Welton of "production enhancement to increase hydrocarbon production from a subterranean formation" (Welton ¶ 4) and "hydrocarbon production [can be] enhanced" (*id.* ¶ 11) does not, by itself, establish that Welton's fluid treatment necessarily results in an outlet stream containing a non-aqueous phase of oil or gas, as claimed. In other words, this description does not establish that such "production

enhancement” inherently occurs *during* the step of applying the treatment fluid containing a chelating agent and a viscosity-increasing agent to a carbonate-containing formation, thereby producing an outlet stream, as claimed.

We also disagree with the Examiner that, in regard to Welton, “this is the purpose of the matrix acidizing treatment, i.e.[,] to enhance formation fluid production, this treatment resulting in a combination of at least oil/hydrocarbons and water (the original aqueous portion of the treatment fluid and possibly formation water), either initially or as the flow back takes place.” Final Act. 6; Ans. 4 (emphasis omitted). As discussed, we are not convinced that Welton discloses “matrix acidizing” as well as a treatment that would result in producing an outlet stream containing a combination of oil/hydrocarbons and water.

We are not persuaded by the Examiner that “Welton discloses acidic treatment fluids and explicitly states in paragraph [0004] that he will be ‘treating a portion of a matrix of a subterranean formation’. *This is matrix acidizing under a plain reading of the term.*” Ans. 12 (emphasis added). As described in Exhibit C (*Schlumberger Oilfield Glossary*) provided with the Second De Wolf Declaration, “matrix acidizing,” as defined and understood in the oil industry, is a treatment of a reservoir formation with a stimulation fluid containing a reactive acid, and “[m]atrix acidizing operations are ideally performed at high rate, but at treatment pressures below the fracture pressure of the formation.” (emphasis added). We note this definition of matrix acidizing is consistent with the description in the API article, which describes, “[i]n matrix acidizing, the acid treatment is injected below the

formation fracturing pressure. In fracture acidizing, acid is pumped above the formation fracturing pressure.” API article 1.

Although Welton discloses that the treatment fluid *may* have an acidic pH, Welton further discloses that the methods can be advantageous for treatment of subterranean formations using treatment fluids that are *non-acid* containing, thus indicating that acid is not required to achieve the desired formation treatment. Consistent with this disclosure, Appellant asserts, “Welton is directed to treatment with chelating agents, not with acid.” Reply Br. 6. Appellant contends, “[t]he fact that in some Welton embodiments some acid may be present does not mean that Welton is a matrix acidizing process that results in an outlet stream containing hydrocarbons that must be separated from an aqueous phase.” *Id.* We agree with Appellant that this disclosure alone is insufficient to establish that the introduction of such treatment fluid to a subterranean formation is a matrix acidizing step that will necessarily produce an outlet stream containing a non-aqueous phase of oil or gas, as required by claim 1.

The Examiner relies on Simon as teaching the recited “next” (second) step of the two-step process. As such, Simon is not relied on to cure the deficiency in Welton as to the first step of the two-step process. Thus, as the combination of Welton and Simon as applied by the Examiner fails to disclose or suggest all limitations of claim 1, we do not sustain the rejection of claim 1, and dependent claims 2–7 and 12–15, as unpatentable over Welton and Simon.

Rejection of claims 8 and 9 over Welton, Simon, Qu, and Collins

Rejection of claims 10 and 11 over Welton, Simon, and Collins

The Examiner's additional reliance on Qu and/or Collins in rejecting dependent claims 8–11 does not cure the deficiency in the rejection of claim 1 discussed above. Final Act. 9–11. Thus, we do not sustain the rejection of claims 8 and 9 as unpatentable over Welton, Simon, Qu, and Collins, or the rejection of claims 10 and 11 as unpatentable over Welton, Simon, and Collins for the same reasons as for claim 1.

CONCLUSION

In summary:

Claim(s) Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
1–7, 12–15	103(a)	Welton, Simon		1–7, 12–15
8, 9	103(a)	Welton, Simon, Qu, Collins		8, 9
10, 11	103(a)	Welton, Simon, Collins		10, 11
Overall Outcome				1–15

REVERSED