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United States Court of Appeals for the Federal Circuit

01-1599

EARL N. DOYLE and W. SCOTT CARSON,

Plaintiffs-Appellants,

v.

CRAIN INDUSTRIES, INC., CANNON U.S.A.,
CANNON VIKING, LTD., and FOAMING TECHNOLOGIES CARDIO B.V.,

Defendants-Appellees,

and

CANNON S.p.A.,

Defendant.

DECIDED: November 1, 2002

Before RADER, GAJARSA, and LINN, Circuit Judges.

RADER, Circuit Judge.

At close of plaintiffs' case-in-chief, the United States District Court for the Southern District of Texas granted judgment as a matter of law (JMOL) that Crain Industries, Inc., Cannon U.S.A., Cannon

Viking, Ltd., and Foaming Technologies Cardio B.V. (collectively Crain) did not infringe U.S. Patent No. 5,120,770 ('770 patent), owned by Earl N. Doyle and W. Scott Carson (collectively D&C). Doyle v. Crain Indus., Inc., No. H-97-3468, slip op. at 39 (S.D. Tex. Sept. 21, 2001) (Doyle II). The court further held that the '770 patent was invalid. Id. Because a reasonable jury could find for D&C on patent invalidity and on literal, willful, contributory, and induced infringement, this court vacates the grant of JMOL on these issues and remands. This court affirms the grant of JMOL of no infringement by equivalents because no reasonable jury could find for D&C on that issue.

I.

The '770 patent claims a method for the production of open-cell polyurethane foam. The claimed method involves forming a mixture from a number of components, including a blowing agent, in a mixing zone. Independent claim 21 requires that the mixture of components be "subjected to a pressure in said mixing zone which is sufficient to maintain said blowing agent in the liquid state at ambient temperatures." '770 patent, col. 9, ll. 16-19. In a prior appeal this court determined that this claim language requires sufficient pressure to keep the blowing agent, such as carbon dioxide (CO₂), in a liquid state at ambient temperatures in the mixing zone. Doyle v. Crain Indus., Inc., 243 F.3d 564 (Fed. Cir. 2000) (unpublished opinion) (Doyle I). Hence, this court remanded the case for determination, inter alia, of whether the accused CarDio method maintains a pressure sufficient to keep the blowing agent liquid when the temperature in the mixing zone is "about 70°F to about 100°F." Id.

On remand, D&C asserted infringement of dependent claims 39, 40, and 41 of the '770 patent—all of which depend (directly or indirectly) from claim 21. The district court granted JMOL of noninfringement and invalidity at the close of D&C's (the plaintiffs-patentees') case-in-chief. Doyle II at 39. The court held that the accused CarDio method did not maintain a liquid blowing agent in the mixing zone as required by claim 21, and therefore did not infringe the '770 patent. The court stated that the objective evidence showed that the CO₂ blowing agent used in the CarDio method is a gas-in-solution in the mixing zone. Further, the court held the '770 patent invalid for failure to disclose the best mode and for lack of enablement. Crain alleged and the district court agreed that the '770 patent's failure to disclose the use of a T-bar let down device violated the best mode requirement. The T-bar device gradually lowers the pressure of the mixture to atmospheric pressure as it is ejected from the mixing chamber. The court also found that the '770 patent contained no disclosure of how to establish sufficient back pressure to maintain the CO₂ in the liquid state, nor any disclosure of how to lower that

pressure to atmospheric pressure in order to successfully produce foam.

II.

This court reviews a grant of JMOL without deference, reapplying the JMOL standard. Allied Colloids, Inc. v. Am. Cyanamid Co., 64 F.3d 1570, 1573, 35 USPQ2d 1865, 1869 (Fed. Cir. 1999). JMOL is appropriate when "a party has been fully heard on an issue and there is no legally sufficient evidentiary basis for a reasonable jury to find for that party on that issue." Fed. R. Civ. P. 50(a)(1) (2002). Hence, a grant of JMOL on an issue is improper if a reasonable jury could find for the nonmoving party on that issue.

A.

An infringement analysis compares the construed claims with the allegedly infringing device. Kemco Sales, Inc. v. Control Papers Co., 208 F.3d 1352, 1360, 54 USPQ2d 1308, 1312 (Fed. Cir. 2000). To prove infringement, the patentee must show that the accused device meets each claim limitation, either literally or under the doctrine of equivalents. Seal Flex, Inc. v. Athletic Track & Court Const., 172 F.3d 836, 842, 50 USPQ2d 1225, 1228 (Fed. Cir. 1999).

1.

On remand, D&C presented evidence attempting to show that the accused CarDio method maintained pressure sufficient to keep the CO₂ blowing agent liquid when the temperature in the mixing zone is about 70-110°F. That evidence included testimony by Mr. Doyle, who was not designated as an expert, stating that he believed the CarDio method would not work unless the CO₂ was liquid in the mixing zone. Mr. Doyle, however, admitted that he had no personal knowledge of the CarDio method, and that he believed it was impossible to measure the CO₂ in the dynamic mixing zone. Although Mr. Doyle's testimony alone may not constitute convincing evidence to support a finding of infringement, D&C presented other evidence that does provide such support.

D&C introduced the CarDio manual, which Crain previously admitted accurately reflected its

CarDio method. The manual states (emphasis added):

Mixing

As is the case for storage of liquid carbon dioxide, pressure and temperature conditions must be maintained at levels which ensure that the CO₂ remains in the liquid state at all times.

Additionally, D&C presented testimony by Glen Cavanaugh, the former Vice President and Technical Director of Trinity Foam. Before its closing in 1997, Trinity Foam was a third-party CarDio method licensee. Mr. Cavanaugh testified that Trinity followed the CarDio manual instruction to keep the CO₂ liquid at all times. He further testified:

- Q. And once you put the liquid CO₂ into the polyol stream in that CarDio system at Trinity Foam, did it form a solution?
- A. Yes, sir, yeah, yes, it certainly did.
- Q. Is it a solution of liquid and liquid?
- A. Yes, sir.
- Q. So CO₂ is liquid and the polyol is liquid?
- A. That is correct.
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- Q. [D]id you run the CarDio system in such a manner to utilize pressures to avoid gas formation?
- A. Yes, sir.
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- Q. [Crain's attorney] stated the will [sic] CO₂ was gas in the mixing zone. Does that comport with your understanding and how you ran the process at Trinity Foam?
- A. No. At my plant we are doing liquid and we are doing many things to keep it a liquid in the mixing zone.

On cross-examination, Crain asked Mr. Cavanaugh what temperature and pressure ranges Trinity used in performing the CarDio method. Crain then plotted the ranges on a phase diagram for CO₂, which showed the CO₂ to be in a vapor state in the specified ranges. On re-direct, however, Mr. Cavanaugh testified that the CO₂ phase diagram did not reflect the state of the CO₂ after it was mixed with the polyol in the mixing zone.

Claim 21 requires that the "mixture [is] subjected to a pressure in said mixing zone which is sufficient to maintain said blowing agent in the liquid state at ambient temperatures." '770 patent, col. 9, ll. 16-19 (emphasis added). As clearly stated by the claim language, this limitation requires sufficient

pressures and temperatures to keep the blowing agent (e.g., CO₂) liquid in the mixing zone. Id. Thus, the claim specifies that the mixture is subject to pressures and temperatures. The CO₂ phase diagram charts the effects of temperature and pressure on CO₂ alone. The diagram does not account for the effects of the other components in the mixture. Further, the record does not show that the addition of the other components has no effect on the pressure and temperature necessary to keep the CO₂ liquid. Rather, the record indicates that the addition of other components, such as polyol, affects the pressure and temperature needed to maintain liquid CO₂. By relying on the phase diagram for CO₂ alone -- not CO₂ as part of the specified mixture -- the trial court discounted a portion of the claim language as written and construed.* In effect this impermissibly rewrites the disputed limitation to be “the blowing agent (i.e., CO₂) being subjected to a pressure in said mixing zone which is sufficient to maintain said blowing agent in the liquid state at ambient temperatures.” Regardless of whether the district court properly admitted the CO₂ phase diagram, a reasonable jury could conclude that the diagram is not relevant to determine the phase of CO₂ as contained in the specified mixture. Indeed, Mr. Cavanaugh testified that the diagram was not representative of the CarDio method practiced at Trinity:

- Q. Does this CO₂ phase diagram reflect the state of the CO₂ after it's been mixed into the polyol in the Trinity Foam process . . . ?
- A. No, sir.

Because a reasonable jury could conclude that the CarDio method subjects the mixture to temperatures and pressures sufficient to keep the CO₂ liquid in the mixing zone, the district court erred in granting JMOL of no literal infringement at close of D&C's case in chief. Further, because the district court's holding of no willful, contributory, or induced infringement rests on the court's erroneous grant of JMOL of no direct infringement, this court also vacates those judgments.

2.

Although identifying infringement under the doctrine of equivalence as an issue in this appeal, D&C has not directed this court to any record evidence purporting to show that the accused method—if not using a liquid blowing agent—is equivalent to the claimed method. Based on this record no

reasonable jury could find infringement under the doctrine of equivalence. The district court therefore properly granted JMOL of no infringement under the doctrine of equivalents.

B.

At close of D&C's case in chief, the district court held "the claims of the '770 patent" invalid for failure to satisfy the best mode and enablement requirements of 35 U.S.C. § 112, ¶ 1 (2000). Because Crain bears the burden of proof on invalidity, which must be proven by clear and convincing evidence, and because Crain had not yet presented its case, Crain must rely on solely the testimony of D&C's witnesses to prove its invalidity case.

1.

Section 112 requires disclosure of "the best mode contemplated by the inventor of carrying out his invention." 35 U.S.C. § 112. As this court's recent precedent makes clear, the best mode requirement focuses on the claimed invention. Teleflex, Inc. v. Ficosa North Am. Corp., 299 F.3d 1313, 1330, 63 USPQ2d 1374, 1385 (Fed. Cir. 2002). Thus, the disclosure necessary to satisfy the best mode requirement, which is a question of fact, depends on the scope of the claimed invention.

The district court found a best mode violation based on an alleged admission by Mr. Doyle. To the contrary, Mr. Doyle's testimony does not admit a best mode violation. In response to questions about his lab apparatus for performing the claimed method, Mr. Doyle testified that his "favorite" setup used a T-bar device and that the T-bar produced better foam. Mr. Doyle did not testify, however, that the T-bar device is a part of the claimed invention or even that it is necessary to practice the claimed invention. Section 112 does not require disclosure of preferred technologies outside the scope of the claims. In this case, the claims recite a method for production of polyurethane foam, not specific laboratory apparatus.

Moreover, Mr. Doyle testified that while he used the T-bar more often than any other device, it was not necessarily the ideal setup. Mr. Doyle indicated that the equipment available in his small pilot lab dictated his preference for the T-bar device, but that such a device would be unsuitable for commercial machines. Based on this testimony, a reasonable jury could find that Crain did not prove a best mode violation by clear and convincing evidence. Thus, the district court erred in granting JMOL of invalidity for an alleged best mode violation at the close of D&C's case in chief.

2.

Section 112 also requires that the specification disclose the invention sufficiently to enable one of ordinary skill in the relevant art to make and use the invention. 35 U.S.C. § 112. Thus, the sufficiency of an enabling disclosure requires reference to the knowledge of one of ordinary skill in the relevant art. Enablement is a question of law based on underlying facts. Union Pac. Res. Co. v. Chesapeake Energy Corp., 236 F.3d 684, 690 (Fed. Cir. 2001).

The district court held that the failure to disclose any let down device in the '770 patent amounted to a violation of the enablement requirement. The court apparently emphasized Mr. Doyle's testimony that a let down device is needed to produce foam. Mr. Doyle's testimony, however, does not show that the '770 patent does not enable one of ordinary skill to make and use the invention, including the use of a let down device. The use of a let down device may well be within the knowledge of skilled artisans. Based on this record, a reasonable jury could find that Crain did not prove an enablement violation by clear and convincing evidence. Thus, the district court erred in granting JMOL of invalidity for an alleged

enablement violation at the close of D&C's case in chief.

CONCLUSION

Because the record provides a sufficient basis for a reasonable jury to conclude that the accused CarDio method literally satisfies the disputed claim language, this court vacates the grant JMOL of no literal infringement. The record, however, does not provide sufficient evidence for a reasonable jury to find for D&C under the doctrine of equivalence. Because the district court erred in concluding that no reasonable jury could find in favor of D&C on the alleged best mode and enablement violations, this court vacates the grant of JMOL of patent invalidity. This case is remanded for trial.

COSTS

Each party shall bear its own costs.

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* D&C argues that the CO₂ diagram is inapplicable by stating that the diagram was for pure CO₂ and that the dependent claims show that the CO₂ may be mixed before entering the mixing zone (i.e., that it is not pure CO₂ entering the mixing zone). Based on this argument, D&C alleges that the district court must construe the dependent claims before finding them not infringed. To the contrary, the limitation at issue here is in the independent claim from which the asserted claims depend.