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POLSINELLI PC
900 WEST 48TH PLACE
SUITE 900
KANSAS CITY, MO 64112-1895

EXAMINER	
LAU, JASON	

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte MARK JOSEPH MATHIS

Appeal 2019-002888
Application 14/800,562
Technology Center 3700

Before MICHAEL J. FITZPATRICK, LISA M. GUIJT, and
LEE L. STEPINA, *Administrative Patent Judges.*

STEPINA, *Administrative Patent Judge.*

DECISION ON APPEAL

STATEMENT OF THE CASE

Pursuant to 35 U.S.C. § 134(a), Appellant[1] appeals from the Examiner's decision to reject claims 1–12, 15–17, and 35–45.[2] We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM-IN-PART.

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[1] We use the word Appellant to refer to "applicant" as defined in 37 C.F.R. § 1.42. Appellant identifies the real party in interest as Confluence Energy, LLC. Appeal Br. 3.

[2] Claims 13, 14, and 18–34 are cancelled. Claims App. ii.

CLAIMED SUBJECT MATTER

The claims are directed to a system for producing activated carbon. Spec. ¶ 15.

Claim 1, reproduced below, is illustrative of the claimed subject matter.

> 1. A system for pyrolysis of a biomass, the system comprising:
>
> a furnace comprising a combustion chamber, the furnace configured for generating thermal energy from combustion within the combustion chamber and supplying the thermal energy to at least one operation within a biomass facility; and
>
> a reactor comprising a pyrolysis chamber configured to house a preprocessed biomass feedstock therein, the pyrolysis chamber comprising a tubular body that is vertically positioned at least partially within the combustion chamber of the furnace such that the preprocessed biomass feedstock is pyrolyzed by the thermal energy within the combustion chamber of the furnace, the pyrolysis chamber comprising an auger disposed vertically within the tubular body, the auger comprising a shaft extending a length and flighting extending from the shaft and extending at least a portion of the length of the shaft, the auger configured for mixing at least a portion of the preprocessed biomass feedstock within the pyrolysis chamber.

Claims App. i.

REFERENCES

The prior art relied upon by the Examiner is:

Name	Reference	Date
Sanga	US 3,875,077	Apr. 1, 1975
Bridle	US 4,618,735	Oct. 21, 1986
White	US 5,181,989	Jan. 26, 1993
McMullen	US 5,589,599	Dec. 31, 1996
Ballantine	US 2003/0010266 A1	Jan 16, 2003
Hopkins	US 2009/0250331 A1	Oct. 8, 2009
Coates	US 2012/0063965 A1	Mar. 15, 2012
Siemons	US 2013/0011803 A1	Jan. 10, 2013
Carney	US 2013/0153395 A1	June 20, 2013

REJECTIONS

I. Claims 1–4, 12, 15, 16, and 36 are rejected under 35 U.S.C. § 103(a) as unpatentable over Sanga, Siemons, and McMullen.[3]

II. Claims 5–10 are rejected under 35 U.S.C. § 103(a) as unpatentable over Sanga, Siemons, McMullen, and Coates. [4]

III. Claim 11 is rejected under 35 U.S.C. § 103(a) as unpatentable over Sanga, Siemons, McMullen, and Ballantine.

IV. Claim 17 is rejected under 35 U.S.C. § 103(a) as unpatentable over Sanga, Siemons, McMullen, and Carney.

V. Claims 37–39 are rejected under 35 U.S.C. § 103(a) as unpatentable over Sanga, Siemons, and Bridle.

VI. Claims 42–44 are rejected under 35 U.S.C. § 103(a) as unpatentable over Sanga, Siemons, Bridle, and McMullen.[5]

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[3] The heading for this rejection includes claims 28, 31, and 32, which are cancelled. *See* Final Act. 2; Claims App. ii.
[4] The heading for this rejection includes claims 18–20, 23, 26, 27, 29, and 30, which are cancelled. *See* Final Act. 6; Claims App. ii.
[5] The Examiner objected to claims 43 and 44 as being duplicates of each other. Final Act. 2. Appellant argues that we should address this objection.

VII. Claim 35 is rejected under 35 U.S.C. § 103(a) as unpatentable over Sanga, Siemons, McMullen, and White.

VIII. Claims 40 and 41 are rejected under 35 U.S.C. § 103(a) as unpatentable over Sanga, Siemons, Bridle, and Hopkins.

IX. Claim 45 is rejected under 35 U.S.C. § 103(a) as unpatentable over Sanga, Siemons, Bridle, and White.

OPINION

Rejection I– Sanga, Siemons, and McMullen

Claims 1–4, 12, 15, and 16

The Examiner finds that Sanga discloses many of the elements recited in independent claim 1, including a pyrolysis chamber comprising a tubular body. Final Act. 2–3. However, the Examiner finds Sanga does not disclose an auger disposed vertically within the tubular body, along with the functional language further limiting the auger. *Id.* at 3. To address this deficiency, the Examiner turns to McMullen, finding this reference teaches a pyrolysis chamber including an auger (6, 8, Fig. 4) disposed within a tubular body and configured for mixing at least a portion of preprocessed biomass feedstock within the pyrolysis chamber. *Id.* The Examiner reasons that it would have been obvious to modify the system of Sanga to further include an auger disposed vertically within the tubular body (i) to promote

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Appeal Br. 5. However, generally, objections are matters to be addressed via petition, not appeal, unless they implicate another rejection subject to appeal. The Examiner's objection does not involve another rejection on appeal. Accordingly, we do not address the objection of claims 43 and 44.

uniformity in the feedstock, i.e., to provide agitation, (ii) to prevent clogging of rotary valve 4 of Sanga's system, (iii) to scrape feedstock from the inner wall of the reactor in Sanga, and (iv) to regulate the movement of the feedstock and to prevent clumping in the bottom of the reactor. *Id.* at 3–4.

Appellant argues the Examiner's proposed modification changes the principle of operation in Sanga's system. Appeal Br. 6–8. In support of this contention, Appellant notes that the system in McMullen uses auger 6, 8 to transport material horizontally in a continuous pyrolysis plant, and, in contrast, the system of Sanga is a closed system in which material is fed into a vertical reaction chamber. *Id.* at 7. Appellant asserts the Examiner's proposed modification to include an auger disposed vertically within the tubular body of Sanga's pyrolysis chamber would "involve additional design considerations and possibly inoperability of its system," and that "[p]erhaps most significantly, adding an auger to the Sanga device without significant modifications would break the reaction chamber 1, clearly rendering the device unsatisfactory for its intended purpose, in which case there is no suggestion or motivation to make the proposed modification." *Id.* Appellant also contends the proposed modification would force feedstock against rotary valve 4 "eventually breaking the valve 4 and the system, generally," and the structure of valves 3, 4 would interfere with removal or operation of the added auger. *Id.* 7–8. Appellant further argues that, in the Examiner's proposed modification, "motors would need to be added into the Sanga system as part of the redesign," and "[s]uch a redesign would also change the basic principle of the gravity-fed Sanga design." *Id.* at 8.

In response, the Examiner finds that the principle of operation in Sanga's system is that feedstock delivered at an inlet is pyrolyzed by heat

supplied by a combustion chamber, and the pyrolyzed product is then removable via valve 4 and auger 5. Ans. 16. The Examiner finds that this principle is not changed by adding an additional auger disposed vertically within the already vertically-oriented tubular body of Sanga's pyrolysis chamber. *Id.*

The Examiner has the better position on this issue. The Examiner's proposed modification to Sanga's system may involve certain mechanical changes to accommodate the vertically oriented auger within chamber 1, but we see no reason such changes would change Sanga's principle of operation. Specifically, after the Examiner's proposed modification, Sanga would still pyrolyze the same material using the same heat source in the same vertically-oriented pyrolysis chamber. Further, the mere fact that certain changes may be required does not mean the Examiner's proposed modification would not have been obvious. An assessment of the propriety of a proposed combination of the teachings of the prior art must not "ignore the modifications that one skilled in the art would make to a device borrowed from the prior art." *In re ICON Health and Fitness, Inc.*, 496 F.3d 1374, 1382 (2007).

Nor would such changes be beyond the level of one of ordinary skill in the art. Indeed, as Appellant points out (*see* Appeal Br. 7; Reply Br. 2), Sanga already uses "screw conveyor" 5 beneath chamber 1 for removal of material after processing. Adding an auger within the chamber, as proposed by the Examiner, would appear to involve similar considerations.

Appellant next argues that the proposed modification is based on improper hindsight because "Sanga makes no mention of an auger or other type of agitation mechanism within the reaction chamber 1," and "[t]he

purpose of the auger 6, 8 is to transport feedstock horizontally in a continuous pyrolysis plant system." Appeal Br. 9. Appellant states, "[t]here is no teaching, suggestion, or motivation from Sanga that it would be beneficial to add a vertically oriented auger in the reaction chamber 1." *Id.*

The Examiner's reasoning for the proposed modification is based, in part, on promoting uniformity in the feedstock and regulating its movement. *See* Final Act. 8. The Examiner cites column 21, lines 51–54 of McMullen in support of the rejection. Final Act. 3. McMullen states "[t]urbulence is also important as an operating parameter within the present pyrolytic apparatus. As is shown in FIG. 4, notches defined within flight 102 of the augers 6, 8, 10 are preferred for increasing turbulence within the retorts." McMullen, 21:51–54. Thus, McMullen teaches the importance of turbulence in a pyrolytic apparatus. This teaching in McMullen provides adequate underpinning for the Examiner's rationale based on promoting uniformity in the feedstock, regulating its movement, and preventing clumping in the bottom of the reactor. Accordingly, we do not agree that the Examiner's reasoning is based on impermissible hindsight.

We have considered all of Appellant's arguments in support of the patentability of claim 1, but find them unavailing. Accordingly, we sustain the rejection of claim 1. Appellant does not make arguments for the patentability of claims 2–4, 12, 15, and 16 aside from the arguments presented for claim 1, and therefore, we also sustain the Examiner's rejection of claims 2–4, 12, 15, and 16, as unpatentable over Sanga, Siemons, and McMullen. Appeal Br. 9.

Claim 36

Claim 36 recites, in part, "a motor operably coupled to the auger, the motor configured to vertically displace the auger within the pyrolysis chamber." Claims App. ii.

The Examiner finds "McMullen teaches a motor coupled to the auger to drive the auger." Final Act. 5 (citing McMullen, 7:18–19). The Examiner reasons it would have been obvious to a person of ordinary skill in the art "to modify Sanga to further comprise a motor operably coupled to the auger, the motor configured to vertically displace the auger within the pyrolysis chamber so as to vertically displace the preprocessed biomass feedstock housed therein . . . to provide for automatic hands-free operation." *Id.* at 5–6.

Appellant argues "McMullen simply does not describe a motor configured to vertically displace the auger, and, instead, merely rotates its auger." Appeal Br. 10.

In response, the Examiner asserts that Appellant is attacking the references individually, and that "Sanga discloses a vertical chamber. McMullen teaches an auger (similar to the auger of Appellant's invention) housed in a tubular chamber wherein the threads/twists/flights are movable horizontally so as to horizontally displace the preprocessed feedstock housed therein." Ans. 19. The Examiner then concludes that the proposed combination meets all the limitations of claim 36. *Id.*

Appellant has the better position. Claim 36 requires a motor configured to cause the auger itself to displace vertically, not merely that the auger rotate to cause material within the chamber to move vertically. The Examiner does not explain how adding the auger disclosed in McMullen to the chamber disclosed by Sanga would satisfy this requirement or, to the

extent further modification is required to make the auger displace in the vertical direction, what this modification would be or how it relates to providing automatic hands-free operation. *See* Final Act. 5–6. Accordingly, we do not sustain the rejection of claim 36 as unpatentable over Sanga, Siemons, and McMullen.

Rejections II–IV

Sanga, Siemons, McMullen, Coates, Ballantine, and Carney

Appellant does not make arguments for the patentability of claims 5–10, 11, and 17 aside from those discussed above regarding claim 1. *See* Appeal Br. 10–11. Accordingly, for the same reasons, we sustain the Examiner's decision to reject claims 5–10, 11, and 17.

Rejection V—Sanga, Siemons, and Bridle

The Examiner finds Sanga teaches most of the elements required by independent claim 38, including providing a direct conduit between a top portion of the pyrolysis chamber and a bottom portion of the combustion chamber for volatiles to move from the pyrolysis chamber to the combustion chamber. Final Act. 9 (referring to conduit 6). However, the Examiner finds conduit 6 of Sanga does not satisfy the requirement that this component have no intervening connections to conduits from outside the combustion chamber. *See id.* Nonetheless the Examiner finds that Bridle teaches pipe 56 extends entirely within chamber 12b. *Id.*; *see also* Ans. 20. The Examiner determines that, in light of the teachings of Bridle, it would have been obvious to modify conduit 6 of Sanga to be entirely within

Sanga's combustion chamber to make the system "more compact, easier to transport, and less likely to break during transport." Final Act. 10.

Appellant argues that, contrary to the requirements of claim 38, (i) pipe 56 of Bridle exits and re-enters enclosure 10 and (ii) this pipe does not permit passage of volatiles into the combustion chamber. Appeal Br. 12.

The Examiner responds, noting that Sanga discloses that conduit 6 allows volatile gases to pass into combustion chamber 2, and "Bridle was used to teach where the conduit 56 for removing gases from the tubular pyrolysis chamber 10 is located inside the combustion chamber (12)." Ans. 20. The Examiner reiterates this point, stating, "Bridle was only used to teach the technique of confining a conduit for volatiles to be within the combustion chamber, and not to teach each and every limitation of claim 38." *Id.*

Appellant's argument raises the issue of whether the proposed combination of the teachings in Sanga, Siemons, and Bridle meets all the limitations of claim 38. The Examiner's proposed modification is to place conduit 6 of Sanga entirely within combustion chamber 2. *See* Final Act. 10; Ans. 20. This modification does not appear to remedy the deficiency the Examiner finds exists in Sanga's system, namely, that conduit 6 as disclosed by Sanga includes an intervening connection. *See* Final Act. 9; Sanga, Fig. 1 (air supply pipe 12). In other words, even when conduit 6 is modified to be entirely within combustion chamber 2, conduit 6 would still suffer from the deficiency the Examiner refers to on page 9 of the Final Office Action. Accordingly, we do not sustain the rejection of claim 38, and claims 37 and 39 depending therefrom, as unpatentable over Sanga, Siemons, and Bridle.

Rejection VII—Sanga, Siemons, McMullen, and White

Appellant does not make arguments for the patentability of claim 35 aside from those discussed above regarding claim 1, from which claim 35 depends. *See* Appeal Br. 10–11. Accordingly, for the same reasons, we sustain the rejection of 35.

Rejections VI, VIII, and IX

Sanga, Siemons, Bridle, McMullen, White, and Hopkins

All of the claims rejected in Rejections VI, VIII, and IX depend, directly or indirectly, from independent claim 38, which is addressed in our discussion of Rejection V. The Examiner does not use the teachings of McMullen, White, and Hopkins in any manner that would remedy the deficiency discussed above regarding Rejection V. Accordingly, for the same reasons, we do not sustain the rejection of claims 40–45, pursuant to Rejections VI, VIII, and IX.

CONCLUSION

The Examiner's rejections are AFFIRMED-IN-PART.

DECISION SUMMARY

In summary:

Claims Rejected	35 U.S.C. §	Basis	Affirmed	Reversed
1–4, 12, 15, 16, 36	103	Sanga, Siemons, McMullen	1–4, 12, 15, 16	36
5–10	103	Sanga, Siemons, McMullen, Coates	5–10	
11	103	Sanga, Siemons, McMullen, Ballantine	11	
17	103	Sanga, Siemons, McMullen, Carney	17	
37–39	103	Sanga, Siemons, Bridle		37–39
42–44	103	Sanga, Siemons, Bridle, McMullen		42–44
35	103	Sanga, Siemons, McMullen, White	35	
40, 41	103	Sanga, Siemons, Bridle, and Hopkins		40, 41
45	103	Sanga, Siemons, Bridle, White		45
Overall Outcome			1–12, 15–17, 35	36–45

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