

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opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.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. 37

UNITED STATES PATENT AND TRADEMARK OFFICE

---

BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

---

Ex parte MICHIIYASU YAMAMOTO, KEN YAMAMOTO  
and RYOUICHI SANADA

---

Appeal No. 97-3006  
Application 08/571,032<sup>1</sup>

---

ON BRIEF

---

Before McCANDLISH, Senior Administrative Patent Judge, COHEN  
and McQUADE, Administrative Patent Judges.

McQUADE, Administrative Patent Judge.

DECISION ON APPEAL

Michiyasu Yamamoto et al. appeal from the final rejection

---

<sup>1</sup> Application for patent filed December 12, 1995.  
According to appellants, the application is a continuation of  
Application 08/155,227, filed November 22, 1993, now  
abandoned.

Appeal No. 97-3006  
Application 08/571,032

of claims 1 and 3, the only claims pending in the application.  
We reverse.

The invention relates to a refrigerant condenser wherein the refrigerant changes direction, i.e., turns, at least once as it flows through the condenser. According to their specification, the appellants have discovered an optimal relationship in terms of heat exchange efficiency between the condensation distance in such a condenser (which is a function of the number of turns) and the equivalent or hydraulic diameter of the refrigerant flow tubes. Claim 1 reads as follows:

1. A refrigerant condenser comprising:
  - a plurality of superposed tubes having opposing ends,
  - a pair of headers joined to the tubes at the ends thereof, and
  - separators disposed inside the headers for dividing the tubes into a plurality of groups,
  - a high temperature, high pressure gaseous refrigerant flowing through the tube groups changing in direction of flow in the headers,
  - when the number of times the direction of flow is changed in the headers is  $N$  and the distance between the pair of headers is  $W$  (unit: mm), the distance  $W$  being selected within

Appeal No. 97-3006  
Application 08/571,032

the range of 300 to 800 mm, the condensation distance L (unit: mm) of the refrigerant is expressed by the equation:  $L = (N+1)W$ , and

the condensation distance L (unit: mm) is  $L = 400 + 1180 d_e$  to  $700 + 1180 d_e$

where the equivalent diameter in the tubes corresponding to the tube area is  $d_e$  (unit: mm), and the equivalent diameter  $d_e$  (unit: mm) of the tubes is less than 1.15 mm,

the number N being an integer rounded from the expression  $(L/W)-1$ .

The items relied upon by the examiner as evidence of obviousness are:

Guntly et al. (Guntly)	4,998,580	Mar. 12, 1991
Hoshino et al. (Hoshino)	5,190,100	Mar. 2, 1993
	(filed Mar. 19, 1991)	

The item relied upon by the appellants as evidence of non-obviousness is:

The 37 CFR § 1.132 Declaration filed on August 26, 1996 as part of Paper No. 25.

Claims 1 and 3 stand rejected under 35 U.S.C. § 103 as being unpatentable over Hoshino in view of Guntly.

Reference is made to the appellants' brief (Paper No. 29) and to the examiner's answer (Paper No. 30) for the respective positions of the appellants and the examiner with regard to

the merits of this rejection.

Hoshino discloses a refrigerant condenser 10 composed of headers 13 and 14, coolant inlet and outlet pipes 16 and 18, and a core consisting of a plurality of planar tubes 11 and corrugated fins 12. Each of the headers includes an internal partition 20 and 21 for "turning" the refrigerant flow path through the condenser (see Figure 8). In discussing the provision of a core which enhances heat exchange efficiency, Hoshino indicates that a delicate balance must be struck between the various dimensional characteristics of the tubes 11 and fins 12 (see column 5, line 59, through column 6, line 38).

Guntly also discloses a refrigerant condenser composed of headers 10 and 12, coolant inlet and outlet fittings 26 and 32, and a core consisting of a plurality of flattened tubes 20 and serpentine fins 34. In contrast to the Hoshino condenser, Guntly's headers do not include internal partitions. As a result, the coolant flows through the condenser in hydraulically parallel fluid flow paths with no turns. Like Hoshino, Guntly is concerned with improving the heat exchange

efficiency of the condenser. Guntly proposes that this can be accomplished by, among other things, constructing the tubes to define capillary fluid flow paths of relatively small hydraulic diameter (see, for example, column 4, lines 42 through 54). Guntly adds that such capillary flow paths afford the additional benefit of rendering the operation of the condenser free from the effects of gravity (see column 6, lines 33 through 38).

In the examiner's view, Hoshino meets all of the limitations in claim 1 except for the one requiring the equivalent (i.e, hydraulic) diameter of the tubes to be less than 1.15 mm (see page 3 in the answer). To overcome this deficiency, the examiner relies on Guntly to conclude that "it would have been obvious to one of ordinary skill in the art to provide a smaller equivalent diameter in the tubes of the condenser of Hoshino et al. to make its refrigerant passages capillary and thus permit its use in any orientation" (answer, page 4).

As is clearly evident from the teachings of both Hoshino and Guntly, however, the design of refrigerant condenser tubes is a rather complex area of endeavor. Furthermore, Hoshino's

Appeal No. 97-3006  
Application 08/571,032

condenser involves changes of refrigerant flow path direction (i.e., turns) while Guntly's condenser does not. Given the complexity of condenser tube design, the disparate natures of the Hoshino and Guntly condensers and the failure of either reference to recognize the relationship between condensation distance and equivalent diameter appreciated by the appellants and set forth in claim 1, we are led to conclude that the only suggestion for combining Hoshino and Guntly in the manner proposed by the examiner stems from hindsight knowledge impermissibly derived from the appellants' own teachings. In other words, the examiner's reference evidence fails to establish a prima facie case of obviousness with respect to the subject matter recited in claim 1 and in claim 3 which depends therefrom.<sup>2</sup> Therefore, we shall not sustain the standing 35 U.S.C. § 103 rejection of these claims.

The decision of the examiner is reversed.

REVERSED

---

<sup>2</sup> This being so, we find it unnecessary to delve into the merits of the appellants' 37 CFR § 1.132 declaration evidence of non-obviousness.

Appeal No. 97-3006  
Application 08/571,032

	HARRISON E. McCANDLISH	)	
	Senior Administrative Patent Judge	)	)
		)	
		)	
		)	
	IRWIN CHARLES COHEN	)	) BOARD OF
PATENT	Administrative Patent Judge	)	APPEALS AND
		)	INTERFERENCES
		)	
		)	
	JOHN P. McQUADE	)	
	Administrative Patent Judge	)	

Appeal No. 97-3006  
Application 08/571,032

Cushman, Darby and Cushman  
Ninth Floor East Tower  
1100 New York Avenue, NW  
Washington, DC 20005-3918

jpm/ki