NOTE: This disposition is nonprecedential.

United States Court of Appeals for the Federal Circuit

TENNANT CO.,
Appellant

v.

OXYGENATOR WATER TECHNOLOGIES, INC.,
Appellee

2022-2304

Appeal from the United States Patent and Trademark Office, Patent Trial and Appeal Board in No. IPR2021-00625.

Decided: July 23, 2024

OLIVER RICHARDS, Fish & Richardson P.C., San Diego, CA, argued for appellant. Also represented by NITIKA GUPTA FIORELLA, DOUGLAS E. MCCANN, JOSEPH B. WARDEN, Wilmington, DE.

J. DEREK VANDENBURGH, Carlson, Caspers, Vandenburgh & Lindquist, P.A., Minneapolis, MN, argued for appellee. Also represented by NATHAN D. LOUWAGIE, HANNAH MOSBY O'BRIEN, AARON W. PEDERSON.

Before DYK, REYNA, and STOLL, *Circuit Judges*.

DYK, *Circuit Judge*.

Tennant Co. ("Tennant") appeals from a decision of the Patent and Trial Appeal Board ("Board") finding that claims 13, 14, and 17–27 of U.S. Patent No. RE45,415E (the "'415 patent") were not unpatentable as anticipated or obvious. We conclude that substantial evidence supports the Board's finding that the claim limitation requiring nanobubbles was not shown to be inherent in the prior art by Tennant's testing of the prior art or by establishing that the prior art used the same spacing of the electrodes as the '415 patent. However, because the Board failed to address Tennant's argument that the prior art practiced all the claimed parameters of the '415 patent and thus inherently anticipated the claimed nanobubbles limitation, we *reverse and remand*.

BACKGROUND

Oxygenator Water Technologies, Inc. ("OWT") is the owner of the '415 patent. The patent is directed to a method for oxygenating water by "generat[ing] very small microbubbles and nanobubbles of oxygen in an aqueous medium, which bubbles are too small to break the surface tension of the medium, resulting in a medium supersaturated with oxygen." '415 patent, col. 2, l. 67–col. 3, l. 3. Claim 13 of the '415 patent is the only independent claim at issue on appeal, and it provides:

> 13. A method for producing an oxygenated aqueous composition comprising:
>
> > flowing water at a flow rate no greater than 12 gallons per minute through an electrolysis emitter comprising an electrical power source electrically connected to an anode electrode and a cathode electrode contained in a tubular housing,

> causing electricity to flow from the power source to the electrodes, and,
>
> producing the composition comprising a suspension comprising oxygen microbubbles and nanobubbles in the water, the microbubbles and nanobubbles having a bubble diameter of less than 50 microns, wherein:
>
> > the electrode is separated at a critical distance from the cathode such that the critical distance is from 0.005 inches to 0.140 inches;
> >
> > the power source produces a voltage no greater than about 28.3 volts and an amperage no greater than about 13 amps,
> >
> > the tubular housing has an inlet and an outlet and a tubular flow axis from the inlet to the outlet;
> >
> > the water flows in the inlet, out the outlet, is in fluid connection with the electrodes, and the water flowing into the inlet has a conductivity produced by the presence of dissolved solids such that the water supports plant or animal life.

'415 patent, col. 11, ll. 20–45.

Tennant petitioned for inter partes review of claims 13, 14, and 17–27 of the '415 patent alleging anticipation over two prior art references, U.S. Patent No. 3,891,535 ("Wikey") and U.S. Patent No. 4,917,782 ("Davies"), and obviousness over either Wikey in combination with other prior art references or Davies in combination with other prior art references. The Board first found that

"[Tennant's] testing does not sufficiently demonstrate that Wikey inherently discloses nanobubbles." J.A. 28. Second, the Board found that "[Tennant's] reliance on milkiness and supersaturation to demonstrate the presence of nanobubbles [wa]s also unsupported." J.A. 28. Third, the Board found that "the '415 patent itself does not necessarily equate a certain critical distance of electrodes with the formation of nanobubbles or microbubbles, to the exclusion of all other variables." J.A. 26. For the dependent claims, the Board found that "[e]very dependent claim challenged . . . includes the microbubbles and nanobubbles limitation of claim 13, and, accordingly, [Tennant] does not make its case as to these dependent claims." J.A. 31. In summary, the Board determined that Tennant "ha[d] not shown by a preponderance of the evidence that claims 13, 14, and 17–27 of the '415 patent are unpatentable" as anticipated or obvious. J.A. 2. Tennant appeals.

We have jurisdiction pursuant to 28 U.S.C. § 1295(a)(4)(A).

DISCUSSION

We first consider the question of anticipation. "Anticipation is a question of fact that we review for substantial evidence." *HTC Corp. v. Cellular Commc'ns Equip., LLC*, 877 F.3d 1361, 1368 (Fed. Cir. 2017). Substantial evidence is "such relevant evidence as a reasonable mind might accept as adequate to support a conclusion." *Consol. Edison Co. of New York v. NLRB*, 305 U.S. 197, 229 (1938). "A claim is anticipated if a single prior art reference discloses all the claimed limitations arranged or combined in the same way as in the claim." *HTC Corp.*, 877 F.3d at 1368; *see also* 35 U.S.C. § 102. The prior art reference can disclose each limitation of the claimed invention either expressly or inherently. *Eli Lilly & Co. v. Los Angeles Biomedical Rsch. Inst. At Harbor-UCLA Med. Ctr.*, 849 F.3d 1073, 1074 (Fed. Cir. 2017).

The Board found that both Wikey and Davies "appear[] to disclose each limitation of claim 13 except 'microbubbles and nanobubbles having a bubble diameter of less than 50 microns.'" J.A. 22, 40–41. Although there seems to have been no issue as to whether Wikey and Davies disclose microbubbles, the Board noted that neither Wikey nor Davies disclosed nanobubbles, which is a requirement of claim 13 of the '415 patent. The issue is therefore whether Wikey or Davies discloses the nanobubble limitation. Tennant makes four distinct arguments in support of its position.

Tennant first contends that its testing of the devices from Wikey and Davies demonstrates anticipation. Tennant's expert re-created the device disclosed in Wikey and tested to see if it produced microbubbles and nanobubbles. "Microbubble" is defined as "a bubble with a diameter less than 50 microns." '415 patent, col. 4, ll. 10–11. "Nanobubble" is "a bubble with a diameter less than that necessary to break the surface tension of water," '415 patent, col. 4, ll. 12–13, which Tennant's expert testified was "[r]oughly 100 nanometers" (0.1 microns), J.A. 6048. The expert used an imaging tool which showed that the Wikey device created microbubbles. Likewise, the expert re-created the device from Davies, and testing showed that it also produced microbubbles. However, Tennant's expert admitted "that none of the testing [he] performed determined whether or not there were nanobubbles in the water." J.A. 6049, 70:1–3. The Board did not err in concluding that the testing did not detect the presence of nanobubbles.

Second, Tennant argues that even if the testing did not directly detect nanobubbles, it demonstrated that the water was supersaturated, and that this was sufficient to show the presence of nanobubbles. Tennant points to the specification of the '415 patent which describes "an oxygen emitter which . . . generates very small microbubbles and nanobubbles of oxygen in an aqueous medium, which bubbles are too small to break the surface tension of the medium, resulting in a medium supersaturated with oxygen."

'415 patent, col. 2, l. 66–col. 3, l. 3. Tennant contends that "the presence of nanobubbles was tested according to the only parameters provided by the '415 patent (i.e. that they supersaturate water, *see* [J.A.] 73 at 4:12–15)." Appellant's Opening Br. at 35. However, the '415 patent defines "nanobubble" as "a bubble with a diameter less than that necessary to break the surface tension of water. Nanobubbles remain suspended in the water, giving the water an opalescent or milky appearance." '415 patent, col. 4, ll. 12–15.

The specification describes that nanobubbles result in supersaturation, but Tennant has not shown that the reverse is true. The Board found that supersaturation does not show the presence of nanobubbles. The Board's decision is supported by substantial evidence. Tennant's expert admitted that "dissolved oxygen" does not "tell us anything about the size of the bubbles that are in the water." J.A. 6050, 76:9–14. Additionally, Tennant presents no evidence that the water it tested had a milky appearance or that supersaturation gives the water a milky appearance. Tennant's tests of Wikey and Davies showed that the "[v]ast majority of bubbles disappear[ed] within 1 minute" and "no bubbles [were] visible after 3 hours." J.A. 6548, 6556, 6562. The specification provides that "[the device] forms bubbles which are too small to break the surface tension of the fluid. These bubbles remain suspended indefinitely in the fluid and, when allowed to build up, make the fluid opalescent or milky. Only after several hours do[es] . . . the water clear[]." A'415 patent, col.4, ll. 32–37. Thus, Tennant failed to show that supersaturation demonstrated the existence of nanobubbles.

Third, Tennant argues that both Wikey and Davies inherently produce microbubbles and nanobubbles because they both "describe[] an anode and cathode spaced at the 'critical distance,' and given the '415 patent's teachings that the 'critical distance' is the critical factor in the creation of microbubbles and nanobubbles, the Board should have found Wikey [and Davies] inherently anticipate[] the

bubble size limitation." Appellant's Opening Br. at 34; *see also* Appellant's Opening Br. at 47. Tennant relies on the '415 patent's abstract which states that "[w]hen the anode and cathode are separated by a critical distance, very small microbubbles and nanobubbles of oxygen are generated." J.A. 62.

The Board found "that the '415 patent itself does not necessarily equate a certain critical distance of electrodes with the formation of nanobubbles or microbubbles, to the exclusion of all other variables." J.A. 26. The Board's finding is supported by substantial evidence. Tennant's expert, Dr. Tremblay, testified that "a person of skill in the art reading the '415 patent would understand . . . that many things other than spacing of the electrodes are going to have an effect on the bubble size created using devices described in the patent." J.A. 6039, 30:24–31:5.

Finally, Tennant argues that Wikey and Davies "met all of the limitations of independent claim 13 as they relate to the parameters of the device—i.e., the voltage used, the amperage used, the shape of the housing, the inlet, the outlet, the fluid flow, and even the 'critical distance.'" Appellant's Opening Br. at 33. The Board found that both Wikey and Davies "appear[] to disclose each limitation of claim 13 except 'microbubbles and nanobubbles having a bubble diameter of less than 50 microns.'" J.A. 22, 40–41. And, Tennant argues, "when all claimed parameters are present—as in Wikey—microbubbles and nanobubbles are inherently formed."[1] Appellant's Reply Br. at 7. For support,

---

[1] OWT contends that parameters other than those found in the claim limitations affects the production of microbubbles and nanobubbles. This appears to contradict OWT's representations made during prosecution of the '415 patent. And even if other parameters affect bubble size, nothing in the specification discloses any such requirement

Tennant points to *In re King*, which holds that "if a previously patented device, in its normal and usual operation, will perform the function which an appellant claims in a subsequent application . . . then such application . . . will be considered to have been anticipated by the former patented device." 801 F.2d 1324, 1326 (Fed. Cir. 1986); *see also In re Ackenbach*, 45 F.2d 437, 439 (C.C.P.A. 1930).

Tennant made this same argument to the Board in its IPR petition, contending that "[t]he Wikey emitter has the same configuration as claim 12 and therefore produces the same result – namely, a suspension comprising microbubbles and nanobubbles." J.A. 121–22; *see also* J.A. 24–25 (The Board noting that "[Tennant] also replies that claim 13 specifies voltage, current, and flow rate limits that, combined with the critical distance, create microbubbles and nanobubbles, and that Wikey teaches values for each of these variables falling within the claimed ranges"); J.A. 112 ("Wikey discloses a tubular water electrolysis emitter having an anode separated from a cathode by the claimed critical distance in combination with the claimed voltage, amperage and flow rate. The Wikey emitter therefore produces a suspension comprising microbubbles and nanobubbles in the water, as the '415 patent acknowledges.").

Tennant's expert testified that "Wikey not only discloses the claimed anode and cathode separation distance in combination with the claimed voltage, it inherently provides the claimed current and flow rates," J.A. 528, and "Davies not only discloses the anode and cathode separation distance in combination with the claimed voltage and flow rate of the '415 patent, it also inherently provides the claimed current," J.A. 559. However, the Board did not address this argument, finding only that Wikey's and Davies'

---

or describes how to manipulate those parameters to produce microbubbles and nanobubbles.

disclosure of the "critical distance" was insufficient to inherently disclose production of nanobubbles.

The Board's error is particularly significant given the prosecution history where OWT represented that microbubbles and nanobubbles were inherently produced when the claim parameters of the '415 patent were followed. The examiner rejected "[c]laims 2, 3, 5, 7, 9, 10, 13–17, 21, 22, 26, 27, 29–32, 35, and 39–42 . . . as being anticipated by Murrell U.S. Patent 5,049,252." *Tennant Co. v. Oxygenator Water Techs., Inc.*, IPR2021-00625, Exhibit 1102 at 216 (PTAB Mar. 9, 2021). OWT cancelled claims 13–49 in favor of new claims 50–67. New claim 55, which, as amended, became claim 13 in the '145 patent, provided that "the combination of the critical distance, the voltage, amperage and the water conductivity results in the formation of a suspension comprising oxygen nanobubbles in the water." *Tennant*, IPR2021-00625, Exhibit 1102 at 190.[2] In defending claim 55 against anticipation by Murrell, OWT submitted:

> The new claims are directed to . . . a method of producing the suspension of nanobubbles in water . . . [h]ence, the water and microbubbles/nanobubbles of oxygen suspended in the water are positively recited features of a system, a method and a suspension. In addition, the voltage, amperage, the separation of the electrode spacing, and the total solids in the water signifying viscosity and

---

[2] That language was ultimately deleted from claim 13, but there was no suggestion that the change was substantive. The patent examiner had accepted claim 55 (except for a defective reissue oath, *Tennant*, IPR2021-00625, Exhibit 1102 at 167), and Tennant deleted the language after the acceptance. *Tennant*, IPR2021-00625, Exhibit 1102 at 140–141. Tennant provided no explanation for the deletion. *See id.* at 136–153.

> conductivity of the water, which can be summed by the phrase tap water, are positively recited features of this system. These features achieve the suspension of nanobubbles in water.

Id. at 196. Additionally, OWT stated that its "system, method and suspension" was different than Murrell's because its "micro and nanobubbles do not rise to the surface [i.e., they remain suspended in the water] . . . [OWT's] claims now recite the conditions needed to produce [microbubbles and nanobubbles], including voltage, amperage, total water solids indicating conductivity, and the electrode spacing." *Id.* at 198.

In other words, if the physical parameters of the claim were followed, it would automatically produce nanobubbles. OWT cannot make one argument when seeking issuance of its patent and the opposite argument in defending the patent in post-grant review and to this court. "[J]udicial estoppel[] 'generally prevents a party from prevailing in one phase of a case on an argument and then relying on a contradictory argument to prevail in another phase.'" *New Hampshire v. Maine*, 532 U.S. 742, 749 (2001) (quoting *Pegram v. Herdrich*, 530 U.S. 211, 227 n.8 (2000)); *see also Trustees in Bankr. Of N. Am. Rubber Thread Co. v. United States*, 593 F.3d 1346, 1354 (Fed. Cir. 2010) ("Judicial estoppel applies just as much when one of the tribunals is an administrative agency as it does when both tribunals are courts."); *Tyler Refrigeration v. Kysor Indus. Corp.*, 777 F.2d 687, 690 (Fed. Cir. 1985) (holding that the district court properly treated the Aokage reference as prior art "[i]n view of [patent owner's] explicit admission" "before the PTO during the prosecution of the [patent]" that "the Aokage reference [was] prior art"); *In re Nomiya*, 509 F.2d 566, 570–71 (C.C.P.A. 1975) (holding that while "[a]ppellants' brief now questions the PTO's use of Figs. 1 and 2 of their application as 'prior art' . . . arguing that there is no statutory basis for considering Figs. 1 and 2 to be 'prior art' . . . [b]y filing an application containing Figs. 1 and 2,

labeled prior art . . . appellants have conceded what is to be considered as prior art in determining obviousness of their improvement.").

CONCLUSION

Because the Board failed to address Tennant's argument that Wikey and Davies disclosed all the parameters of the '415 and therefore inherently produce microbubbles and nanobubbles, we vacate and remand. Because we vacate and remand to the Board to consider Tennant's anticipation argument, we do not reach Tennant's obviousness arguments (which depends on its contention that either Wikey or Davies produce nanobubbles).

VACATED AND REMANDED

COSTS

No Costs.