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Could Benson Get a Patent Today?



BY LEE HOLLAAR

When the U.S. Supreme Court issued its opinion in *Alice Corp. Pty Ltd. v. CLS Bank Int'l* (134 S. Ct. 2347, 110 U.S.P.Q.2d 1976 (2014) (119 PTD, 6/20/14)) on June 19, 2014, it became much more difficult to get a patent on a software-based invention. The Court stated that “the mere presence of a generic computer cannot transform a patent-ineligible abstract idea into a patent-eligible invention.” It goes on to say that “claims to a computer system and a computer-readable medium fail for substantially the same reasons.”

Unfortunately, the Court provided little guidance on how to determine what is an “abstract idea,” although the opinion does caution that one must “tread carefully in construing this exclusionary principle lest it swallow all of patent law” because every invention must “embody, use, reflect, rest upon, or apply laws of nature, natural phenomena, or abstract ideas.” *Alice* does not even address what was claimed, bringing to mind Justice Stewart’s famous test for obscene material, “I know it when I see it.” (*Jacobellis v. State of Ohio*, 378 U.S. 184, 197 (1964).)

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For a while after *Alice*, it seemed like every patent on a software-based invention was being invalidated by lower courts citing *Alice*. But that is likely because the only patents currently being litigated are those that were granted on applications that were filed long before *Alice*. It is not surprising that such patents claimed methods of doing business (in line with *State Street Bank & Trust Co. v. Signature Financial Group Inc.*, 149 F.3d 1368, 47 U.S.P.Q.2d 1596 (Fed. Cir. 1998)), articles of manufacture (in line with *In re Beauregard*, 53 F.3d 1583, 35 U.S.P.Q.2d 1383 (Fed. Cir. 1995)), and other ways of claiming that were approved by the U.S. Court of Appeals for the Federal Circuit which are now questionable under *Alice*. Since a patent owner goes into court with the claims that were issued, not what they should be under later court decisions, trial courts are invalidating most of those patents and the Federal Circuit is affirming those decisions.

It will be years before claims written in light of *Alice* reach the Federal Circuit (and hopefully escape Supreme Court review). First, the examiner must reject a claim twice before it can be appealed to the Patent Trial and Appeals Board, at which point it enters the board’s backlog queue of ex parte appeals, which is now several years long. Once the board hears the appeal and writes its opinion, the case can go to the Federal Circuit, which may issue its opinion in perhaps a year. We will have a good idea of what type of claims appear to pass the *Alice* test only after the Federal Circuit has issued a number of opinions on a variety of claim forms.

In the mean time, the Patent and Trademark Office offered guidance to its examiners in light of *Alice* on how to examine software-based applications. (See <http://www.uspto.gov/patent/laws-and-regulations/examination-policy/2014-interim-guidance-subject-matter-eligibility-0>.) While the guidance provides some idea of the office’s view of the various statutory subject matter decisions, it mainly parrots those opinions, treating them as if they were clear, coherent and consistent.

First, the examiner should “determine whether the claim is directed to a law of nature, a natural phenomenon, or an abstract idea (judicial exception).” Next, the examiner should “determine whether any element, or combination of elements, in the claim is sufficient to ensure that the claim amounts to significantly more than the judicial exception.”

It is interesting to see how today’s *Alice* test might work with the invention in the Supreme Court’s first “software patent” case, *Gottschalk v. Benson*, 409 U.S. 63, 175 U.S.P.Q. 673 (1972)), that started this confusion.

Was that invention inherently unpatentable, or could the application and claims be written in a way that would pass the current statutory subject matter tests?

Benson's Invention

Little information about Benson's invention is readily available beyond very brief descriptions in the U.S. Court of Customs and Patent Appeals (CCPA, predecessor to the Federal Circuit) and Supreme Court decisions. All that most people know is that it involves the conversion of a binary-coded decimal (BCD) number to a pure binary representation and, according to its claim 8, at least some embodiments of it use a reentrant shift register.

Benson's application is not available from the PTO because no patent was granted based on Benson's application. Today's publication of patent applications is the result of a 2000 amendment to the patent statutes, years after *Benson*. But the application was reprinted in the appeals record at the CCPA, and I have made that available online at <http://digital-law-online.info/papers/lah/BensonAppendix.pdf>. The briefs filed with the Supreme Court provide additional descriptive information.

Converting from BCD to binary certainly wasn't new at the time of Benson's invention. The patent office had an entire subclass for inventions that convert numbers from one representation to another (class 235, subclass 155), and it contained approximately 75 patents for means of converting between BCD signals and binary signals. But those techniques generally required either the addition of multi-digit binary numbers or the storage of a large number of conversion values. The latter was a significant concern at the time since the most common business computer, the IBM 1401, had only 1,400 six-bit memory locations, expandable to 16,000 locations.

Benson's technique was developed for a specialized processor that was to run a private branch telephone exchange (PBX). It was necessary because the PBX computer didn't have the multi-digit adder of a conventional computer and had very limited storage capacity. But it did take advantage of the reentrant shift register that was already in the PBX processor.

In *Benson*, the Court seemed to view the invention as encompassing the abstract idea of converting a BCD number to binary, rather than a better way of doing that task. Perhaps that is because there is no discussion of other ways of doing that in the original application, other than one paragraph that says with prior art techniques "the number of steps becomes appreciable and some of the steps relatively complex" and that can "significantly increase the amount of storage required, as well as the likelihood of error in the execution of a program."

The best-known technique for converting from BCD to binary is to clear a register and starting with the most-significant BCD digit, add it to the accumulator and then multiply the contents of the accumulator by 10. That is repeated for each of the remaining BCD digits until the last one, which is simply added to the accumulator to give the final answer. But for a N-digit BCD number, that requires N-1 multiplications, which are each a time-consuming operation consisting of many shifts and adds.

In contrast, Benson's technique only requires shifting and the addition of a fixed number to get the final result. It is essentially equivalent in computational complexity to a single multiplication. And it can store the intermediate result in the reentrant shift register (one whose output is looped back to its input) so that less hardware may be necessary.

Benson's Application

Probably the most surprising thing about the Benson application is how poorly it describes the actual technique. The specification is only 10 pages long and has only a single figure. Much of it describes the specialized PBX computer, although no other aspect of that computer is claimed.

The conversion technique is disclosed by a 13-step program, and discussion of this program is more about how it is executed step-by-step on the computer, and not what the conversion technique is doing. There is an example of converting 53 from BCD to decimal, but it is difficult to follow because there is no figure that accompanies the explanation of what each instruction does. In the response to the first office action, such a figure is provided, but that was done to show that the technique could be carried out by hand.

It isn't until an appendix to Benson's reply brief to the Supreme Court that the technique is really discussed with figures and examples. There is nothing in the original application that points out how the new technique substantially improves the operation of a computer that includes it, either in hardware or as an available routine for programmers to use.

An Application for Today?

So, can an application written in light of the *Alice* test, and the recent opinions refining it, get past the statutory subject matter hurdle?

Of course, we'll have to ignore the simple test that Benson's invention is similar to (well, exactly) an invention found by the courts as ineligible for patenting. In its summary of past decisions, the PTO characterized the subject matter as a "conversion of numerical information" method, but it seems unlikely that *all* methods for converting numerical information are categorically ineligible.

In a concurring opinion in a Federal Circuit panel decision in 2014, Judge Mayer gave his view of the eligibility spectrum that can be helpful in deciding how to describe an invention: "Because the purported inventive concept in [the] asserted claims is an entrepreneurial rather than a technological one, they fall outside section 101." (*Ultramercial, LLC v. Hulu, LLC*, 772 F.3d 709, 717, 112 U.S.P.Q.2d 1750, 1756 (Fed. Cir. 2014)). In other words, it will be much more difficult to write a successful application for something that performs a business function than one that improves technology. Luckily, Benson's invention is technological, and so describing it that way should be straightforward.

Two recent Federal Circuit opinions (both by Judge Hughes) indicate how the specification should be written to support the patentability of the claims. It should highlight the technique as an improvement to a computer, because "some improvements in computer-related technology when appropriately claimed are undoubtedly not abstract." (*Enfish, LLC v. Microsoft*

Corp., 822 F.3d 1327, 118 U.S.P.Q.2d 1684, 1689 (Fed. Cir. 2016)). If the claimed invention is an improvement to the computer itself, and not just using the computer as a tool, then it passes the first step of the *Alice* analysis and is patentable.

On the other hand, if “the specification fails to provide any technical details for the tangible components, but instead predominately describes the system and methods in purely functional terms,” then what is being described is likely an unpatentable abstract idea. (*TLI Commc’ns v. AV Automotive*, 823 F.3d 607, 118 U.S.P.Q.2d 1744 (Fed. Cir. 2016) (96 PTD, 5/18/16).)

The first thing in the new specification could be a section explaining the past conventional ways of converting from BCD to decimal. This would show that a patent on Benson’s invention would definitely not preempt all ways of doing the conversion, a concern that courts have expressed not only regarding software-based inventions but also patents that disclose a little but claim a lot.

It would also show how Benson’s technique represents a substantial technological advance over the prior art because it does not require computationally-intensive multiplications. Even today, reduced instruction set computing (RISC) processors may not have a multiply instruction, depending on a subroutine instead. So, replacing many multiplication calls with a single call to a routine simpler than a single multiplication results in a substantial improvement in performance.

That would go a long way toward showing that Benson’s invention is an “improvement to the functioning of a computer itself,” one of the things that the PTO says indicates that the technique is “something more” than an “abstract idea.”

That can be reinforced in the description of the technique that follows, describing it with examples like in the Supreme Court brief appendix rather than just showing a short computer program. The use of a flowchart rather than a program to illustrate the technique also lessens the impression that Benson was trying to get a patent on a computer program, rather than a processing technique. It can say that the technique can be implemented in hardware, in microcode to produce a special instruction, or as a subroutine as part of a RISC processor’s standard library. But the emphasis will be on how the technique is much more than the abstract idea of converting a BCD number to binary.

One thing that probably would not help would be to spend much time discussing the reentrant shift register as a way to make patentability more likely. Its existence seemed to interest Judge Rich in his opinion (*In re Benson*, 441 F.2d 682, 169 U.S.P.Q. 548 (C.C.P.A. 1971)) that was reversed by the Supreme Court. But it was not something that was stressed in Benson’s briefs at the CCPA and Supreme Court, except to say that the invention wasn’t a “mental process” because it involved hardware like an adder and a shift register. And in the end it made no difference, since the CCPA said the claims were patentable even without it and the Supreme Court said they were unpatentable even with it.

And besides, if patentability hinges on the reentrant shift register, one could get around the patent simply by using a conventional shift register that is twice as long but gets the same result.

Are Different Claims Necessary?

Having changed the application to highlight the technique and how it improves on past ways of doing a BCD to binary conversion, we can then look at how the invention might be claimed. And, surprisingly, the original Benson claims may now be patentable!

Consider this claim, which is Benson’s claim 13 (the one without the reentrant shift register):

A data processing method for converting binary coded decimal number representations into binary number representations comprising the steps of

- (1) testing each binary digit position *i*, beginning with the least significant binary digit position, of the most significant decimal digit representation for a binary ‘0’ or a binary ‘1’;
- (2) if a binary ‘0’ is detected, repeating step (1) for the next least significant binary digit position of said most significant decimal digit representation;
- (3) if a binary ‘1’ is detected, adding a binary ‘1’ at the (*i*+1)th and (*i*+3)th least significant binary digit positions of the next lesser significant decimal digit representation, and repeating step (1) for the next least significant binary digit position of said most significant decimal digit representation;
- (4) upon exhausting the binary digit positions of said most significant decimal digit representation, repeating steps (1) through (3) for the next lesser significant decimal digit representation as modified by the previous execution of steps (1) through (3); and
- (5) repeating steps (1) through (4) until the second least significant decimal digit representation has been so processed.

The preamble of the claim, a “method for converting binary coded decimal number representations into binary number representations,” gives a good starting point for the examiner in determining what the abstract idea of the claim may be. It is certainly what the Supreme Court saw in *Benson*.

The rest of the claim elements, viewed singly or in combination, are then considered to determine if what is claimed is “substantially more” than just that abstract idea. A good argument could be made that it is, especially given its detail and the fact that no past way of converting BCD to binary did those steps, and they are much more than simply claiming to convert BCD to binary, so it appears that the claim should be eligible for patenting under current court decisions and the PTO guidance.