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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte GAVIN JAMES BOYLE, ZAMIR ALAM, REID BAYLY, MICHAEL DAVID THEODOULOU, and HONGDE ZHOU

Appeal 2019-001292
Application 14/442,807
Technology Center 1700

Before MICHAEL P. COLAIANNI, MONTÉ T. SQUIRE, and SHELDON M. McGEE, *Administrative Patent Judges*.

COLAIANNI, *Administrative Patent Judge*.

DECISION ON APPEAL

Pursuant to 35 U.S.C. § 134(a), Appellant[1] appeals from the Examiner's decision to reject claims 1–6, 9, 12, 13, 16, 18, and 19. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM IN PART.

[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 BL Technologies, Inc. Appeal Br. 3.

Appellant's invention is directed to a gas delivery device for use in supplying bubbles to inhibit fouling of an immersed filtering membrane (Spec. ¶ 2; Claim 1).

Claim 1 is representative of the subject matter on appeal:

> 1. A method of air scouring an immersed membrane comprising adjusting one or more aeration parameters: between successive permeation, back pulse or relaxation cycles; during a permeation cycle; or between a permeation cycle and a backpulse or relaxation cycle wherein air scouring during the backpulse or relaxation cycle comprises releasing a series of bursts of bubbles.

Appellant appeals the following rejections:

1. Claims 1, 4–6, and 9 are rejected under 35 U.S.C. § 103 as unpatentable over Cote (US 6,245,239 B1; iss. June 12, 2001 (U.S. equivalent to WO 00/21890 A1; publ. Apr. 20, 2000)) in view of Cumin (US 2011/0049047 A1; publ. Mar. 3, 2011).
2. Claims 2, 12, 13, and 16 are rejected under 35 U.S.C. § 103 as unpatentable over Cote in view of Cumin, and Suzuki (US 2006/0260998 A1; publ. Nov. 23, 2006).
3. Claims 3, 18, and 19 are rejected under 35 U.S.C. § 103 as unpatentable over Cote in view of Cumin, Suzuki and Thayer (US 3,424,443; iss. Jan. 28, 1969).

Appellant argues each claim separately (Appeal Br. 6–17).

FINDINGS OF FACT & ANALYSIS

The Examiner's findings and conclusions regarding the rejection of claims 1, 4-6, and 9 over Cote in view of Cumin are located on pages 3 to 5 of the Final Action.

Claim 1

Appellant argues that Cote does not teach that air scouring during the backpulse or relaxation cycle comprises releasing a series of bursts of bubbles (Appeal Br. 6). Appellant contends that aeration is continuous during the backpulse cycle in the column 8, lines 23 to 38 example relied upon by the Examiner (Appeal Br. 6). Appellant contends that Cote discloses several different embodiments, two of which are the intermittent aeration process relied upon by the Examiner and an intense aeration process (Appeal Br. 7–8). Appellant contends that Cumin's disclosure of avoiding the rapid valve switching in Cote relates to the intense aeration process such that the Examiner's reason for modifying the intermittent aeration process to avoid rapid valve switching is no reason to modify the intermittent aeration process relied upon by the Examiner (Appeal Br. 8–9). Appellant argues that the column 8 embodiment relied upon by the Examiner has a 15 minute cycle and does not require rapid valve movements (Appeal Br. 9). Appellant argues that the long period of non-aeration (i.e., 15 minutes) cannot be provided by Cumin's sparger, especially when Cumin's sparger is also required to produce multiple pulses within a 75 second period including membrane relaxation and backwash (Appeal Br. 9).

The Examiner responds that the claims do not specify any aeration duration (Ans. 12). The Examiner finds that it is unclear how Appellant correlated Cumin's aeration of releasing a burst of bubbles lasting about 1 to 2 seconds every 8 seconds to be similar in duration to a 20 second intense aeration cycle in Cote (Ans. 12). The Examiner finds that Appellant has not provided any evidence to substantiate its argument (Ans. 12). The Examiner finds that Cote's column 8 disclosure is merely an example of what the

reference teaches but it is not necessarily the method required by the rejection (i.e., the rejection is not limited solely to that example) (Ans. 13). The Examiner finds that Cote teaches an intermittent aeration, which includes periods of no aeration and periods of aeration (Ans. 13). The Examiner finds that the exemplary times for aeration or no aeration are not controlling in the rejection (Ans. 13). We agree.

Cote discloses intermittent aeration in the context of a particular embodiment that uses "relatively foulant free surface water" (col. 7, ll. 45–58). Cote discloses that the intermittent aeration process is not limited to that embodiment (col. 7, ll. 45–48). In other words, the Examiner correctly finds that Cote discloses that intermittent aeration includes periods of non-aeration with periods of aeration such that embodiments having different parameters are included within Cote's disclosure. Cote is not limited to the 15 minute cycle time intermittent aeration embodiment. Accordingly, the rapid valve movements in Cote remarked as being a concern in Cumin would appear to be relevant to all of Cote's embodiments. Indeed, Cumin incorporates by reference Cote's disclosure in its entirety (Cumin ¶ 3).

Cumin discloses a sparger that provides the desired bursts of large bubbles, while avoiding the rapid valve cycling of Cote (¶¶ 3 to 6). Given Cumin's teachings, we find that the preponderance of the evidence favors the Examiner's conclusion that it would have been obvious to modify Cote's process to use Cumin's sparger in order to release a series of bursts of bubbles to aid membrane cleaning while minimizing rapid valve movements that produce undesirable pressure spikes (Final Act. 4).

Appellant proffers no evidence to substantiate the attorney argument that Cumin's sparger would not work for intermittent aeration, which includes periods of no aeration. Rather, if no aeration is required, the gas supply to the sparger would be simply turned off or the gas flow rate would be reduced to a very low level. Cumin teaches that increasing or decreasing the gas flow rate controls the time between the bubble bursts but it has very little, if any, effect on the duration of the bubble bursts (¶ 19). Cumin teaches by its incorporation by reference of Cote that Cumin's sparger may be used in place of Cote's aeration device and in so doing provides the benefit of avoiding pressure spikes caused by rapid valve movements.

On this record, we affirm the Examiner's § 103 rejection of claim 1.

Claim 4

Appellant argues that the Examiner modifies Cote by replacing the aerator with the sparger of Cumin so that Cote's aerator 238 would not exist in the modified structure of Cote (Appeal Br. 10). Appellant argues that the aerators 238 extend equally from manifolds 251a or 251b such that Cote does not teach each of the multiple flow of pressurized gas traveling a different distance from the manifold (Appeal Br. 10). We agree.

The Examiner finds that Appellant argues bodily incorporation of Cote's and Cumin's teachings and the broadest reasonable interpretation of claim 4 includes different outlets of the conduit aerators 238 in Cote (Ans. 14). The Examiner, however, has not dispensed with the initial burden of establishing a prima facie case of obviousness. The Examiner's claim interpretation that the holes in the aerators 238 of Cote would meet the requirement that the multiple flows of gas travel a different distance from the manifold is unreasonable. As noted by Appellant, each aerator 238 in

Figure 7A of Cote includes a plurality of symmetrically arranged holes. Gas traveling from manifold 251a or 251b to any aerator would travel the same distance from either manifold with the same dispersing of the gas along the path.

On this record, we reverse the Examiner's § 103 rejection of claim 4.

Claim 5

Appellant argues that Cote's column 8, lines 23 to 38 embodiment has the aeration flow rate at every permeation cycle the same (Appeal Br. 10). Appellant contends that the applied prior art does not teach variation between successive permeation cycles (Appeal Br. 10). Appellant argues that claim 5 requires that the aeration flow rate in one permeation cycle varies relative to the aeration flow rate in another permeation cycle (Appeal Br. 11).

The Examiner finds that Cote's column 8 disclosure varies the aeration flow rate between successive permeation cycles (Ans. 14). The Examiner finds that the variation in aeration flow between successive permeation cycles may include a period of backpulse or relaxation (Ans. 14). We agree.

Appellant does not direct us to a portion of the Specification that defines "between successive permeation cycles" as requiring an aeration flow rate variation during each permeation portion of the cycle. Rather, between successive permeation cycles may include steps that occur between each permeation cycle, such as backpulse and relaxation steps. Appellant's claim construction is too narrow and inconsistent with the plain meaning of "between successive permeation cycles."

We affirm the Examiner's § 103 rejection of claim 5 over Cote and Cumin.

Claim 6

Appellant argues that the Examiner's rejection improperly combines Cote's disclosures regarding intense aeration with Cote's disclosure regarding intermittent aeration (Appeal Br. 11). Appellant argues that the Examiner provides no reason for modifying Cote's intermittent embodiment to use the intense aeration flow rates during the permeation step (Appeal Br. 11).

The Examiner finds that Cote teaches several examples of aeration, which include modifying the baseline of the aeration, which may be low or may be zero (Ans. 14). The Examiner finds that such a modification is an obvious alternative to one having ordinary skill in the art. Both may be considered "intermittent" in the sense of alternating the air flow at different times (Ans. 14). We agree.

As noted in our discussion of the rejection of claim 1, the intermittent aeration is not limited to the particular embodiment discussed in the column 8, lines 23 to 38 disclosure. Cote further discloses that the quality of the feed water controls the lower air flow rate for aeration (col. 6, ll. 60–66). Cote discloses that the lower aeration rate is preferably in an air off condition (i.e., no air) but if the membranes foul quickly or the quality of the feed water is poor, the lower aeration rate is usually set to half of the higher aeration rate (col. 6, ll. 66–67). The teachings of Cote as a whole would have suggested that using a lower aeration rate during permeation followed by an increased aeration rate during a backpulse or relaxation cycle to clean the membrane.

On this record, we affirm the Examiner's § 103 rejection of claim 6 over Cote in view of Cumin.

Claims 2, 12, 13, and 16

Appellant argues that the Examiner's rejection of claims 2 and 16 modify the combination of Cote and Cumin to use the tubes 21 of Suzuki (Appeal Br. 12). Appellant argues that the Examiner has not provided any reasons why a skilled person would have modified the intermittent gas sparging device of Cumin to have tubes 21 as in Suzuki (Appeal Br. 12). We agree.

The Examiner states that Appellant argues bodily incorporation (Ans. 15). The Examiner finds that the rejection does not require a replacement in tubes or insertion of tubes into the membranes, but rather a modification of a desired feature (each channel have a single outlet) known in the prior art to achieve a desired membrane cleaning efficiency and decreasing air volume (Ans. 15).

The Examiner does not, however, explain how the single opening channels would have been combined with Cumin's intermittent sparger (Final Act. 6). Rather, the Examiner finds that it would have been obvious to modify Cote to use Suzuki's single outlet (Final Act. 6). The Examiner proposes to modify Cote's aerator to use Cumin's intermittent sparger (Final Act. 4, 6). In light of this omission in the factual basis for the rejection, the Examiner has not dispensed with the initial burden of providing a prima facie case of obviousness. Claims 12 and 13 depend from claim 2 and therefore share the same deficiency with regard to the prima facie case. We reverse the Examiner's § 103 rejection of claims 2, 12, 13, and 16 over Cote in view of Cumin, and Suzuki.

Claims 3, 18, and 19

Appellant argues that the Examiner has not established a prima facie case of obviousness because there is no explanation of how the substitutions from Suzuki and Thayer would have been obvious in the context of a system in which aerators 238 of Cote have been replaced by the intermittent gas sparging device of Cumin (Appeal Br. 15). We agree.

The Examiner's analysis in the rejection of claims 3, 18, and 19 focuses on modifying Cote's aerator 238 to have a port and an outlet as required by the claims (Final Act. 7–9). Claim 3 depends from claim 1 and thus is based on the combination of Cote and Cumin. Therefore, the rejection of claim 3 must include an analysis based on how the modified structure that would have rendered the subject matter of claim 1 obvious, would have been further modified by Suzuki and Thayer. The Examiner provides no such analysis but rather bases the rejection of claim 3 on a hypothetical modification of Cote's aerators 238, which would have been replaced by Cumin's spargers. On this record, the Examiner has not dispensed with establishing a prima facie case of obviousness of the subject matter of claim 3, or claims 18 and 19 that depend therefrom. We reverse the Examiner's § 103 rejection of claims 3, 18, and 19 over Cote in view of Cumin, Thayer, and Suzuki.

CONCLUSION

In summary:

Claims Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
1, 4–6, 9	103	Cote, Cumin	1, 5, 6, 9	4
2, 12, 13, 16	103	Cote, Cumin, Suzuki		2, 12, 13, 16
3, 18, 19	103	Cote, Cumin, Suzuki, Thayer		3, 18, 19
Overall Outcome			1, 5, 6, 9	2–4, 12, 13, 16, 18, 19

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a). *See* 37 C.F.R. § 1.136(a)(1)(iv) (2017).

AFFIRMED IN PART