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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte LUCA PAROLINI and VITTORIO MICHELASSI

Appeal 2019-004337
Application 14/830,471
Technology Center 2100

Before JAMES R. HUGHES, JUSTIN BUSCH, and
NORMAN H. BEAMER, *Administrative Patent Judges*.

HUGHES, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Claims 1, 3–14, and 16–20 are pending, stand rejected, are appealed by Appellant, and are the subject of our decision under 35 U.S.C. § 134(a).¹ *See* Final Act. 1.^{2, 3} We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

CLAIMED SUBJECT MATTER

The claimed subject matter, according to Appellant, relates generally to “a method of operating a hydrocarbon extraction field [that] is performed with the aid of a computer,” which “may include programming the computer with a virtual flow meter model.” Spec. 1:22–24. More specifically, Appellant’s claimed subject matter relates to methods of operating a hydrocarbon extraction field using a computer by programming the computer with a virtual flow meter model that includes one or more of mass flow, temperature, and pressure within pressure loss elements (PLEs) (that include wells) in the hydrocarbon extraction field. The computer receives sensor data from sensors in the PLEs and uses the model to estimate mass flow rates from the wells. *See* Spec. 1:22–30; Abstract. Claims 1, 14, and 18 (each directed to a method) are independent. Claim 1, reproduced below, is illustrative of the claimed subject matter:

¹ We use the word Appellant to refer to “applicant” as defined in 37 C.F.R. § 1.42(a). Appellant identifies the real party in interest as General Electric Company. *See* Appeal Br. 3.

² We refer to Appellant’s Specification (“Spec.”), filed Aug. 19, 2015; and Appeal Brief (“Appeal Br.”), filed July 13, 2018. We also refer to the Examiner’s Final Office Action (“Final Act.”), mailed Dec. 28, 2017; and Answer (“Ans.”) mailed Oct. 2, 2018.

³ We note that Appellant’s claim 3 improperly shows dependence on canceled claim 2 and Appellant’s claim 16 improperly shows dependence on canceled claim 15. *See* Appeal Br. 14, 16.

1. A method of operating a hydrocarbon extraction field with the aid of a computer, the method comprising:

programming the computer with a virtual flow meter model, said model written with a notation that represents at least one of mass flow, temperature and pressure at extremities of a plurality of pressure loss elements (PLEs), said PLEs including a plurality of wells located in said hydrocarbon extraction field;

receiving sensor data from sensors installed in association with said PLEs;

providing the sensor data to the computer;

estimating, based on the sensor data, by said computer, using said model, respective mass flow rates from a plurality of said wells; and

controlling elements of the hydrocarbon extraction field based at least in part on said estimated mass flow rates.

Appeal Br. 14 (Claims App.).

REFERENCES

The prior art relied upon by the Examiner is:

| Name | Reference | Date |
|------------------|--------------------|--------------|
| Li et al. (“Li”) | US 2013/0110485 A1 | May 2, 2013 |
| Rashid | US 2014/0094974 A1 | Apr. 3, 2014 |

Yeboah Gyasi-Agyei, *Hydraulic Modelling of Drip Irrigation Systems Used for Grass Establishment on Steep Slopes*, vol. 96, pp. 159–169, WIT Transactions on Ecology and the Environment (Aug. 2006) (“Gyasi-Agyei”).

REJECTIONS⁴

1. The Examiner rejects claims 1, 7–11, 14, and 17–19 under 35 U.S.C. § 102(a)(1) as being anticipated by Rashid. *See* Final Act. 2–9.⁵

2. The Examiner rejects claims 12 and 13 under 35 U.S.C. § 103 as being unpatentable over Rashid and Gyasi-Agyei. *See* Final Act. 9–11.

3. The Examiner rejects claims 3–6, 16, and 20 under 35 U.S.C. § 103 as being unpatentable over Rashid and Li. *See* Final Act. 12–16.

ANALYSIS

Appellant argues independent claims 1, 14, and 18, and dependent claims 7–11, 17, and 19 together as a group with respect to the § 102(a)(1) rejection. *See* Appeal Br. 12. Appellant does not provide separate arguments with respect to the rejections of claims 3–6, 12, 13, 16, and 20. *See* Appeal Br. 12–13. We select independent claim 1 as representative of Appellant’s arguments with respect to claims 1, 3–14, and 16–20. 37 C.F.R. § 41.37(c)(1)(iv).

Anticipation Rejection of Claims 1, 7–11, 14, and 17–19

The Examiner rejects independent claim 1 as anticipated by Rashid. *See* Final Act. 2–4; Ans. 3–4. Appellant contends Rashid does not disclose the disputed features of claim 1—“receiving sensor data from sensors installed in association with” “pressure loss elements (PLEs),” “providing

⁴ The Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112–29, 125 Stat. 284 (2011), amended 35 U.S.C. §§ 102, 103. Because the present application has an effective filing date (Aug. 19, 2015) after the AIA’s effective date for applications (March 16, 2013), this decision refers 35 U.S.C. §§ 102(a)(1) and 103.

⁵ The Examiner’s statement of the rejection includes canceled claim 15. *See* Final Act. 2. We find this typographical error to be harmless and revise the statement of rejection to omit claim 15.

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the sensor data to [a] computer,” “estimating, based on the sensor data, by [the] computer, using” “a virtual flow meter model,” “respective mass flow rates from a plurality of . . . wells,” and “controlling elements of [a] hydrocarbon extraction field based at least in part on [the] estimated mass flow rates” (Appeal Br. 14 (Claims App.) (claim 1)). Appeal Br. 7–8; *see* Appeal Br. 7–12. Specifically, Appellant contends that:

Rashid does not disclose anything akin to the receiving sensor data from sensors installed in association with said PLEs; providing the sensor data to the computer; and estimating, based on the sensor data, by said computer, using said model, respective mass flow rates from a plurality of said wells; and controlling elements of said equipment installation based at least in part on said estimated mass flow rates elements.

Appeal Br. 8; *see* Appeal Br. 8–9.

We adopt as our own (1) the findings and reasons set forth by the Examiner in the action from which this appeal is taken (Final Act. 2–4) and (2) the reasons set forth by the Examiner in the Examiner’s Answer (Ans. 3–4) in response to Appellant’s Appeal Brief. We concur with the findings and conclusions reached by the Examiner, and we provide the following analysis for emphasis.

Rashid describes, as explained by the Examiner, a flow simulation model (Rashid ¶ 41), and simulators (e.g., reservoir simulator) (Rashid ¶ 56), that predict flow rates, temperature profiles, and pressure. *See* Final Act. 3 (citing Rashid ¶¶ 41, 56); Ans. 3–4 (citing Rashid ¶¶ 55, 56). We agree with the Examiner that Rashid discloses “a virtual flow meter model” (claim 1), which “is an estimator which attempts to compute relevant properties of a fluid by combining real-time measured data and a variety of models that relate the relevant fluid properties to the measured data” (Spec. 5:7–9), in that Rashid describes a flow simulation model and reservoir simulator that

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determine, simulate, or predict hydrocarbon flow (“reservoir simulator **228** may be configured to solve for hydrocarbon flow rate through a reservoir and into one or more wellbores” (Rashid ¶ 56)). *See* Rashid ¶¶ 36, 41, 56. Rashid also describes pressure loss elements (PLEs), which “may include a plurality of wells located in the hydrocarbon extraction field” (Spec. 1:24–25), as Rashid describes wells (wellbores) and reservoirs. *See* Rashid ¶¶ 35, 46, 56. Rashid further describes sensors, receiving sensor data from sensors, and providing the sensor data to a computer (the surface unit). *See* Final Act. 3 (citing Rashid ¶¶ 52–53); Ans. 3–4 (citing Rashid ¶¶ 52–55). Rashid additionally describes controlling elements of the equipment installation or hydrocarbon extraction field using a controller. *See* Final Act. 3 (citing Rashid ¶¶ 45, 54, 57, 58); Ans. 3–4 (citing Rashid ¶¶ 53–54).

Accordingly, Rashid discloses the disputed features of claim 1—“receiving sensor data from sensors installed in association with” “pressure loss elements (PLEs),” “providing the sensor data to [a] computer,” “estimating, based on the sensor data, by [the] computer, using” “a virtual flow meter model,” “respective mass flow rates from a plurality of . . . wells,” and “controlling elements of [a] hydrocarbon extraction field based at least in part on [the] estimated mass flow rates” (Appeal Br. 14 (Claims App.) (claim 1)). Appellant’s generalized contentions that Rashid does not disclose the disputed features (*supra*) do not persuasively explain how the Examiner’s findings are erroneous. Additionally, Appellant did not file a Reply Brief addressing the Examiner’s clarified findings with respect to Rashid and the disputed limitations of claim 1 (*see* Ans. 3–4), or otherwise rebutting the findings and responsive arguments made by the Examiner in the Answer.

To the extent Appellant argues that the disputed features of claim 1 are not identically disclosed in Rashid as arranged in the claims (*see* Appeal Br. 8–12), we disagree. “Anticipation is a factual question.” *Microsoft Corp. v. Biscotti, Inc.*, 878 F.3d 1052, 1068 (Fed. Cir. 2017). We find, as did the Examiner (*supra*), that the disputed features are disclosed in Rashid as arranged in claim 1 (*see* discussion *supra*). Further, even if the disputed features are not identically disclosed in Rashid as arranged in claim 1, Rashid need not “expressly spell out all limitations combined as in the claim if a [person ordinarily skilled in the art] would at once envisage the arrangement or combination.” *Biscotti*, 878 F.3d at 1069.

Accordingly, we find a preponderance of the evidence supports the Examiner’s finding that Rashid anticipates the disputed limitations of claim 1. Therefore, we affirm the Examiner’s anticipation rejection of independent claim 1, independent claims 14 and 18, and dependent claims 7–11, 17, and 19, not separately argued with particularity (*supra*). *See* 37 C.F.R. § 41.37(c)(1)(iv).

Obviousness Rejections of Claims 3–6, 12, 13, 16, and 20

The Examiner rejects claims 12 and 13 over Rashid and Gyasi-Agyei. *See* Final Act. 9–11. The Examiner also rejects claims 3–6, 16, and 20 over Rashid and Li. *See* Final Act. 12–16. Appellant does not address the obviousness rejections in detail or the individual claims with specificity. *See* Appeal Br. 12–13. Thus, we are not persuaded of error in the Examiner’s obviousness rejections of claims 3–6, 12, 13, 16, and 20 for the same reasons set forth with respect to claim 1 (*supra*). Therefore, we affirm the Examiner’s obviousness rejections of claims 3–6, 12, 13, 16, and 20.

CONCLUSION

Appellant has not shown that the Examiner erred in rejecting claims 1, 7–11, 14, and 17–19 under 35 U.S.C. § 102(a)(1). Appellant has also not shown that the Examiner erred in rejecting claims 3–6, 12, 13, 16, and 20 under 35 U.S.C. § 103. We, therefore, sustain the Examiner’s rejection of claims 1, 3–14, and 16–20.

DECISION SUMMARY

In summary:

| Claims Rejected | 35 U.S.C. § | Reference(s)/ Basis | Affirmed | Reversed |
|------------------------|--------------------|----------------------------|--------------------|-----------------|
| 1, 7–11, 14, 17–19 | 102(a)(1) | Rashid | 1, 7–11, 14, 17–19 | |
| 12, 13 | 103 | Rashid, Gyasi-Agyei | 12, 13 | |
| 3–6, 16, 20 | 103 | Rashid, Li | 3–6, 16, 20 | |
| Overall Outcome | | | 1, 3–14, 16–20 | |

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). See 37 C.F.R. § 41.50(f).

AFFIRMED