When does functional language in an apparatus claim become a claim limitation?

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Nazomi Communications, Inc. v *Western Digital Corp. and Sling Media, Inc.*

- Nazomi sued Western Digital Corp. and Sling Media, Inc. along with several others for infringement of US Patent Nos. 7,080,362 and 7,225,436 in US District Court for the Northern District of California.
- Western Digital and Sling filed a motion for Summary of Judgment of non-infringement.
- District Court granted summary judgment of non-infringement.
- Nazomi appealed.

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Background

The ‘362 and ‘436 patents are directed to a Java hardware accelerator for implementing portions of the Java virtual machine in hardware. i.e., accelerating the translation of Java bytecodes into native CPU instructions.

One of the advantages of the hardware-based JVM of ‘362 and ‘426 patent is that is capable of processing stack-based instructions as well as register-based applications without using the JVM.

Claims at issue

- At issue are four apparatus claims from the two patents:

  independent claims 48 and 74 of the ‘362 patent; and

  independent claims 1 and 5 of the ‘436 patent.

- Claim 48 was selected as the representative claims without dispute.

Representative Claim

48. A central processing unit (CPU) capable of executing a plurality of instruction sets comprising:

an execution unit and associated register file, the execution unit to execute instructions of a plurality of instruction sets, including a stack-based and a register-based instruction set;

a mechanism to maintain a least some data from the plurality of instructions sets in the register file, including maintaining an operand stack for the stack-based instructions in the register file and an indication of a depth of he operand stack;

a stack control mechanism that includes at least one of an overflow and underflow mechanism, wherein at least some of the operands are moved between the register file and memory; and

a mechanism to generate an exception in respect of selected stack-based instructions.

Western Digital and Sling

- Both Western Digital and Sling are consumer product manufacturers that incorporate various processors into their products.
- At issue here is their incorporation of an ARM processor design into Western's MyBook World Edition and Sling's Slingbox Pro-HD.

Products at issue

- Both the MyBook and Slingbox have CPUs containing an ARM core with Jazelle hardware, but do not include the Jazelle Technology Enabling Kit ("JTEK").
- Neither Western Digital nor Sling licensed the JTEK software from ARM and have never installed the JTEK software to enable Jazelle on the accused devices.

Jazelle Hardware Accelerator

- In 2000, ARM developed a chip design that accelerates the processing of Java bytecodes, referred to as Jazelle.
- Because the ARM core design and the chips based on that core are intended to be used in a wide variety of products, they often contain optional functional not utilized nor enabled by every manufacturer, such as Jazalle.
- To enable the Jazalle hardware, manufacturers can license the Jazalle Technology Enabling Kit ("JTEK").

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District Court's Claim Construction

- The District Court found that the claimed apparatus must itself be capable of performing the claimed functions, and construed the asserted claims to require a hardware and software combination capable of processing both register-based and stack-based instructions.
- Based on this interpretation, the Court concluded that without the enabling JTEK software, the Jazelle hardware cannot process stack-based instructions at all.
- Nazomi argued that the claims should be construed to require only hardware that was capable of performing the claimed functionality.
- The Federal Circuit agrees with the District Court.

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Representative Claim revisited

48. A central processing unit (CPU) capable of executing a plurality of instruction sets comprising:

an execution unit and associated register file, the execution unit ***to execute instructions of a plurality of instruction sets, including a stack-based*** and a register-based instruction set;

a mechanism to maintain a least some data from the plurality of instructions sets in the register file, including ***maintaining an operand stack for the stack-based instructions*** in the register file and an indication of a depth of he operand stack;

a ***stack control mechanism*** that includes at least one of an overflow and underflow mechanism, wherein at least some of the operands are moved between the register file and memory; and

a mechanism ***to generate an exception*** in respect

Federal Circuit Analysis

- The claims recite a CPU that can perform particular functions, namely the processing of both register-based and stack-based instructions.
- Representative claim 48 does not recite generic mechanisms, but requires specific functions of "(1) maintaining an operand stack for the stack-based instructions; (2) performing 'stack control' of 'overflow/underflow' by moving operands between the registers and memory; and (3) generating exceptions for certain stack-based instructions."
- The need for the specified functionality is confirmed by the '362 patent specification, which indicates that "the [Java] hardware accelerator can convert the stack-based Java bytecodes into…register-based native instructions on a CPU."

Federal Circuit Analysis

- The face of the claims shows that each particular functionality is a claim limitation.
- The claims recite specific functionality that cannot be practiced in hardware alone and require enabling software.
- Since hardware cannot meet these limitations in the absence of enabling software, the claims are properly construed as claiming an apparatus comprising a combination of hardware and software capable of practicing the claim limitations.

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Federal Circuit Analysis

- Nazomi points out that the Fed. Cir. has held that "an apparatus claim directed to a computer that is claimed in functional terms is nonetheless infringed so long as the product is designed in such a way as to enable the user of that [product] to utilize the function *without having to modify the product*." *Silicon Graphics, Inc. v. ATI technology, Inc.* 607 F.3d 784, 794 (Fed. Cir. 2010).
- Nazomi argues that the installation of the JTEK software is not a modification that precludes a finding of infringement.
- Western Digital and Sling argue that installation of the JTEK software would require hacking the products.
- Fed. Cir. did not address the hacking issue, because they found installation of the software, without hacking, a modification of the product.

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Silicon Graphics Representative Claim

1. A computer system comprising:

a processor for performing geometric calculations on a plurality of vertices of a primitive;

a rasterization circuit coupled to the processor that rasterizes the primitive according to a rasterization process which operates on a floating point format;

a frame buffer coupled to the rasterization circuit for storing a plurality of color values; and

a display screen coupled to the frame buffer for displaying an image according to the color values stored in the frame buffer.

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Silicon Graphics Analysis

- Even if the products cannot rasterize or store absent an operating system, if they include a rasterization circuit and a frame buffer for doing so they infringe separate and apart from the operating system.
- Nothing in the record suggests the operating system provides anything other than a way to activate the accused product.

Drafting Solutions?

- Could the apparatus claims have been drafted to only recite hardware?
- Would reciting an execution unit…adapted to execute instructions have changed the outcome?
- Would "capable of" changed the outcome?
- Would the use of means plus function language have changed anything?

In re Raymond Gianneli

- Gianelli appealed the PTAB's affirmance of the rejection of claims 1-25 of Application No. 10/378,261 under 35 USC §103(a) as obvious over US Patent No. 5,997,447.
- Representative claim 1 recites a row exercise machine comprising an input assembly including a first handle portion **adapted to be** moved from a first position to a second position by a pulling force exerted by a user on the first handle portion….

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In re Raymond Gianneli

- The Board characterized the dispositive issue as being whether the chest press machine of the ‘447 patent was “capable of being used by exerting a pulling force on the handles in a rowing motion.”
- The Board deemed it reasonable that a user could face the handles of the prior art machine and exert a pulling force on its handles in a rowing motion.
  The Board noted that the recitation of a new intended use for an old product did not make a claim to the old product patentable.
- The Board also noted that Gianneli had not shown that the prior art device could not be used in such a manner.

In re Raymond Gianneli

- The Fed. Circuit noted that although the phrase adapted to can also mean "capable of" or "suitable for," the specification of the '261 application makes it clear that "adapted to" as used in the application means designed or constructed to be used as a rowing machine.
- Therefore, the dispositive issue was whether the prior art apparatus was "made to", "designed to", or "configured to" allow the user to perform a rowing exercise by pulling the handles.
- There is not question the chest machines of the '447 patent does not have handles that are adapted/designed to be pulled in a rowing motion.
- "the mere capability of pulling the handles is not the inquiry that the Board should have made; its should have determined whether it would have been obvious to modify the prior art apparatus to arrive at the claimed rowing machine."

Questions?