

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

Paper No. 19

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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Ex parte MICHAEL LEE BROWN,  
NINEV KARL ZIA and SHAILESH SHARAD MANOHAR

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Appeal No. 2004-0616  
Application 09/692,982

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ON BRIEF

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Before COHEN, ABRAMS, and FRANKFORT, Administrative Patent Judges.

FRANKFORT, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal from the examiner's final rejection of claims 1, 4 through 6, 8 through 11, 14 through 16 and 18 through 20, which are all of the claims remaining in this application. Claims 2, 3, 7, 12, 13 and 17 have been canceled.

Appellants' invention relates to an improved furnace heat exchanger of the multipass clamshell type constructed in such a

manner as to have controlled surface temperatures, reduced hot spots and minimal thermal stresses. As noted in the paragraph bridging pages 2 and 3 of the specification, in accordance with one aspect of the invention, the heat exchanger surface area, per unit height of the multipass heat exchanger, is increased by providing wavy cross-sectional shapes in the sides of at least two of the passes. Moreover, there is a single pass in which the cross-sectional shape transitions from a non-wavy shape or "unenhanced form," such as the generally elliptical form seen in Figure 7a, to a wavy shape or "enhanced form," like that seen in Figure 7d, and wherein the transition section is of a substantial length, such that the transition from one shape to the other is gradual, thereby providing for reduced temperatures and stresses in that section. Greater detail concerning the above-noted transition section of the heat exchanger and the significance of the length thereof is set forth on pages 8-10 of the specification and shown in Figures 6, 7a-7d and 8 of the application drawings. Independent claims 1 and 11 are representative of the subject matter on appeal and a substantially correct copy of those claims may be found in the

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Appendix attached to the reply brief (Paper No. 16, filed June 13, 2003).<sup>1</sup>

The prior art references of record relied upon by the examiner as evidence of obviousness of the claimed subject matter are:

Ripka	4,467,780	Aug. 28, 1984
Chase et al. (Chase)	5,359,989	Nov. 1, 1994
Reinke et al. (Reinke)	6,109,254	Aug. 29, 2000

Claims 1, 4 through 6, 8 through 11, 14 through 16 and 18 through 20 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Ripka.

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<sup>1</sup> Although the examiner's answer (page 2) indicates that "[t]he copy of the appealed claims contained in the Appendix to the brief is correct" (emphasis added), we find no such Appendix in the record associated with the brief (Paper No. 13) and further note that appellants have highlighted in the reply brief (Paper No. 16) that such Appendix was inadvertently omitted from the brief. Thus, we are at somewhat of a loss to understand how the examiner could have reviewed such a non-existent paper and subsequently urged that the content thereof was correct. In point of fact, even the claims in the Appendix attached to the reply brief are not correct. For example, in claim 1, line 2, "eternally" should be -- externally --; in claim 1, line 9, "ration" should be -- ratio --; and claim 14 should depend from claim 11, not claim 1 as shown in the Appendix.

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Claims 1, 4 through 6, 8 through 11, 14 through 16 and 18 through 20 additionally stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Ripka in view of Chase.

Claims 1, 4 through 6, 8 through 11, 14 through 16 and 18 through 20 also stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Reinke.

Rather than attempt to reiterate the full text of the examiner's positions set forth in the above-noted rejections and the conflicting viewpoints advanced by the examiner and appellants regarding those rejections, we refer to the examiner's answer (Paper No. 15, mailed May 20, 2003), to appellants' brief (Paper No. 13, filed April 1, 2003), and to the reply brief (Paper No. 16, filed June 13, 2003), for a full exposition thereof.

#### OPINION

In reviewing the obviousness issues raised in this appeal, we have carefully considered appellants' specification and claims, the applied prior art references, and the respective viewpoints advanced by appellants and the examiner. As a

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consequence of our review, we have determined, for the reasons which follow, that the examiner's respective rejections of the appealed claims are not well founded, and that the evidence relied upon by the examiner does not support a conclusion of obviousness under 35 U.S.C. § 103 with respect to the subject matter of claims 1, 4 through 6, 8 through 11, 14 through 16 and 18 through 20 on appeal.

Looking first to the examiner's rejection of claims 1, 4 through 6, 8 through 11, 14 through 16 and 18 through 20 under 35 U.S.C. § 103(a) as being unpatentable over Ripka, we make note of the examiner's position as set forth on pages 5 and 6 of the answer, but find nothing therein that identifies where specifically in Ripka there is to be found "in at least one flow passage" the cross-sectional shape thereof transitioning from "an unenhanced form to an enhanced form in a gradual manner so as to reduce the occurrence of stress therein, the length of said transition being defined by the following relationship:  $1.7 < L/D_h a < 7.0$  ...," as set forth in similar language in both independent claims 1 and 11 on appeal. The examiner's reliance on "(col. 5, lines 52-68, col. 6, lines 1-2, fig. 2, fig. 9, fig. 3)" of Ripka for this aspect of appellants' claimed subject

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matter appears to us to be misplaced, since those portions of the Ripka patent refer to and show configurations for more than one flow passage, i.e., for flow passages (102) and (104), and the second curved portion (105). As a further point, while it may be true that there exists a transition region in the heat exchanger of Ripka that has some length, an average hydraulic diameter, a cross-sectional area of the flow passage, and a given wetted perimeter, we are at a loss to understand exactly what "relationship" (answer, page 5) the examiner thinks such transition region satisfies or is defined by, since at that point in the examiner's statement of the basis for the rejection, the examiner has merely used "... " to represent the relationship. As for the examiner's further positions that

[i]t would have been an obvious matter of design choice to modify Ripka to provide the transition length is further defined by the following relationship  $2.6 < L/D_{ha} < 6.1$ ,  $2 \text{ inches} < L < 8 \text{ inches}$ ,  $3 \text{ inches} < L < 7 \text{ inches}$ ,  $1.7 < L/D_{ha} < 7.0$ , since applicant has not disclosed that the specified length solves any stated problem in a new or unexpected way or is for any particular purpose which is unobvious to one of ordinary skill and it appears that the claimed feature does not distinguish the invention over similar features in the prior art, since the length of Ripka will perform the invention as claimed by the applicant. It would have been an obvious matter of design choice to modify Ripka to provide one form of said flow path

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is wavy in form, said transition is from a generally oval shape to a wavy shape, since applicant has not disclosed that the shape or form of the transition solves any stated problem in a new or unexpected way or is for any particular purpose which is unobvious to one of ordinary skill and it appears that the claimed feature does not distinguish the invention over similar features in the prior art, since the shape or form of Ripka will perform the invention as claimed by the applicant (answer, pages 5-6),

we find no basis whatsoever in Ripka or otherwise for such wholesale speculation and conjecture on the examiner's part.

When an obviousness rejection is based on a single prior art reference, there must be a showing of a suggestion or motivation to modify the teachings of that reference to arrive at the claimed subject matter. See In re Kotzab, 217 F.3d 1365, 1370, 55 USPQ2d 1313, 1316-17 (Fed. Cir. 2000). There is no such showing in the rejection presently before us on appeal. Moreover, the examiner is clearly in error with regard to the assertions that appellants have not disclosed that the specified length of the transition region solves any stated problem or is for any particular purpose. Appellants' specification at pages 8 through 10 and Figure 8 of the application clearly highlight both the problem solved and the particular purpose served by a

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transition region within the range specified in the claims on appeal. In this light, it is clear to us that the limitation at issue cannot be dismissed as merely being a matter of "obvious design choice," based solely on the examiner's bald assertion that such is the case.

For the reasons set forth above, we share appellants' view that the examiner has not made out a ***prima facie*** case of obviousness, and for that reason we will not sustain the examiner's rejection of claims 1, 4 through 6, 8 through 11, 14 through 16 and 18 through 20 under 35 U.S.C. § 103(a) as being unpatentable over Ripka.

The next rejection for our consideration is that of claims 1, 4 through 6, 8 through 11, 14 through 16 and 18 through 20 under 35 U.S.C. § 103(a) as being unpatentable over Ripka in view of Chase. In this instance, the examiner expressly concedes that Ripka does not disclose a transition region having a length as specified in independent claims 1 and 11 on appeal, but urges that Chase teaches a transition region of the claimed length and which satisfies the various relationships set forth in appellants' claims on appeal. From the combined teachings of

Ripka and Chase, the examiner concludes (answer, pages 4-5) that it would have been obvious to one of ordinary skill in the art to modify Ripka by including the length of said transition being defined by the relationships as purportedly taught by Chase for the purpose of providing a furnace with compact construction to maximize heat transfer.

Again, we note that the examiner has not specifically identified in the rejection exactly which one of the flow passages in either Ripka or Chase contains a transition region like that defined in the claims on appeal. Like appellants, we observe that Chase shows a heat exchanger (Figs. 4-6) which transitions from a single flow passage (24b) with a generally flat with rounded ends configuration as seen in Figures 4 and 6 to an enhanced three flow passageway arrangement (25a, 25b, 25c) seen in Figures 4 and 5, wherein each of the three flow passageways is generally circular in configuration. The actual transition from the passageway configuration (24b) seen in Figure 6 to the three passageway arrangement (25a, 25b, 25c) of Figures 2 and 5 in Chase appears from Figures 4-6 of that patent to be rather abrupt and thus would not seem to occur in a "gradual

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manner" and over a transition length within the range specified in appellants' claims on appeal.

As for Ripka, this patent shows a heat exchanger (Figs. 1-14) which transitions, at (106), from a single flow passageway with a generally elliptical configuration as seen in Figures 9 and 10 to a reduced cross-section, single flow passageway of generally rectangular configuration as seen in Figure 11. Thus, although both of the applied references seek to maintain an increase in flow velocity as the combustion gas flow moves through the heat exchanger so as to enhance internal gas-to-surface heat transfer, given the clearly different configurations selected by Ripka and Chase to achieve this result, we see no cogent reason why one of ordinary skill in the art would have sought to import selected dimensional features of some portion of the heat exchanger in Chase into the structurally different heat exchanger of Ripka. Moreover, as we noted above, it does not appear to us that Chase actually teaches or suggests a gradual transition region having a length like that claimed by appellants. Accordingly, we will not sustain the examiner's rejection of claims 1, 4 through 6, 8 through 11, 14 through 16

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and 18 through 20 under 35 U.S.C. § 103(a) as being unpatentable over Ripka in view of Chase.

The last of the examiner's rejections for our review is that of claims 1, 4 through 6, 8 through 11, 14 through 16 and 18 through 20 under 35 U.S.C. § 103(a) as being unpatentable over Reinke. The examiner's basis for this rejection is set forth on pages 6 through 8 of the answer and appears to be premised on the examiner's belief that it would have been merely an obvious matter of design choice for one of ordinary skill in the art to size the transition region seen as the ramp at the beginning of passageway (14) in Figure 1 of Reinke to have a length in the range specified in appellants' claims on appeal,

since applicant has not disclosed how, the length of said transition being defined by the following relationship:  $1.7 < L/D_{ha} < 7.0$  wherein,  $L/D_{ha}$  = The ratio of transition length (L) to the average hydraulic diameter ( $D_{ha}$ ) over the entire transition length, and wherein the hydraulic diameter  $D_h$  is defined as:  $D_h = 4A/P$ , where A is the cross sectional area of the flow passage, P is the wetted perimeter, the transition length is further defined by the following relationship  $2.6 < L/D_{ha} < 6.1$ , 2 inches  $< L < 8$  inches, 3 inches  $< L < 7$  inches solves any problem in a new way or provides unexpected results that would be unobvious to one of ordinary skill in the art since the length of Reinke et al

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would perform the invention as claimed by the applicant (answer, page 7).

For the same reasons we found this type of unsupported assertion by the examiner to be unpersuasive of obviousness under 35 U.S.C. § 103 in the rejection involving Ripka, *supra*, we find it equally unpersuasive here. Although it is clear that there must be some form of transition region between the generally circular flow passageway (12) and the wavy configuration portion (50) of the flow passageway (14) seen in Figures 1 and 3 of Reinke, we find no particular disclosure in this patent concerning any details of such a transition region, the need for such a transition to occur in a gradual manner, and nothing whatsoever concerning a length or range of lengths for such a transition region which would be like that claimed by appellants. As for the examiner's attempt on page 10 of the answer to selectively import dimensional features of the heat exchanger of Chase into the structurally different heat exchanger of Reinke, we find no basis for such assumption or the examiner's consequent speculation concerning the length of the transition region of Reinke being 1/3 to 1/4 of 18.5 inches, i.e., the overall length ( $L_2$ ) of the heat exchanger in Chase.

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For the reasons set forth above, we find that the examiner has not made out a ***prima facie*** case of obviousness, and for that reason we will not sustain the examiner's rejection of claims 1, 4 through 6, 8 through 11, 14 through 16 and 18 through 20 under 35 U.S.C. § 103(a) as being unpatentable over Reinke.

Since we have not sustained any of the examiner's rejections on appeal, it follows that the decision of the examiner rejecting claims 1, 4 through 6, 8 through 11, 14 through 16 and 18 through 20 of the present application under 35 U.S.C. § 103(a) is reversed.

REVERSED

IRWIN CHARLES COHEN	)	
Administrative Patent Judge	)	
	)	
	)	
	)	BOARD OF PATENT
NEAL E. ABRAMS	)	APPEALS
Administrative Patent Judge	)	AND
	)	INTERFERENCES
	)	
	)	
	)	
CHARLES E. FRANKFORT	)	
Administrative Patent Judge	)	

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