THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 14

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte KAM B. LEE

Appeal No. 95-2741
Application 08/008,120[1]

ON BRIEF

Before SCHAFER, LEE and TORCZON, Administrative Patent Judges.

SCHAFER, Administrative Patent Judge.

DECISION ON APPEAL UNDER 35 U.S.C. § 134

Applicants appeal from the rejection of claims 1 to 6, all the claims in the application. We have jurisdiction under 35 U.S.C. § 134.

[1] Application for patent filed January 25, 1993.

The examiner made three rejections:

1. The rejection of claim 2 under 35 U.S.C. § 112, second paragraph as indefinite;

2. The rejection of claims 1-3 under 35 U.S.C. § 103 as unpatentable over the Austin[2] patent; and

3. The rejection of claims 1-6 under 35 U.S.C. § 103 as unpatentable over the combination of the Austin and the Lee[3] patent.

We reverse the rejections under 35 U.S.C. § 103 and 35 U.S.C. § 112, second paragraph.

BACKGROUND

A. The claimed subject matter

The invention is directed to a process for the producing carbon black. Carbon black is particulate carbon produced in a reactor by pyrolysis of a hydrocarbon. Pyrolysis refers to the thermal decomposition of a hydrocarbon.[4] The hydrocarbon is injected into the stream of hot combustion gases at one or more points to form an effluent.[5] The hydrocarbon may be in the form of liquid, gas or vapor,

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[2] Austin, U.S. Patent 4,358,289, issued November 9, 1982

[3] Lee et al., U.S. Patent 5,082,502, issued January 21, 1992

[4] Specification page 2, lines 9-10.

[5] Specification page 2, line 8.

and may be the same or different than the fuel utilized to form the combustion gas stream.[6] According to applicant, the carbon black containing effluent flows from the reactor into a "lined wall" heat exchanger where the effluent is cooled to stop pyrolysis and to permit handling of the effluent by downstream equipment.[7] A line wall heat exchanger is apparently a heat exchanger with an internal lining of a material which is both highly conductive and highly heat resistant (i.e., will withstand 3200°F).[8] Applicant defines the phrase in the specification as follows:

> The lined wall heat exchanger utilized in the process of the present invention has internal walls made from a highly conducting material that enables heat transfer to be carried out at wall temperatures up to 3200 °F. These internal walls contact the hot effluent. The lined wall heat exchanger may dissipate the heat of the effluent into the atmosphere or may be utilized to transfer the heat to another fluid stream. Suitable highly conducting materials for the manufacture of the internal heat transfer surfaces of composite wall heat exchanger include materials that are able to withstand temperatures up to 3200 °F without deteriorating and are sufficiently thermally conductive to lower the temperature of the effluent to a temperature wherein pyrolysis is stopped and to permit handling of the effluent by the downstream equipment. Suitable materials include, but are not limited to, silicon carbide and silicon nitride. I have discovered that these materials will provide the suitable heat transfer, and resist degradation, even if cracked. The particular design of the lined wall heat exchanger is within

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[6] Specification page 2, lines 8-9.

[7] Specification page 5, lines 7-10.

[8] Specification page 5, line 17.

the skill of one of ordinary skill in the art.[9]

Representative claims 1 and 2 are and reproduced below:

> Claim 1. A process for the producing carbon blacks comprising: passing a stream of hot combustion gases through a reactor; injecting feedstock into the stream of hot combustion gases at one or more points to form an effluent and start pyrolysis of the feedstock in the effluent; cooling the effluent after the formation of carbon blacks by passing the effluent through a lined wall heat exchanger in order to stop pyrolysis and obtain a resultant process stream of combustion gases and carbon black; further cooling the process stream in a secondary cooler without adding any cooling liquid to a temperature that prevents damage to the means utilized for separating and collecting the carbon black product; and separating and collecting carbon black product.
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> Claim 2. The process of claim 1 further comprising injecting a quenching fluid into the effluent prior to its passing into the lined wall heat exchanger wherein the quenching fluid is injected into the effluent at a rate wherein all of the fluid is atomized to minimize the duration of the presence of the quenching fluid in the liquid phase in the effluent stream.

B. The Austin patent

Austin describes a process for the production of carbon black. Carbon black is produced in a reactor by contacting hydrocarbon with hot combustion gases to produce combustion products containing particulate carbon black.[10] The combustion products are cooled by injecting quench fluid into the combustion products to form effluent.[11] The hydrocarbon combustion products temperature is

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[9] Specification, page 5.

[10] Austin, column 1, lines 7-11.

[11] Austin, column 1, lines 17-19.

lowered below the pyrolysis temperature by the liquid quench.[12] The effluent flows from the quench chamber into conventional heat exchangers then through a trim quench chamber containing a tubular member.[13] Figure 1 describes the carbon black production apparatus. The carbon black production apparatus employs indirect type heat exchangers that operate to cool the effluent to a temperature in the range of 600-1000°F. The effluent flows from the heat exchangers to a trim quench into a filter means.[14]

C. The Examiner's and Applicant's positions

1. The rejections under 35 U.S.C. § 103

The examiner presents two rejections under 35 U.S.C. § 103 directed to two groups of claims: (1) Claims 1-3 as unpatentable over Austin; and (2) Claims 1-6 as unpatentable over the combination of the teachings of Austin and Lee. The examiner's position may be understood from the following excerpt from the Answer.

> The reference [Austin] teaches in col. 3 line 1 to column 4 line 68 the claimed carbon black forming steps, then cooling with smoke (which is finely-divided solid particles entrained in a non-liquid medium), followed by passing the effluent through heat exchangers and recovering the product. The reference differs in the description of the heat exchanger, although it has a pipe which inherently exchanges heat since it is not a perfect insulator.
>
> It would have been obvious to one of ordinary skill in the art at the time of the instant invention to use a lined wall heat exchanger in the process of Austin because doing so will perform the cooling required in col. 5 line 26 of the reference.[15]

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[12] Austin, column 3, lines 38-43.

[13] Austin, column 4, lines 24-29; Figure 1, numerals 25, 26 and 27.

[14] Austin, column 1, lines 37-60.

[15] Examiner's Answer, pages 3 -4.

The Lee patent was relied upon as evidence that certain features of the dependent claims were old.

Applicant argues the Patent Office has not established a prima facie case of obviousness. Applicant's position is understood from the following excerpt from the Brief:

> Austin clearly discloses a conventional carbon black production process wherein a quench injecting a liquid quenching fluid is utilized to stop pyrolysis of the carbon black yielding feedstock. Austin does not disclose or suggest the use of a lined wall heat exchanger to cool the effluent and stop pyrolysis of the carbon black yielding feedstock. Thus Austin fails to disclose or suggest Appellant's claimed invention. Austin clearly teaches the conventional practice of injecting water into the effluent stream to cool the effluent stream and stop pyrolysis and contains no suggestion to use other than standard conventional equipment for making carbon blacks. Therefore, Austin cannot suggest the use of a lined wall heat exchanger such as specified in the present claims. Moreover, since Austin teaches a process wherein the effluent is cooled and pyrolysis is stopped by the injection of quench water into the effluent, there would be no reason in the process disclosed by Austin to utilize a lined wall heat exchanger to cool the effluent to stop pyrolysis of the reaction. To utilize sufficient quench to stop pyrolysis in a process where a lined wall heat exchanger is to be used for the same purpose would not only be uneconomical, but also, and more importantly, negate the advantages resulting from the use of the lined wall heat exchanger.[16]

Applicant has not challenge the examiner's reliance on Lee other than to note that the reference did not cure the deficiencies of the Austin patent.[17]

2. Rejection under 35 U.S.C. § 112, second paragraph

The examiner rejected claim 2 under 35 U.S.C. § 112, second paragraph as indefinite. As we

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[16] Appeal Brief, page 7.

[17] Appeal Brief, page 9, second paragraph.

understand the examiner's position, the indefiniteness rejection is premised on two grounds. First, the inconsistency between applicant's argument as to the scope of Claim 1 as excluding a preliminary quench and dependent Claim 2's explicit requirement for a preliminary quench renders the scope of Claim 2 unclear. Secondly, Claim 2 assertedly encompasses a quench liquid flow rate of zero, so it is not clear what Claim 2 adds to Claim 1.

Applicant contends that claim 2 complies with the requirements of 35 U.S.C. § 112, second paragraph. "Claim 2 clearly recites that a quenching fluid is being added to the effluent at a rate such that the duration of the presence of the quenching fluid in liquid phase in the effluent is minimized."[18]

DECISION

We reverse all of the rejections.

ANALYSIS

A. The § 103 rejections

1. Grouping of the claims

In presenting the appeal, applicant has not asserted the patentability of the dependent claims separate from claim 1.[19] Thus, we decide the § 103 rejections on the basis of claim 1 alone and need not address the Lee reference.

2. Claim interpretation

Because it appears the examiner and the applicant disagree as to the scope of claim 1, we must construe that claim. Claim interpretation is the logical starting point of the patentability analysis. Titanium

[18] Appeal Brief, page 6, second paragraph.

[19] Appeal Brief, page 4.

Metals Corporation of America v. Banner, 778 F.2d 775, 782, 227 USPQ 773, 779 (Fed. Cir. 1985); Raytheon Co. v. Roper Corp., 724 F.2d 951, 956, 220 USPQ 592, 596 (Fed. Cir. 1983). Applicant asserts that the subject matter of Claim 1 is distinguishable from Austin because Austin teaches the use of a preliminary quench liquid to cool the effluent prior to introduction into the heat exchangers.[20] Applicant appears to assert that Claim 1 does not permit the use of a preliminary quench fluid prior to the introduction of the effluent into the heat exchanger. Thus, applicant argues:

> Applicant has discovered a process for producing carbon blacks where pyrolysis is stopped not by a quench, but by means of a lined wall heat exchanger. As a result, there is no need to introduce any quench into the effluent and, in a preferred embodiment of the present invention, no quenching fluid is injected into the effluent. However, if for economic reasons it is desired to cool the effluent prior to the point at which the effluent enters the lined wall heat exchanger, a reduced amount of quenching fluid, relative to the amount of quenching fluid utilized in a conventional process to stop pyrolysis, may be injected into the effluent. Claim 2 is directed to this embodiment of the present invention.[21]

The examiner construes claim 1 to be open to inclusion of other unspecified process steps including the use of a quench fluid prior to the entry of the effluent into the lined wall heat exchanger.[22]

Claim 1 does not expressly recite the use of a quench liquid prior to the introduction of the effluent into the lined wall heat exchanger. The preamble of claim 1, however, uses the open word "comprising." The use of the word opens the claim to the inclusion of additional unspecified steps. Moleculon Research Corp. v. CBS, Inc., 793 F.2d 1261, 229 USPQ 805 (Fed. Cir. 1986); In re Baxter, 656 F.2d 679, 686,

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[20] Appeal Brief, page 7, second paragraph.

[21] Appeal Brief, paragraph bridging pages 7-8.

[22] Examiner's Answer, pages 4-5.

210 USPQ 795, 802 (CCPA 1981). Thus, the language of claim 1 does not exclude the use of a liquid quench prior to the effluent entering the lined wall heat exchanger.

Additionally, a comparison of claim 1 with dependent claim 2 makes it clear that adding a quench fluid to the effluent prior to entering the lined wall heat exchanger is not excluded from claim 1. Claim 2 expressly requires the step of "injecting a quench into the effluent prior to passing into the lined wall heat exchanger . . . ." Claims in dependent form are construed to include all the limitations of the claim incorporated by reference into the dependent claim and must further limit the claim to which it refers. 35 U.S.C. § 112, ¶ 4. Thus, limitations added by a dependant claim are implicitly within the scope of the claim to which it refers. As noted by the Federal Circuit: "It is axiomatic that dependent claims cannot be found infringed unless the claims from which they depend have been found to have been infringed." Wilson Sporting Goods Co. v. David Geoffrey & Associates, 904 F.2d 677, 685, 14 USPQ2d 1942, 1949 (Fed. Cir. 1990) quoting Wahpeton Canvas Co., Inc. v. Frontier, Inc., 870 F.2d 1546, 1553 & n.9, 10 USPQ2d 1201,1208 & n.9 (Fed. Cir. 1989). Thus, the use of a quench liquid prior to the effluent entering the lined wall heat exchanger is implicitly included within the scope of Claim 1.

3. Rejection over Austin

In rejecting the claims the examiner originally was of the view that lined wall heat exchangers were well known in the art. (First office action, paper no. 2, paragraph bridging pages 2-3). Applicant traversed the examiner's position, expressly stating that in applicant's experience, line wall heat exchangers were not well known in the art.[23] (Amendment A, paper no. 4, paragraph 3.) In his Answer, the examiner refers to column 5, line 26, of Austin apparently as support for the position that the use of a line walled heat

[23] Under appropriate circumstances, the examiner's burden of presenting a prima facie case of unpatentability may be satisfied by an statement that certain features of the claims are "well known." See, MPEP § 1244.03. Where an applicant goes on the record expressly contradicting the examiner's statement, as was done here, the examiner must supplement the record with evidence supporting the rejection. See 37 CFR § 1.104(d)(2). Because the duty of candor and good faith placed upon applicant's by 37 CFR § 1.56(a), applicant's contradiction of the examiner's holding need not be in the form of an affidavit or declaration.

exchanger would have been obvious.[24]

While Austin discloses the use of heat exchangers, the patent does not disclose the high temperature, high heat conductivity lined wall heat exchanger of the type required by applicant's claims. At best Austin merely teaches the use of conventional heat exchangers. The examiner has not explained how the heat exchanges described by Austin would suggest the high temperature, high heat conductivity heat exchangers required by applicant's claims. We have not been directed to any evidence supporting a conclusion that the use of a lined wall heat exchanger, as that phrase is used and defined by applicant, would have been obvious to a person of ordinary skill in the art.

The rejections under 35 U.S.C. §103 are REVERSED.

B. The § 112 rejection

As we understand the examiner's position, the indefiniteness rejection is premised on two grounds. First, the inconsistency between applicant's argument as to the scope of Claim 1 as excluding a preliminary quench and dependent Claim 2's explicit requirement for a preliminary quench renders the scope of Claim 2 unclear. Secondly, Claim 2 assertedly encompasses a quench liquid flow rate of zero, so it is not clear what Claim 2 adds to Claim 1.[25]

We reverse.

As to the first ground, our construction of Claim 1, that it encompasses a preliminary quench, disposes of any perceived inconsistency.

As to the second ground, the examiner is simply incorrect as to the construction of the claim. Claim 2 expressly requires "injecting a quench fluid into the effluent prior to passing into the lined wall heat exchanger . . . ." This language precludes a construction that the claim encompasses a zero quench liquid

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[24] Examiner's Answer, paragraph bridging pages 3-4.

[25] Examiner's Answer, pages 4-5.

flow rate.

The rejection of claim 2 under 35 U.S.C. § 112, second paragraph is REVERSED**.**

REVERSED

	)
RICHARD E. SCHAFER	)
Administrative Patent Judge	)
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	)
	) BOARD OF PATENT
JAMESON LEE	)
Administrative Patent Judge	) APPEALS AND
	)
	) INTERFERENCES
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