

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. 21

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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Ex parte TACK-DON HAN, GI-HO PARK and SHIN-DUG KIM

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Appeal No. 1998-2596  
Application 08/522,222

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ON BRIEF

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Before JERRY SMITH, BARRETT, and RUGGIERO, Administrative Patent Judges.

JERRY SMITH, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on the appeal under 35 U.S.C. § 134 from the examiner's rejection of claims 1-27, which constitute all the claims in the application.

The disclosed invention pertains to the field of instruction prefetching in a computer. In this field, instructions are prefetched from a main memory and transferred

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to an on-chip memory based on predictions as to what instructions a computer will probably execute after the instruction in progress has been completed. The invention is primarily concerned with the manner of caching prefetched instructions which are not subsequently referenced by the computer.

Representative claim 1 is reproduced as follows:

1. An instruction prefetching method wherein instruction blocks prefetched in accordance with an instruction prefetch mechanism, but not referenced by a central processing unit are stored in an on-chip memory without being discarded upon replacing them by new ones in a prefetch buffer so that they are to be used for memory reference at later times.

The examiner relies on the following reference:

Jouppi et al. (Jouppi)                      5,261,066                      Nov. 09, 1993

Claims 1-27 stand rejected under 35 U.S.C. § 103. As evidence of obviousness the examiner offers Jouppi taken alone.

Rather than repeat the arguments of appellants or the examiner, we make reference to the briefs and the answer for the respective details thereof.

OPINION

We have carefully considered the subject matter on

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appeal, the rejection advanced by the examiner and the evidence of obviousness relied upon by the examiner as support for the rejection. We have, likewise, reviewed and taken into consideration, in reaching our decision, the appellants' arguments set forth in the briefs along with the examiner's rationale in support of the rejection and arguments in rebuttal set forth in the examiner's answer.

It is our view, after consideration of the record before us, that the evidence relied upon and the level of skill in the particular art would not have suggested to one of ordinary skill in the art the obviousness of the invention as set forth in claims 1-27. Accordingly, we reverse.

In rejecting claims under 35 U.S.C. § 103, it is incumbent upon the examiner to establish a factual basis to support the legal conclusion of obviousness. See In re Fine, 837 F.2d 1071, 1073, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). In so doing, the examiner is expected to make the factual determinations set forth in Graham v. John Deere Co., 383 U.S. 1, 17, 148 USPQ 459, 467 (1966), and to provide a reason why

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one having ordinary skill in the pertinent art would have been led to modify the prior art or to combine prior art references to arrive at the claimed invention. Such reason must stem from some teaching, suggestion or implication in the prior art as a whole

or knowledge generally available to one having ordinary skill in the art. Uniroyal, Inc. v. Rudkin-Wiley Corp., 837 F.2d 1044, 1051, 5 USPQ2d 1434, 1438 (Fed. Cir.), cert. denied, 488 U.S. 825 (1988); Ashland Oil, Inc. v. Delta Resins & Refractories, Inc., 776 F.2d 281, 293, 227 USPQ 657, 664 (Fed. Cir. 1985), cert. denied, 475 U.S. 1017 (1986); ACS Hosp. Sys., Inc. v. Montefiore Hosp., 732 F.2d 1572, 1577, 221 USPQ 929, 933 (Fed. Cir. 1984). These showings by the examiner are an essential part of complying with the burden of presenting a prima facie case of obviousness. Note In re Oetiker, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992). If that burden is met, the burden then shifts to the applicant to overcome the prima facie case with argument and/or evidence.

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Obviousness is then determined on the basis of the evidence as a whole and the relative persuasiveness of the arguments. See Id.; In re Hedges, 783 F.2d 1038, 1039, 228 USPQ 685, 686 (Fed. Cir. 1986); In re Piasecki, 745 F.2d 1468, 1472, 223 USPQ 785, 788 (Fed. Cir. 1984); and In re Rinehart, 531 F.2d 1048, 1052, 189 USPQ 143, 147 (CCPA 1976). Only those arguments actually made by appellants have been considered in this decision. Arguments which appellants could have made but chose not to make in the briefs have not been considered [see 37 CFR § 1.192(a)].

With respect to independent claim 1, the examiner indicates how he reads claim 1 on the disclosure of Jouppi. The examiner cites victim cache 52 as storing instructions which have been removed from the primary cache. The examiner notes that Jouppi does not teach that these instructions are not referenced by the CPU, however, the examiner asserts that the victim instructions of Jouppi are analogous to the prefetched instructions of the claimed invention. The examiner concludes that it would have been obvious to use the

victim cache as disclosed by Jouppi [answer, pages 3-4].

Appellants argue that the examiner has incorrectly analyzed the Jouppi disclosure and has confused the disclosures relating to the miss cache, the victim cache and the prefetch techniques. Specifically, appellants argue that the victim cache of Jouppi, which is cited by the examiner to reject claim 1, is loaded only with items from cache 20 which only holds items which have previously been referenced by the computer. Appellants additionally argue that the prefetch instructions of Jouppi are not stored in the victim cache as asserted by the examiner [brief, pages 4-11]. Thus, appellants argue that Jouppi's victim cache does not store blocks which have not been referenced by the computer as recited in claim 1. The examiner responds that although the victim cache of Jouppi contains blocks thrown out from cache 20, this does not mean that the data blocks from the cache 20 are already referenced by the computer [answer, page 16].

We agree with appellants' position for essentially the

reasons set forth in the main brief. The items in direct cache 20 are placed there only in response to a reference by the computer. Therefore, the items in victim cache 52, which come from direct cache 20, have already been referenced by the computer. The recitation in claim 1 "but not referenced by a central processing unit" eliminates directly cached items from consideration. Instead, the noted recitation from claim 1 requires that qualified instructions be prefetched, that is not yet referenced by the computer. The instructions which are prefetched in Jouppi are stored in a stream buffer 62. These instructions are loaded into direct cache 20 if they are subsequently referenced by the computer. However, these instructions are discarded when additional instructions get placed into the stream buffer [column 10, lines 24-49]. Claim 1

also recites that the instructions not referenced by the computer are not "discarded upon replacing them by new ones in a prefetch buffer." Since the prefetch buffer 62 of Jouppi

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does discard

these instructions, it also cannot meet the recitations of claim 1. Thus, neither victim cache 52 nor prefetch buffer 62 can meet the limitations set forth in claim 1.

The examiner's incorrect findings with respect to the teachings of Jouppi result in the examiner having failed to establish a prima facie case of the obviousness of claim 1. Therefore, we do not sustain the rejection of claim 1 or of claims 2-5 which depend therefrom. Since the examiner's rejection of all the remaining claims relies on the same incorrect interpretation of Jouppi, we also do not sustain the rejection of claims 6-27 for reasons discussed above and for the additional reasons set forth in appellants' main brief with respect to these claims.

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In summary, we have not sustained the examiner's rejection of any of the claims on appeal based on Jouppi taken alone. Accordingly, the decision of the examiner rejecting claims 1-27 is reversed.

REVERSED

JERRY SMITH	)	
Administrative Patent Judge	)	
	)	
	)	
	)	BOARD OF PATENT
LEE E. BARRETT	)	)
Administrative Patent Judge	)	APPEALS AND
	)	
	)	INTERFERENCES
	)	
JOSEPH F. RUGGIERO	)	
Administrative Patent Judge	)	

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JS:pgg  
The Law Offices of Fleshner & Kim  
P.O. Box 221200  
Chantilly, Virginia 20153-1200