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BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte STEPHAN CRAIG MOEN,
JACK PATRICK NOONAN, and PRADIP SAHA

Appeal 2011-000606
Application 11/777,377
Technology Center 3600

Before JAMES P. CALVE, NEIL T. POWELL, and JILL D. HILL, *Administrative Patent Judges*.

CALVE, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Appellants appeal under 35 U.S.C. § 134 from the rejection of claims 1-9 and 18-25. App. Br. 4. Claims 10-17 are cancelled. *Id.* We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM-IN-PART.

CLAIMED SUBJECT MATTER

Claims 1, 9, 18, and 23 are independent. Claim 1 is reproduced below:

> 1. A system for controlling the power level of a natural circulation boiling water nuclear reactor (NCBWR), said system comprising:
>
> a heating subsystem for heating feedwater flowing into an annulus of a NCBWR, the heating subsystem including a steam diversion line configured to receive steam generated by a core of the NCBWR, and a steam bypass valve configured to control a flow of the steam in the steam diversion line, wherein the steam received by the steam diversion line has not passed through a turbine;
>
> a temperature sensor operable to sense the temperature of the feedwater flowing into the annulus; and
>
> a controller configured to control a power output level of the NCBWR by controlling the heating subsystem, based on the sensed temperature, to adjust the temperature of the feedwater flowing into the annulus to a desired temperature, wherein the steam bypass valve is configured to be controlled by the controller and controlling the heating subsystem includes controlling the steam bypass valve.

REJECTIONS

Claims 1-4, 6, 8, and 18-23 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Collett (US 4,150,546; iss. Apr. 24, 1979) and Chaki (US 2007/0000250 A1; pub. Jan. 4, 2007).

Claim 7 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Collett, Chaki, Suzuki (US 4,877,574, iss. Oct. 31, 1989), and Kitou (US 2005/0220253 A1; pub. Oct. 6, 2005).

Claims 9, 24, and 25 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Suzuki and Kitou.

ANALYSIS

Claims 1-4, 6, 8, and 18-23 unpatentable over Collett and Chaki

Claims 1-4, 6, 8, and 23

Regarding claims 1 and 23, the Examiner found that Collett discloses a system for controlling the power level of a boiling water reactor (BWR) with a bypass valve 62 configured to be controlled by a controller 60 based on temperature but lacks a temperature sensor that is operable to sense the temperature of feedwater flowing into the annulus of the reactor. Ans. 4-5, 11-12. The Examiner found that Chaki discloses a temperature sensor that is operable to sense the temperature of feedwater flowing into the annulus and determined that it would have been obvious to include this feature in Collett to monitor the temperature of feedwater entering the reactor and verify that the temperature is maintained at a preset value. Ans. 5. The Examiner also found that Collett teaches a steam bypass valve configured to be controlled by a controller based on pressure and temperature. Ans. 18.

Appellants argue that Collett does not teach a temperature sensor that senses a temperature of feedwater that flows into the reactor annulus, as the Examiner acknowledges, and Chaki does not remedy this deficiency. App. Br. 17-18. Appellants contend that the Examiner has asserted that Chaki remedies the deficiencies of Collett because pressure and temperature are directly related and the controller of Collett controls the power output level based on pressure so it inherently controls the power output level based on temperature. App. Br. 18; Reply Br. 6-8. Appellants also assert that Collett teaches that secondary flow control valve 62 is configured to be controlled by regulator 60 based on the pressure of the steam, which is not inherently related to the temperature of steam at that location. Reply Br. 6-7.

These arguments do not apprise us of error in the Examiner's finding that Chaki discloses a temperature sensor operable to sense the temperature of feedwater flowing into the annulus of a reactor or the Examiner's determination that it would have been obvious to include such a temperature sensor in the system of Collett to verify that the temperature is maintained at a preset value as taught by Chaki. Ans. 4-5 (citing Chaki, para. [0074]). The Examiner noted that Collett is considered to inherently disclose controlling a steam bypass valve based on pressure and temperature (Ans. 4) but emphasized that the rejection of claims 1 and 23 was based on Chaki's temperature sensor in combination with Collett's system. Ans. 18. Appellants have not persuaded us of error in the Examiner's findings or determination of obviousness or explained how the Examiner's observations about Collett's pressure sensor undermines the Examiner's findings and determination of obviousness as set forth in the Answer. We sustain the rejection of claims 1-4, 6, 8, and 23.

Claims 18-22

Regarding claim 18, the Examiner found that Chaki teaches a system for controlling the power level of a BWR except for teaching that the flow of steam into the feedwater heater has not passed through a turbine. Ans. 8-9. The Examiner found that Collett feeds steam into a feedwater heater 68 from a steam heater without passing through a turbine 5, 6 and determined that it would have been obvious to include such a bypass line in Chaki to facilitate bypass of the turbine during failure. Ans. 9.

Appellants argue that Chaki and Collet operate differently and differ structurally and the Examiner has arbitrarily pointed to Collett, which does not operate under the same principle as Chaki, and asserted that it would

have been obvious for steam supplied to the feedwater heater 9 to have not passed through the turbine. App. Br. 20. In particular, Appellants argue that the system of Chaki manages power uprating by measuring the temperature of the feedwater entering the reactor for the purpose of adjusting the coolant enthalpy whereas the system of Collett accommodates changes in demand by monitoring the pressure of the steam exiting the reactor. *Id.* As a result, Appellants argue that the proposed combination and modification are the result of impermissible hindsight. *Id.* These arguments do not apprise us of error in the Examiner's finding and determination of obviousness as set forth in the Answer. It is not necessary that inventions of references be physically combinable to render obvious the invention under review. *See In re Mouttet*, 686 F.3d 1322, 1332 (Fed. Cir. 2012) (citations omitted); *see also* Ans. 19 (citation omitted). The Examiner's reason for including Collett's bypass on Chaki is supported by a rational underpinning of facilitating bypass of the turbine during failure and Appellants have not persuaded us of error in that determination or explained why the alleged different manner of operation of Collett and Chaki undermines the Examiner's findings or determination of obviousness. We sustain the rejection of claims 18-22.

Claim 7 unpatentable over Collett, Chaki, Suzuki, and Kitou

The Examiner relied on Suzuki and Kitou to disclose features of claim 7, which depends from claim 1. Ans. 13-14. Appellants argue that Suzuki and Kitou fail to remedy the deficiencies of Collett and Chaki as to claim 1. App. Br. 21. Because there are no deficiencies to cure for claim 1, we sustain the rejection of claim 7.

Claims 9, 24, and 25 unpatentable over Suzuki in view of Kitou

The Examiner found that Suzuki discloses a system for controlling the power level of a natural circulation boiling water nuclear reactor (NCBWR) including a feedwater bypass valve 14 operable to receive commands from a temperature controller 25 to control a flow of the feedwater through a heater bypass line 10 to the annulus 4 to decrease the temperature of the feedwater flowing into the annulus 4. Ans. 14-15. The Examiner found that Suzuki fails to teach a plurality of principal feedwater heaters but Kitou teaches this feature (figure 4) and determined that it would have been obvious to include a plurality of principal feedwater heaters in Suzuki to heat feedwater from high and low pressure turbines to extract more energy from the steam and increase efficiency. Ans. 15-16. The Examiner reasoned that when Suzuki is combined with Kitou, the valve 14 of Suzuki is considered a bypass valve. Ans. 20. The Examiner also found that a skilled artisan would understand from Figure 4 of Kitou that there is a bypass valve at the branch of bypass line 11 between feedwater heater 9 and pump 8 even though Figure 4 does not show any valve in line 11. Ans. 20.

Appellants argue that Suzuki discloses a flow rate regulating valve 14 and this valve does not allow feedwater to bypass anything and return pipe 10 is not a heater bypass line as the Examiner found because return pipe 10 feeds directly into heater 15 as opposed to bypassing it. App. Br. 21-22. As a result, Appellants argue that the Examiner's interpretation is inconsistent with the ordinary meaning of these terms. App. Br. 22.

The Examiner's finding that Suzuki discloses a feedwater bypass valve is not supported by a preponderance of evidence. Suzuki discloses that valve 14 is a flow regulating valve in the return pipe 10 from the turbine

condenser 9 to a cooling water descending passage 4 in the reactor pressure vessel 1. Col. 4, ll. 1-10; fig. 1. Water flows from flow rate regulating valve 14 directly into heater 15 and then into the reactor 1. We find no disclosure in Suzuki that the flow rate control valve 14 controls a flow of feedwater through a heater bypass line as recited in claim 9 and the Examiner has not pointed to any such disclosure or explained how combining Kitou's plurality of feedwater heaters with Suzuki would result in flow rate control valve 14 operating as a bypass valve. Nor has the Examiner established that Kitou discloses a bypass valve in feedwater bypass line 11. *See In re Robertson*, 169 F.3d 743, 745 (Fed. Cir. 1999) ("Inherency . . . 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.") (internal citation and quotations omitted). We cannot sustain the rejection of claims 9, 24, and 25.

DECISION

We AFFIRM the rejection of claims 1-8 and 18-23 and REVERSE the rejection of claims 9, 24, and 25.

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-IN-PART

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