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Count(s)	Word(s)	Char(s)	Char(s) (WS)
Section 1	**99**	**512**	**609**
Section 2	**99**	**495**	**594**
Section 3	**496**	**2562**	**3056**
Section 4	**1163**	**5931**	**7085**
Section 5	**1996**	**10237**	**12198**
Total	**3853**	**19737**	**23542**

Answer-to-Question-_1_

Under *Lexmark*,the authorized first sale exhaust the patentee's rights to control the product. There is no territorial limit against parallel importation. Laurent was authorized to sell the corkscrew in Italy and was under no duty to inform Max of its territorial limitation. The sale to Max was an authorized first sale.

Kara can compete against Wine Enthusiast on price. Kara could set a licensing fee to create a floor for imported corkscrews price. Kara is rewarded by Max's sales. She just cannot price differentiate between Italy and US. Because Kara had control of the prices, this outcome is reasonable.

Answer-to-Question-_2__

Patent is under pre-AIA due to date. Secret sales are bar under both for pre-AIA and AIA §102 (Helsinn). One sale of one embodiment is enough for a public sale. Sale took place over a year prior to filing. Sale must be disclosed under duty of candor. Product was ready for patenting. Thus, Nathan can't get a patent regardless.

"Experimental use" exception will fail under *Polara*. There is no indicia of experimentation through records, monitoring or inventor control of experiment (*Lough*); no need for testing, and the nature of the invention (*Barry*); presence of payment and use of neighbor.

Answer-to-Question-_3__

First, we see what prior art is valid under §102. There are no dates here, so we assume that all references are prior to the application date and there's no 1 year grace because all disclosures are "by another" (i.e., no disclosure from John). The Nature paper, and the textbook are printed publication. The Youtube video is "otherwise available to the public." These are all §102(a)(1) references. The 3 issued patents are §102(a)(2) references.

The PhD dissertation is a close question. Since it is unpublished so it's arguable that it's not "described in a printed publication . . . or otherwise available to the public." However, the PhD dissertation is likely deposited in Harvard's publically-accessible library and is, thus, printed publication. Moreover, the PhD defense was a open-to-the public event where the disclosure took place. So the PhD thesis and/or the contents there in are §102(a)(1) prior art.

We should also identify who's the POSITA. If the POSITA is a lab technician, the Nature paper and the unpublished PhD thesis could probably be outside the prior art. More likely, the POSITA is a PhD researcher in the field and should be aware of all references. For either POSITA, all the references are analogous under §103 and there is motivation to combine under *KSR*, because they are in the same field of antibody

technology. Given the sophistication of the invention, the POSITA here is probably going to be the PhD researcher.

We should now consider the inventive step. One could get obviousness by considering as closest prior art the textbook's teaching the determination of the amount of a specific antigen with a sandwich assay. The missing claimed elements are (1) measuring the amount labelled or the amount unreacted, (2) monoclonal antibodies, and (3) affintiy of the antibody. Because the claim has "or," the radiommunoassay technique in the Youtube lecture, which measures amount labelled, covers (1). The Nature paper and the Youtube lecture covers (2). Alternatively, obviousness could be found under the 3 patents using polyclonal antibodies, modified by the monoclonal antibodies in Nature and the Youtube technique.

The remaining §103 gap under both obviousness paths is the antibody affinity. The 10^10 L/mole affinity in the PhD disclosure is within the "at least 108 L/mole." Accordingly, broad range should not be allowed under literal reading. However the lower bound of the claimed range is substantially lower than the PhD disclosure. There is, thus, an inventive step in being able to detect antigens with antibodies that perform this poorly. Under *Chemours*, the PhD thesis teaches away from the invention since it describes much better antibodies than the ones claimed.

John may need to amend the claims to a narrower range to avoid the PhD thesis disclosure if this is in prosecution or IPR. A district court would be unlikely to invalidate this patent under §103 because it's too harsh of a remedy where the prior art fails to

disclose lower-efficacy antibodies. It may narrow the range in claim construction.

Answer-to-Question-_4__

a) The application would likely survive a utility challenge under §101. The claim describes a machine that implemetns a process (base statutory requirement) and the practical application of reducing fraud is trivial to show here. The bigger question is whether this should survive a Business Method challenge or an *Alice* §101 challenge.

This claim should survive a Covered Business Method challenge. While the claim is for a business method to detect fraud, it is actually directed at a technological application thereof and not to just the business method.

Under the *Alice* test, the claim should survive if we were using the USPTO guidance (New MPEP §2016). The claim describes a machine, so it's within one of the four statutory categories. The claim is not directed to the abstract idea judicial exception. Specifically, it's not directed to merely detecting fraud but, instead, it is directed to a machine performing specific steps being used to detect fraud(*see McRo* and *Finjan*).

The question of district court challenge is more complicated. The claim would still be likely to survive since it is closer to *CardioNet* than to *Geolocation*. Like in *CardioNet*, there is a focus in specific means to detect fraud (use of convolutional neural

network, the use of digital signatures, the implicitly claimed database of digital signatures). The one objection is that the match identification is abstractly and generically claim and that may be considered an abstract idea. To decide this issue, the contents of the disclosure may matter. These are more properly §112 issues, but *Alice* §101 is eating §112, as discussed in *American Axle*. The above-discussed *McRo* and *Finjan* factors also apply.

I believe this patent would survive a §101 challenge, ultimately, under the 1st step in the USPTO (prosecution) and under the 2nd step in Federal Court litigation (the specificity of the steps and the implied database of digital signatures) are "substantially more." It is also relevant to note how narrow the claims are, reciting "healthcare provider," "insurance carrier," "supporting evidence of medical service," and "radiograph," and "insurance claim" which decreases substantially the fear of preemption. While preemption is not a deciding factor any longer, it is a background concern of *Alice* and, in this case, the narrow claims mitigate it.

b) A §102 challenge could probably be based on Samantha's public disclosure. Section 102 analysis does not care about "teaching away," which is a §103 issue, so her saying that it might not be cost effective is irrelevant. Moreover, since she described the FB system in detail, her disclosure would be sufficient under §102(a)(1).

FB's saving grace comes from the grace period under §102(b)(1)(A). Samantha received the disclosure from Frank and, therefore, Samantha was "another who obtained the subject matter . . . from the inventor." We don't know if Frank was one of the

inventors - he was listed as president, but we will assume he was one of the inventors since this is a startup. The public disclosure was made a day before the effective filing and, therefore, within the 1-year grace period.

A more interesting challenge comes from the the September 2019 conversation, which appears to be an offer for sale, under §102(a)(1). Even though the offer is for secret sale, under *Helsinn*, secret sales are considered sales under §102. There does not appear to be a joint research agreement or negotiation thereof, since the product was already ready for patenting by September 2019. Experimental exception would not apply since there absolutely no evidence that FB was seeking to experiment the technology. (FB may attempt to claim that it was looking to develop the technology with SFDIC, since it needs data from insurance companies to test and improve the system. But the conversation was not couched in that manner and will assume that duty of candor to the USPTO and to the courts would be followed by the parties.)

c) The POSITA here is likely going to be a computer scientist or image processing researcher with a graduate degree. There is probably prior art in the field of using convoluted neural networks to match images (e.g., Google reverse image searches). Another area of interest would be in the field of medical image research, since image registration (matching up images from CTs with MRIs, for example) is a problem classic to the field. We could attempt to state that the POSITA is a image processing research in the field of medical images, and that would allow us to broaden the prior art to cover both image processing with AIs and medical imaging research.

The field of insurance fraud industry would be interesting as well to research, but that area isn't likely to have sufficient §103 references. Given the presence of insurance-specific elements in the claim, it may be needed for a proper rejection. Moreover, if the POSITA is defined to be a computer developer in the field of insurance fraud, the broader field of image processing may be foreclosed as prior art. Given the loose connection between the matching technology and the specific application, the application of the image-matching technology to the field of dental insurances would be very likely considered obvious. On the other hand, if we find prior art in the insurance fraud area, we won't even have to fight that battle.

d) As preliminary matter, even if we lose the patent challenge, we might be able to claim non-infringement. I'm assuming, however, that we would lose that claim as well.

Equitable relief

Under *eBay*, FB is very unlikely to get injunctive relief (permanent or preliminary during litigation). FB's damage can be adequately compensated by monetary relief (FB cannot claim that it would suffer non-monetary damage because it is actively attempting to sell the product), balance of hardships does not favor P (BDIC is not in direct competition with FB), and public interest would not be served by the injunction (society would suffer from more fraudulent claims).

Damages

FB is probably eligible to compensatory damages. There were lost profits from the infringement, since BDIC did not buy from FB. The price set by the market on FB's

system can be assessed using avaliable economic theories. There does not appear to be any consequential damages here.

Reasonable royalty could also be assessed by looking at the savings BDIC received from using the FB system knock-off. Here, *Georgia Pacific* factors would apply.

There is also the issue of enhanced damages. Since BDIC is aware of the FB patent and "knew or should have known" the risk of infringement. Under these facts, a finding of egregious conduct should be found under *Halo.*

A better route for BDIC is to challenge the patent in an IPR if there is §103 art from the research. Or attempt a declaratory judgement under §101 after some low-damages infringement (e.g., an internal pilot program with one client). That way the damages will be mitigated, an important thing in light of the high risk of infringement. Alternatively you could just license the product under the patent law system.

Answer-to-PART-TWO

I disagree with Prof. Ryan Abbot's argument in defense of listing AIs as inventors. In my view, his analysis trivializes the nature of the peculiar relationship between a human inventor and their patent in a manner that voids the Patent Law system itself. Specifically, Prof. Abbot's paper takes the stance that an AI inventor has enough cognitive skills to be entitled to a be an inventor in a patent but not enough cognitive skills to decide contractual arrangements for assignment. This is inconsistent with the principle of intellectual property. Moreover, Prof, Abbot's main concerns-the legal risk that AI inventions would not receive patent protection and that incentives to production and operation of AIs would suffer-can be solved with less drastic solutions.

To make this discussion clearer, I'll direct my attention to situations where a firm wishes to protect an invention produced by AIs, not protecting the AI as an invention. Thus, the issues that were the center of attention in Prof. Okediji's lecture on AI, the §101 challenges and §112(f) requirements, are less relevant to the discussion since the claim and the disclosure is concerned with the invention itself. For example, the fractal food container patent application by Thaler and DABUS claims the container shape, not DABUS. Another example, the controller designed by developed by John Koza's AI machine (Abbot at 1087) claims a feedback controller, not an AI.

Inventorship for AI is not required

I am not convinced that AI isn't merely a better tool for invention, akin to the camera in the copyright case (*Sarony* discussed in Abbot at 1100). While the question there was whether the use of camera should negate a copyright to a photography, it is notable that the copyright was assigned to the photographer, not to the camera. The argument against the copyright entitlement appeared to be that the camera, not the photographer, was responsible for the actual placement of the image in the photography. The case, however, ruled that the camera was a mere tool under control of the photographer, who thus, earn the IP. The analogy drawn from this case to the AI realm is that even though the AI was responsible for the actual design in the patent, the AI operator or programmer controlled the AI. Notably, in *Sarony*, there was no argument that the copyright belonged to the camera. Likewise the patent should not be considered to belong to the AI. Another example, the AI-generated antibody discussed at 1117, shows another complication of Abbot's proposal. Scientists routinely produce antibodies by injecting a target antigen into rabbits or llamas, to discover antibodies that may be later patented for use in therapies. Under Abbot's proposal, if we are to give inventorship to an AI that identifies antibodies, we should also be sharing inventorship with the rabbits and llamas.

Abbot's point, however, that an AI-invented tool creates a problem for the human owner because the owner cannot claim inventorship, is a reasonable one and it appears to be the case in DABUS' food container. There are simpler workarounds to this problem. Under existing law, the AI itself may be patented (so long as it can pass the §101

challenges) and the inventions produced by the AI may be patented as product-by-process claims (e.g., a claim directed to a food container designed by a DABUS-type AI). It's also likely that specific designs of particular interest may be claimed as "picture claims" (p. 34 of WIPO claiming manual) without a product-by-process limitation, in continuation patents derived from the product-by-process patent or the AI patent itself. This use of continuations would mitigate risk of evergreening strategies as discussed below, and would protect the AI owner from having the AI becoming a prior art to later successful designs.

If we are truly worried that the absence of the AI name in the face of the patent violates a legal requirement, a better alternative is to clarify in statute that AI-assisted inventions should be attributed to the human designer or operator of the AI. A even better reform could fold the AI listing as part of a disclosure of origin (DOO) requirement. An AI-aware, wholistic DOO requirement could include listing of AI assistance along with listing of use of traditional knowledge sources (e.g., tribal fabric patterns, crop culturing techniques, plant-based medicine), genetic resources (e.g., HeLa cells), or other natural resources (like the llama-producing antibody).

Goldilocks' consciousness

If we are to take a nondiscrimination principle between humans and AI seriously, which requires believing that AIs have a moral right to be listed in the face of the patent, Abbot's proposal errs by not going far enough. An AI that has a moral right to its invention cannot be subject to "default rules" of assignment. As illustrated in Catherine Fisk's paper, an important part of the right of ownership in the patent is the autonomy to

own and assign a patent. While the move from the "equitable licensing to employer" to the contemporary "employee's duty to assign" appears to void this issue, the reality is that the employee-inventor still receives residual benefits by being able to place the patent in his resume, receiving bonuses and creating a reputation as an inventor that allows them to raise in their career profiles. Under Abbot's default rules, AIs that are fully owned by a firm have no residual benefit at all and is effectively a slave, an idea abhorrent to Patent Law's praise of the individual inventor.

Doctrinal Challenges

The foundational quid pro quo in patent law–limited monopoly for innovations as a reward for disclosure of invention–hinges on intelligibility between the persons skilled in the art. Innovations are judged against a background of what a POSITA knows. Disclosure is valuable because other POSITAs can learn from it. Ordinarily, these elements of the quid pro quo are only valuable because PSAs in a field share a symbolic space, something that an AI inventor does not.

This challenge is evident in the evaluation of combination patents, for example. Test for non-obviousness in these inventions consider as factors whether a POSITA would have had a "motivation to combine," and if the combination was "obvious-to-try," for a POSITA. *KSR*. These factors are sensible for combination inventions made by PSAs because she can place herself in the POSITA's shoes and apply these concepts. Consider now a machine learning AI that invents by looking at parts in a database (e.g., circuits), simulating random combinations with a target behavior (e.g., an input/output relationship), and assigning as invention combinations that hit the target within a margin

of error. For this AI, all combinations are obvious to try so long as the parts belongs in the database, and the motivation to combine comes merely from the part belonging in the dataset.

To stress the collapse of obviousness factors, consider the and the "predictable results" factor tempered against the warning against hindsight obviousness findings. *KSR*. This pair of delimits the space of opportunity: combination inventions are patentable when PSA has some intuition that the combination will be successful (PSAs don't engage in random combination of parts) but the certainty of success only exists after reduction to practice. For an AI empowered with simulation capacity and speed to try all combinations, there is no intuition and all reduction to practice necessarily is predictable result for it, and the concept of hindsight is nonsensical.

The central issue is that an innovative step for an AI is categorically distinct from what is an innovative step for a person. Abbot comments on this issue at 1122-26 but his proposed solutions, either to use the existing standard or consider the standard to be one of a larger set of prior art, fails to acknowledge that the inventive process for an AI is fundamentally different, even when inventing the same thing. Abbot implies that the only distinction is the size of the prior art, ignoring that AIs implementing machine learning and genetic algorithms invent by doing something that human inventors very rarely do. This makes it impossible to create an obviousness standard that can be sensible for both AIs and humans.

AI inventors would also impact the disclosure requirement. Patent disclosures are in

a dialog with POSITAs and create an environment that will further creativity of future inventors. That is, the disclosure of an invention against the background of prior art creates a useful technological narrative for other inventors, to identify where are the new opportunities for invention or motivate design-arounds. AI inventions operate outside this narrative and as a result, any pure-AI disclosure would be culturally difficult to digest for the POSITA. Consider the Koza's controller discussed in p. 1087. It was designed "without any knowledge about existing controllers." A disclosure that merely provided the design, without any reference to the current state of the art or any hint of the intuition the inventor had, would not be helpful to move the field forward. Incidentally, the disclosure in U.S. Patent No. 6,847,851, which covers Koza's AI controller, includes in its specification a proper background of controller theory, something the AI did not use in its invention. This background is important because it inserts the AI design within the narrative of control systems and made the disclosure useful for other control engineers.

These doctrinal challenges could be solved with the proposed changes in the statute, but such reform would change the Patent Law from one focused on the quid pro quo to one where the only thing that matters is the invention. Contrary to what Abbot asserts, it is the mental process, not the invention, that is at the heart of Patent Law.

Risk of Evergreening

Say you have a machine learning AI that makes designs by optimizing parts and that AI produces every year one new improved design. Every so often, the AI will give you an improved design that will receive a full-term patent. A competitor that wants to catch up can only do so by producing a better AI, since better designs are out of reach. To

prevent this evergreening, any limited monopoly should be attached to the invention of the AI and the designs should, at best, receive protection as continuations. If we allow AIs to be inventors, it would be legally incoherent to limit the duration of a design to the AI's creation and evergreening will be the norm.

Theories for Patent Law

Two of main theories for IP, Fairness and Personality revolve around the mental process, not the invention. The Lockean Fairness theory rewards an inventor for their effort in inventing something. The Personality theory establishes a connection between the inventor and the invention due to the creation process itself. Only a truly conscious AI should be rewarded with inventorship under these theories. One may believe that, but in such scenario the legal autonomy for the AI should be much broader and, critically, would be incompatible with default assignment rules, as discussed above.

The Welfare theory warrants extending patents to designs invented by AI, but that doesn't require listing AIs as inventors. Firms only care about ownership of the patent, regardless of whether the inventor was an AI or a human employee. The risk to patent validity-the main concern cited by Abbot-can be eliminated by more modest reforms, as discussed above: listing contributing AI inventors under a DOO or removing a requirement to list AI inventors.

The Cultural theory, on the other hand, is drastically opposed to AI inventorship. As discussed above, AI inventorship trivialize the culture of competitive collaboration fostered by Patent Law. Moreover, as discussed by Abbot in his paper, there is a risk of

Industry Consolidation over IP (at 1119), a culturally undesirable result. The more desirable results discussed, the refocus of human activity (at 1118) and the acceleration of technological development (p. 1120), could be supported by reforms less dramatic than AI inventorship, as discussed above.