

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte GUNJEET BAWEJA and HARSH KUMAR

Appeal No. 2006-2633
Application No. 09/174,434

ON BRIEF

Before THOMAS, BLANKENSHIP, and HOMERE, Administrative Patent Judges.
BLANKENSHIP, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal under 35 U.S.C. ' 134 from the examiner=s final rejection of claims 63-84, which are all the claims remaining in the application.

We reverse.

BACKGROUND

The invention relates to branch prediction accuracy in computer processor design.

Representative claim 63 is reproduced below.

63. An apparatus comprising:

- a first portion including a bimodal branch predictor and a local branch predictor;
- a second portion in parallel with the first portion, the second portion including a global branch predictor.

The examiner relies on the following reference:

McFarling et al. (McFarling) 5,758,142 May 26, 1998

Claims 63-71 and 77-81 stand rejected under 35 U.S.C. ' 102 as being anticipated by McFarling.

Claims 72-76 and 82-84 stand rejected under 35 U.S.C. ' 103 as being unpatentable over McFarling.

We refer to the Final Rejection (mailed May 25, 2004) and the Examiner=s Answer (mailed Mar. 20, 2006) for a statement of the examiner=s position and to the Brief (filed Feb. 15, 2006) and the Reply Brief (filed May 24, 2006) for appellants= position with respect to the claims which stand rejected.

OPINION

Appellants argue that McFarling fails to anticipate the subject matter of instant claim 63. In particular, appellants submit that the reference does not describe a bimodal branch predictor within the meaning of the claim.

The examiner responds that appellants= disclosure indicates that a local branch predictor consists of a counter (e.g., 2-bit counters) and a history table. The examiner finds that unit (past history table) 13, as shown in McFarling Figure 1, has a non-modular counter that is not shown in the figures. The examiner bases the finding on column 4, lines 55 through 60 of the reference. According to the examiner, McFarling describes a history table and an

associated counter. The counters associated with Abimodal predictor@ 14 (McFarling Fig. 1) are separate and distinct from the non-modular counter not shown in the figures, in the examiner=s view. (Answer at 10.) The examiner acknowledges that McFarling does not use the same terms of instant claim 63, but the components in McFarling are the same with respect to functionality. (Id. at 12.) Appellants respond, in turn, that the non-modular counter described at column 4, lines 55 through 60 is, in fact, part of counter table 14. (Reply Brief at 2-3.)

McFarling describes a local branch predictor 12 (Fig. 1) containing a past history table 13 and file 14, comprised of a plurality of M-bit counters. McFarling also describes a global branch predictor 16, with the local and the global branch predictors comprising a choosing predictor. McFarling col. 4, l. 5 - col. 5, l. 65; Fig. 1. McFarling at column 4, lines 48 through 67 describes counter (branch prediction) table 14 as comprised of non-modular counters, consistent with appellants= arguments and the ACOUNTERS@ shown as part of counter table 14 in Figure 1 of the reference.

We therefore find that, on this record, there is no reasonable basis for the examiner=s reading of the Alocal branch predictor@ of instant claim 63 on the disclosure of McFarling. Because each of the remaining independent claims rejected under ' 102 (claims 66, 70, and 77) contains similar limitations relating to the combination of the bimodal, local, and global predictors, we do not sustain the rejection of any of claims 63-71 and 77-81.

With respect to the ' 103 rejection of claims 72-76 and 82-84 over McFarling, the examiner relies on a different portion of the reference=s disclosure.¹ The rejection of representative claim 75 relies, for the most part, on the tournament predictor depicted in Figure 9 of the reference, further described at column 10 of McFarling.

¹ In view of the limitations of claim 72 as compared with, for example, claim 63, it is not clear why claim 72 was not included in the ' 102 rejection.

² The instant rejections do not rely on appellants= admitted prior art, which does include bimodal predictors. Instant claim 63, for example, appears to differ from the prior art depicted in instant Figure 1f by the word Aand.@ That is, the prior art contains a bimodal predictor Aor@ a local predictor in parallel with a global predictor.

We are not persuaded by appellants= arguments at page 14 of the Brief, alleging that McFarling=s reference to Adifferent prediction algorithms@ (col. 10, ll. 44-46) does not relate to different Atypes@ of prediction algorithms. Column 10, lines 22 through 25 of the reference provides an example of Adifferent algorithms@ -- local and global algorithms. Nor are we persuaded by appellants= arguments at page 5 of the Reply Brief, noting that unit 74' (McFarling Fig. 9) is a Amux@ rather than a Apredictor.@ Appellants= observation is correct. However, although the statement of the rejection refers to Aa global branch predictor as a unit 74',@ (Answer at 8), we assume that A74'@ should be A71',@ consistent with the examiner=s earlier findings in the statement of the rejection (id. at 7).

In any event, we agree with appellants with respect to the ultimate conclusion. We agree with the examiner to the extent that McFarling discloses, at column 10, that component predictors 72, 76, and 71' (consisting of predictors 72' and 76') may operate using different prediction algorithms. However, the rejection further relies on the finding (Answer at 7) that McFarling discloses, inter alia, a bimodal branch predictor. The ' 103 rejection fails because the examiner has not shown that McFarling describes a bimodal branch predictor within the meaning of the claims.² The rejections over McFarling are thus not sustained.

CONCLUSION

The rejection of claims 63-84 under 35 U.S.C. ' 102 or ' 103 over McFarling is reversed.

REVERSED

JAMES D. THOMAS)
Administrative Patent Judge)
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) BOARD OF PATENT
HOWARD B. BLANKENSHIP) APPEALS
Administrative Patent Judge) AND
) INTERFERENCES
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