

## Module 103

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### A. Utility

Hello. I'm Terry Fisher. This is the third lecture in the PatentX lecture series.

This lecture will focus on two of the four requirements for patent protection: that the invention at issue be useful; and that the applicant disclose enough information in the patent application.

As usual, I'll begin by examining how each of these requirement functions in the patent system of the United States and then consider how the corresponding doctrines in some other jurisdictions differ.

You might think that utility would be an important requirement for obtaining a patent. After all, as we have seen, most justifications of the patent system emphasize the benefit to the public at large of the inventive activity that the system is supposed to foster. From this you might infer that, to be awarded a patent, an applicant would have to demonstrate that the invention at issue will indeed contribute to social welfare.

For the most part, that turns out not to be true. There is a utility requirement – but it's much more lenient than the inference just mentioned would seem to support. Most patent applications satisfy the utility requirement easily. There are exceptions, which I'll identify in due course, but they are few.

In the United States, the requirement of utility has both constitutional and statutory roots. As you can see, the Intellectual Property Clause of the Constitution empowers Congress to create a patent system for the purpose of "promot[ing] the Progress of science and useful arts."

Section 101 of the Patent Statute contains the same adjective: "Whoever invents or discovers any new and useful [invention] or any new and useful improvement thereof may obtain a patent therefor."

From those provisions, the courts have derived three different respects in which an invention, to be patentable, must be useful. Every patent applicant must satisfy all three. However, as we will see, that's usually not hard.

The first, commonly known as “General Utility,” requires that the invention work. Occasionally an examiner will reject an application on this basis. For example, this application by two British inventors for a patent on a warp drive and this one for a patent on a perpetual motion machine both failed – because, for obvious reasons, they could not do what they purported to do. [pause; open map] But so long as the technology does not violate well-known scientific laws, this requirement will be satisfied. Moreover, it’s not necessary that the applicant show that she understand why her invention works, just that it works.

The second requirement (sometimes known as “specific utility”) is that the invention must have some practical application. Again, the requirement is interpreted very generously. It’s not necessary that the practical application be particularly important. Amusing a person – or exercising a cat – will suffice. Nor it is necessary that the invention do a better or more efficient job of achieving its function than already existing technologies.

The only context in which this requirement has significant bite concerns the point at which, in a prolonged research endeavor, it is permissible for a researcher to obtain a patent. This general issue arises in three closely related industries. In the pharmaceutical field, there is often a long period of time between the identification of a potentially promising compound and demonstration that it is effective in preventing or curing a particular disease. In the field of chemistry, scientists often fabricate new compounds – for example, steroids – but don’t learn until later what, if anything, they are good for. Finally, in biotechnology, scientists sometimes isolate or create genetic sequences before they know what they do.

In situations of this general sort, there is a tension between the advantages of incentivizing early stage-research and the hazard of inhibiting the downstream research that is necessary before the public at large can reap any benefit from the early stage research.

There is no clean way of resolving this tension. Here’s how the courts have thus far resolved three specific manifestations of it.

In the pharmaceutical context, the Federal Circuit has held that it is certainly not necessary to have secured FDA approval of a drug before applying for a patent. Indeed, it is routine for pharmaceutical firms to apply for patents on compounds well before any clinical trials have begun.

With respect to chemistry, the Supreme Court held in the *Brenner* case that you cannot apply for a patent on a new compound until you know at least one thing it might be good for. Merely facilitating further research does not count as a practical application; you need something more.

In the context of biotechnology, the Federal Circuit, following guidelines promulgated by the Patent Office, has held that expressed sequence tags – short segments of fabricated DNA whose only function is to identify genes – whose biological role is not yet known – are not patentable.

Other issues of this general sort are likely to arise in the future – and the Patent Office and the courts will struggle to locate the appropriate moment when scientists know enough about what their inventions do or might do to be entitled to obtain patents.

Of the three contexts in which it has arisen thus far, the one in which the relevant policy arguments have been most developed is chemistry. In the majority and dissenting opinions in the Brenner case – and in the legal scholarship commenting on that decision -- you can find the following competing arguments.

As I've already mentioned, the primary argument for making patents available earlier is that the availability of such patents will stimulate early-stage research, while the primary arguments for delaying the availability of patents is that premature awards will both impede follow-on research and remove incentives to engage in such research. To each of these arguments, the opposing camp has responses.

Advocates of early-stage patents point out that companies that discover uses of compounds that have already been patented by others can obtain so-called "new use" patents on those uses. To be sure, they cannot practice those uses without a license from the holder of the patent on the compound, but neither can the holder of the compound practice the new use without a license from the holder of the patent on it. This creates a situation commonly known as "blocking patents." That sounds bad, but, as Mark Lemley observes, it may actually be socially beneficial, because what usually happens in such situations is that the two patentees enter into a contract of some sort, that divides the stream of revenue associated with the new use between them. The prospect of such deals creates an incentive for follow-on research – i.e., neutralizes at least part of the first two arguments against early-stage patents. The weight of this argument depends on how common are such deals – and how much revenue they leave in the hands of the follow-on researcher, which is a tricky empirical question.

The opponents attack the primary argument in favor of early-stage patents in two main ways. First, they argue that patents for the fruits of early-stage research are not necessary, because there are alternative motivations for such research. Much of it is done in universities by academics, who care more about the progress of science than about maximizing their incomes, and is already fueled adequately by governmental grants.

Next, the opponents make an argument that we have already seen in the context of the debate over subject-matter coverage – namely, patents on the kind of platform technologies developed in early-stage research will be too broad – in the sense that they will give the patentees more territory than they deserve and more territory than is socially optimal.

In response to the latter argument, the proponents argue that we already allow someone who has fabricated a compound and determined just one practical use for it to obtain a patent on the compound – and thus to control all subsequent uses of it during the duration of the patent.

That seems almost as excessive as granting a patent on a compound to which there are, as yet, zero known uses. Yet we allow it.

The advocates of early-stage patents supplement their primary arguments by pointing to an additional benefit: if the researchers are able to obtain patents, they will reveal in their patent applications information that will both identify opportunities for follow-on research and facilitate that research. Otherwise, they will conceal their discoveries.

The opponents respond: patent applications are less effective in revealing such information than is commonly thought – for reasons we will consider in the second half of this lecture.

The retort: maybe so, but that problem can and should be cured through reform of the disclosure rules.

The last of the proponents' arguments is that conditioning patents on the demonstration of practical applications will prompt early-stage researchers to hunt for some use for their applications. Such searches will be socially wasteful, because they are more efficiently done by organizations set up for the follow-on research.

The last of the opponents' argument is sometimes known, pretentiously, as efficient-boundary theory. The basic idea here is that, when allocating property rights to scarce resources, it makes most sense to wait until the optimal uses of those resources are visible. The argument is best understood by analogy.

Suppose that, instead of assigning patent rights to zones of technology, we were assigning private property rights to portions of a large tract of public land (in other words, land currently owned by the government). We don't know yet what the land looks like – and therefore we don't know what each piece of it is good for. In this state of ignorance, we might create and allocate parcels using an arbitrary grid, like this. Indeed, that's essentially what the government of the United States did in the 19<sup>th</sup> century when it set up a system for privatizing the land in the so-called Northwest Territories. Each of these squares would likely end up in the hands of a private party.

When, later, we and the new owners learned what the land actually looked like, it would turn out that the boundaries did not correspond to natural divisions in the functionality of the land – and that many of the parcels were now in the hands of people who are not well equipped to put them to their best uses. To be sure, the resultant inefficiency could be alleviated if the parties got together, redrew the boundaries along more sensible lines, and then sold each segment to a party that is well equipped to exploit or manage it. But, as Ronald Coase acknowledged long ago, such deals entail transaction costs – and indeed, those costs may be so high as to prevent the deals altogether. It thus makes more sense – so the argument goes – to wait until you know what each parcel looks like and what it's good for before drawing the boundaries around tracts – and allocating rights to those tracts.

So, for example, instead a grid, we might draw the boundaries like this, give (or sell) these pieces, which are well suited to agriculture, to farmers; give the wetlands area around the river to the state government, which would then dedicate it to conservation purposes, and retain in the hands of the national government the mountainous portion and preserve it as a wilderness. Other allocations are certainly possible. The general point is that you should wait before creating a system of real property rights until you know how the land at issue might be best used.

Similarly, you should wait to allocate patent rights to zones of technology until you have some idea of what the technology is good for.

The strength of this argument plainly depends, not just on the plausibility of the theory as applied to land, but on the force of the analogy between land and technology (or between property rights in tangible resources and property rights in intangible resources).

Turning back to legal doctrine, the third of the three variants of the utility requirement is sometimes known as “Beneficial Utility.” The idea here is that, to be patentable, an invention ought to be socially beneficial. Or, turning things around, socially pernicious inventions should not be patentable.

In the 19<sup>th</sup> century in the United States, there was a meaningful requirement of this sort. The general rule was that patents would be denied to inventions “injurious to the morals, health, or good order of society”. Examples provided by Justice Story, the author of the opinion setting forth this requirement, were “a new invention to poison people, or to promote debauchery, or to facilitate private assassination”. To be sure, that’s a low bar. But it did sometimes result in denial of patent applications. For example, in the Scott and Williams case, it was applied to deny a patent to a seamless stocking to which had been applied stitching that made it look like a seamed stocking. Like this. You might ask: what would be the point? Apparent, in the 1920s, stockings with seams were more traditional and expensive than the newer seamless stocking. So the purpose of the invention was to deceive either consumers -- or the people in whose presence the actual consumers wore the stockings -- into thinking that they were the traditional, expensive type.

In the judgment of the Second Circuit, this meant that the function of the invention was “deception.” Assuming it achieved its goal, “such accomplishment does not create a new useful discovery or invention; it was not the intention of Congress to grant protection to those who confer no other benefit to the public than an opportunity for making the article more salable.”

This requirement has now been almost entirely eliminated. A case that illustrates its abandonment is *Juicy Whip v. Orange Bang*, decided by the Federal Circuit in 1999. The crucial issue in the case was the validity of this patent, which covered a mechanism for displaying and dispensing orange soda – typically at the counters of old-style restaurants, like this. The mechanism was designed to show customers an attractive liquid swirling around in the transparent display and make them think that, when the attendant pulled the lever, some of

that liquid would fall into the cup that was then handed to the customer. But in fact, the liquid in the display was not actually dispensed to the customer. Indeed, it contained preservatives that made it poisonous. Its function was just to be attractive. The stuff that ended up in the cup came from tanks concealed under the counter. In that sense, it was deceptive, just like the mock seam on the stocking. In the judgment of the Federal Circuit, that didn't matter. The Court announced bluntly:

“We decline to follow *Rickard* and *Aristo Hosiery*, as we do not regard them as representing the correct view of the doctrine of utility under the Patent Act of 1952. The fact that one product can be altered to make it look like another is in itself a specific benefit sufficient to satisfy the statutory requirement of utility.”

This stance is now firmly established in US law. Patents are routinely granted on products whose only plausible purpose is to facilitate activities widely considered to be immoral – or even illegal. Here, for example, is a 1997 patent on a radar and laser detector.

The only plausible function of this invention – as the applicant frankly acknowledged – is to make it harder for the police to detect speeding – and thus to make it easier for a motorist to exceed the speed limit without getting caught.

. Here's a more recent application of the same general sort.

There probably is an outer limit. The permissiveness of the Patent Office and the Courts would probably not extend to one of the inventions hypothesized long ago by Justice Story: an invention to facilitate assassinations – although patents like this one, which covers the design for an unobtrusive high-capacity magazine for a handgun, do make you wonder.

Another indication that there is an outer limit is that, when presented with a patent application for a genetically engineered combination of a person and an animal, the PTO initially suggested – in a “media advisory” -- that it was inclined to reject it on the ground that “It is the position of the PTO that inventions directed to human/non-human chimera could, under certain circumstances, not be patentable because, among other things, they would fail to meet the public policy and morality aspects of the utility requirement.” The Office subsequently changed the basis on which it rejected the application, but its initial response is telling.

In any event, there is no doubt that the beneficial utility requirement is much less demanding than it was in the 19<sup>th</sup> century.

Disagreement among scholars concerning whether the requirement should be most robust is similar to the debate concerning early stage patents. Here are the principal arguments.

The main argument made by the proponents of enhancement has already been mentioned. Patent law, as we have seen, is commonly understood as a mechanism used by government to

stimulate innovative activity that promotes public welfare. If that's its function, should not patents be limited to innovations that actually promote public welfare?

Arguably, the force of this argument has grown in recent years – as technologies that could fairly be described as pernicious have become more visible. Ash Carter, former Secretary of Defense of the United States, recently wrote an article emphasizing the importance of bringing the trajectory of technological change into better alignment with social good. Here's an excerpt:

“The arc of innovative progress has reached an inflection point. Recent technological change that has brought immeasurable improvements to billions around the globe now threatens to overwhelm us. Making this disruption positive for all is the chief challenge of our time. We ourselves—not only market forces—should bend the arc of change toward human good. To do so, we must reinvigorate an ethos of public purpose that has become dangerously decoupled from many of today's leading tech endeavors.”

In response, defenders of the current, minimalist approach to beneficial utility, make three arguments. The first challenges the view exemplified by Carter's article head on. Rejecting his plea for more active engagement of government in shaping the arc of technological change, it contends that the best measure of social welfare is the market. If consumers are willing and able to buy a product or pay for access to a service, it's socially beneficial. After all, a patent is not a governmental subsidy, it's just a temporary shield against competition. Unless people are interested in buying the patented product or service, the patent has no value. We thus need not worry that patents will stimulate socially pernicious invention.

The second is less confrontational. Even assuming that, as Carter argues, government has a role in shaping the trajectory of innovation, limiting patents to socially beneficial inventions is not a sensible way of performing that role. Patent examiners, who after all are the main regulators of access to the patent system, typically have extensive scientific training, but no background in philosophy or public policy. They are thus ill-suited to make decisions concerning whether the inventions they review are socially beneficial. There are far more direct and efficacious ways in which government could influence the technologies introduced into society. Returning to the previous example, if we are worried about high-capacity magazines for handguns, we should institute gun control – in other words, forbid the sale of such things or limit the set of people entitled to own and use them. Denying patent protection to the inventors of them would be circuitous and less effective. The same goes for dangerous forms of biotechnology or inventions that would exacerbate climate change.

Finally, as Professor Robert Merges points out, views concerning social welfare change constantly, while the patent system operates on a 20-year cycle. Unless we permit challenges to patents on the basis of attitudinal changes that have occurred since the patents were granted, then there will always be a 20-year lag (roughly speaking) between the emergence of new ideas about the public good and reorientation of the incentives created by patents. Better to rely on more responsive regulatory mechanisms.

In response to the first of these arguments, the proponents contend that social welfare and consumers' ability and willingness to pay for goods and services are often misaligned. The market overweights the preferences of the wealthy and underweights the preferences and interests of the poor. And consumers often don't know what is good or bad for them.

In response to the second argument, the proponents acknowledge that, as currently configured, the Patent and Trademark Office is not well qualified to evaluate patent applications on the basis of social utility. It could, however, be reconfigured. Not by requiring examiners to get Ph.D.s in philosophy, but by developing the institutional expertise necessary to promulgate rules that would guide the decisions of the examiners with respect to social utility. Other administrative agencies – such as the Federal Trade Commission, the Federal Communications Commission, and the Environmental Protection Agency -- routinely do this. The PTO is an administrative agency, after all. There is no reason it could not do so.

Alternatively, if the PTO is not optimally suited to promulgate such guidelines, Congress could do so. Congress has already done so once. In Section 11 of the Atomic Energy Act of 1946, Congress forbade the issuance in the future of patents on technologies “useful solely in the utilization of special nuclear material or atomic energy in an atomic weapon” and expropriated (with compensation) all extant patents of that sort. To be sure, the primary purpose of this provision (now codified in section 42 USC 2181) was not to discourage innovation with respect to atomic weapons; it was to reinforce governmental control over such innovation – an objective that had been pursued during the war in part by private patent applications related to atomic weapons as secret and in part by the government obtaining over 2000 patents of its own on technologies pertaining to atomic weapons. But this provision at least makes clear that it would be possible for the legislature to establish guidelines concerning which technologies should be deemed beneficially useful and which should not.

With respect to the final argument, the proponents concede that it is a powerful objection to the incorporation of moral disqualifications into trademark law – because trademarks are potentially immortal – but suggest that a 20-year lag to the incorporation of moral considerations into the award of patents should not be decisive. In the extreme case, the adoption of a new grounds of disqualification could be accompanied by compensated expropriation of existing patents inconsistent with the new rule – as was done in the context of atomic weapons.

Some support for the proponents' positions might be derived from the fact that many other countries have somewhat more vigorous beneficial utility requirements.

For example, as we have already seen, Article 53© of the European Patent Convention forbids patents on diagnostic and surgical procedures. You might think of this bar as a legislative implementation of a beneficial utility guideline.



In addition, article 53(a) contains an important catch-all provision, which forbids the issuance of patents on “inventions the commercial exploitation of which would be contrary to "ordre public" or morality.”

The EPO Examination guidelines give a bit more texture to this provision:

“The purpose of this is to deny protection to inventions likely to induce riot or public disorder, or to lead to criminal or other generally offensive behavior”

Then provide as an example “Anti-personnel mines”

However, the ambit of 53(a) should not be exaggerated. The Examination Guidelines go on to state that “This provision is likely to be invoked only in rare and extreme cases. A fair test to apply is to consider whether it is probable that the public in general would regard the invention as so abhorrent that the grant of patent rights would be inconceivable.”

The Board of Appeal of the European Patent Office has, on a few occasion, insisted that this language must be taken seriously by examiners. But typically, when the dust has settled, the challenged applications have cleared this hurdle. For example, after a fair amount of hemming and hawing, Harvard’s application for a patent on the oncomouse – a mouse engineered to be especially susceptible to certain cancers – passed muster.

The most significant of the applications of this provision concern biotechnology. The 1998 Biotechnology Directive (itself highly controversial) sets forth some things for which patents cannot be granted, and those exclusions have been incorporated in the EPO Examination Guidelines. They are:

- Processes for cloning human beings
- Processes for modifying the germ line genetic identity of human beings
- Uses of human embryos for industrial or commercial purposes
- Processes for modifying the genetic identity of animals which are likely to cause them suffering without any substantial medical benefit to man or animal, and also animals resulting from such processes

These prohibitions create an odd pattern of difference between the US and Europe with respect to biotechnology. On one important dimension, Europe is more hospitable to patents in this area, because after the Myriad decision (discussed in the preceding lecture) isolated naturally occurring genetic sequences are still patentable in Europe, whereas they are not in the US. On the other hand, with respect to processes involving cloning or the use of human embryos, Europe is more clearly hostile to patent protection than the US. Whether these differences will have an impact on the distribution of the fruits of research in the two regions remains to be seen.

The relevant sections of the laws of Japan and Korea contain provisions similar to 53(a) – and add an exclusion for inventions that threaten public health.

The patent law of China contains an even more open-ended provision: Patent rights shall not be granted for invention-creations that violate the law or “social ethics, or harm public interests.”

Some countries also have a more explicit and demanding analogue to the US requirement of special utility. For example, as you can see, Article 52 of the EPC limits patents to inventions that are “susceptible of industrial application.” Arguably, that’s a tighter limitation than the US requirement that an invention have some practical application – although the requirement is softened by the language of 52(3), which confines the illustrative exclusions of paragraph 2 to inventions that pertain to “such subject-matter or activities as such.”

The Japanese and Korean statutes contain similar language – and less wiggle room.

## B. Disclosure

In this portion of the lecture, I’ll turn to the second of the requirements for obtaining a patent, which concerns the amount of information that the applicant must reveal.

Before examining the doctrines encompassed by this requirement, I’ll spend a few minutes reviewing the policies that the requirement is supposed to advance.

There are five of these. They are summarized on your screen.

The first and most commonly invoked is to compel inventors, when seeking patent protection to reveal information that will enable other scientists and the public at large to benefit from the discoveries they have made in the course of their inventive activity. Inclusion of such information in the patent application, followed by publication of that application, will help other scientists during the term of the patent to push the technological frontier outward in related directions. Then, once the patent has expired, competitors will be able to use the information to begin supplying the products or services covered by the patent; the resultant competition will bring prices down, benefiting consumers.

These two benefits are sometimes said to constitute the “quid pro quo” of the patent system – the consideration extracted by the government in return for granting the patentee a limited monopoly.

The second of the functions of the disclosure requirement is to provide potential infringers of the patent guidance concerning exactly what they can and cannot do. The need to provide such guidance is sometimes said to be rooted in the fundamental principle of the rule of law, one component of which is that all persons must be able to ascertain the contours of the laws by which they are bound.

The third, related function is to provide the courts who may be called upon to interpret the patent information concerning exactly what the inventor understood to be her invention – or, more precisely, what she claimed. Viewed through this lens, the disclosure requirement is a formality – analogous to the parol evidence rule in contracts or the requirement that wills be written down. It's designed to maximize the ability of government officials subsequently to discern the drafter's intent.

The fourth objective of the disclosure obligations is very different. It's connected to the policy (mentioned in the previous lecture and in the first part of this lecture) that we don't want to permit patentees to lock up too large a zone of technology. Forcing patent applicants to indicate exactly what they have invented is said to help prevent them from claiming too much.

Fifth and finally, the disclosure rules are sometimes said to be necessary to enforce the principle that the priority date for an application cannot be prior to the date on which the applicant was fully in control of the relevant technology.

Those are the five. Keep them in mind during the next half hour, while we tour the relevant rules. At the end of the tour, I'll discuss the contentions of some scholars that the rules should be modified if they are to advance these goals most effectively.

The statutory expression of the disclosure requirement in the United States is section 112. Subsection (a) provides: "The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor or joint inventor of carrying out the invention."

Subsection (b) continues in the same vein: "The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention."

From this language, the courts have found three dimensions of the disclosure duty. As was true of the various dimensions of utility, an applicant must comply with all four.

The first and arguably most important is enablement. The nub of this aspect of the duty is that the applicant must include enough information to enable a person having ordinary skill in the relevant art (commonly abbreviated a PHOSITA) to make and use all of the embodiments of the invention claimed in the patent.

Not just some, but all. So, for example, in a recent case involving a patent held by Boston University over a technology used to create films used in blue LED lights, the Federal Circuit held that the absence in the specification of sufficient information to enable a PHOSITA to practice one of six embodiments of a claim was fatal.

The date as of which this requirement is applied is the effective date of the patent application. In other words, the requirement is applied in light of the state of knowledge and skill in the relevant field on that date. As a result, a demonstration that, because of subsequent advances in the field, a PHOSITA at a later date would have found the disclosure sufficient doesn't help the applicant.

The examiner, of course, will make an initial determination concerning whether requirement has been satisfied. If he says yes and the patent is issued, a challenger can still assert in subsequent proceedings that not enough information was provided. The tribunal called upon to assess such a challenge is likely to consider a laundry list of factors – sometimes referred to as “Wands” factors, after the name of the case in which they were first announced:

If a PHOSITA, after reading the patent, was not able to practice the invention immediately but had to conduct additional experimentation, how much of it was necessary?

How much guidance did the patent itself provide?

Did the applicant provide working examples of the invention?

Is this the kind of invention for which lots of guidance is necessary?

How well developed was the body of knowledge in the relevant field?

And how sophisticated are ordinary practitioners of that field?

How predictable are the results of changes in technologies?

How much ground did the relevant claim seek to control?

An important side effect of a subset of these factors is that the strength of the enablement requirement varies by field of technology. As Professors Lemley and Burk argued in an important article, implicit in several opinions by the Federal Circuit is the view that software is a well-developed and predictable field – and thus that patent applicants don't have to disclose as much to satisfy the enablement requirement, whereas biotechnology is less developed and more unpredictable, so applicants have to disclose more. Lemley and Burk go on to challenge the empirical premises of this view of the differences between these two fields.

Some of the classic cases in the canon of patent law relied on what, at least in retrospect, can be called the enablement doctrine to invalidate claims that reached substantially further than was justified by the amount of information provided by the inventors. They include:

An 1853 decision, in which the Supreme Court refused to allow Samuel Morse, the inventor of the telegraph, to claim all ways of using electricity to engage in long-distance communication.

An 1895 decision, in which the Court agreed with Thomas Edison that a patent granted to someone else, prior to his discovery that a carbonized bamboo filament made a light bulb work, failed adequately to specify which carbonized fibrous materials would be effective or how to determine them. and

A 1911 decision by the Second Circuit, invalidating a claim to automobiles, broadly defined

So that's enablement. A very important doctrine.

All of the other major patent system in the world also contain enablement doctrine, which function more or less the same way the US doctrine does.

The second dimension of the US disclosure requirement, by contrast, is not widely shared. Until very recently, the US required an applicant to disclose the "best mode" of practicing the invention at issue. Here's how it worked. In the common situation in which the application includes a claim broad enough to encompass several different ways of practicing the invention, and the inventor (not the assignee of the patent) subjectively believes one of those ways is better than all others, the application must disclose that so-called preferred embodiment.

Such a requirement has the obvious advantage of reducing the social waste associated with forcing other parties to fumble around before hitting upon the best mode – but also the disadvantage of raising the costs associated with patent applications and patent litigation. Other jurisdictions took the position that the costs exceeded the benefits. In 2011, after considerable debate, the US abandoned most of this doctrine.

The current rule is that identification of the preferred mode is still formally a requirement – and it's conceivable that an examiner would reject an application for failure to comply with the requirement – but failure can no longer be asserted as a ground for invalidating a patent.

The third dimensions of the US disclosure requirement is now commonly known as "written description." Until recently, it had independent significance in only one situation: when an applicant altered the scope of what she claimed, but contended that her priority date was earlier than the date of the alteration. Under those circumstances, courts have demanded that the applicant show that she revealed enough information to demonstrate that, on the priority date, she was "in possession" of the invention eventually claimed.

For example, this interpretation underlies a recent opinion of the Federal Circuit that forms part of the very complicated struggle between Stanford University and the University of Hong Kong over a technology for testing DNA found in maternal blood to determine the presence of genetic abnormalities in a fetus.

Interpreted in this way, the written description doctrine arose as a back stop for the priority rules. Sensible enough.

But, starting around the turn of the century, the Federal Circuit began interpreting the written description doctrine to apply in situations in which the concern over priority dates is not relevant. So what information, other than that necessary to satisfy the enablement requirement, does it require? It's hard to say, but roughly, the applicant will be punished for failure to describe the invention itself, not just how to make it.

Many practitioners and scholars – and, indeed, some of the judges on the Federal Circuit – were dismayed by the emergence of a second variant of the written description requirement. In 2010, in the *Ariad* case, the court, sitting en banc, considered their objections but then, by a vote of 9 judges to 2, decided to retain it. The explanation provided by the majority of the scope and rationale for this subtype of written description is highlighted on your screen:

[A] sufficient description of a genus ... requires the disclosure of either a representative number of species falling within the scope of the genus or structural features common to the members of the genus so that one of skill in the art can “visualize or recognize” the members of the genus.”

In short, this variant of written description is designed to prevent overclaiming. Most of the skeptics were unconvinced. To be sure, overclaiming is bad – but, as we have seen, the enablement doctrine is designed – and has frequently been interpreted – to prevent it. Another doctrine doing the same thing thus seems pointless.

As my tone suggests, I remain myself one of the skeptics. But, for better or worse, the doctrine seems to be here to stay.

We come finally to “definiteness.” This requirement, added to the patent statute in 1870, pertains primarily to the language used in the claims. They must be clear and definite to pass muster. For example, a requirement in a claim that a user interface be “aesthetically pleasing” fails the test, because, as the famous aphorism notes, beauty is often in the mind of the beholder and thus the language provides insufficient guidance concerning what is and is not claimed.

The strictness with which this requirement is construed varies by context. It is less strictly applied when a claim is being challenged in litigation than during patent prosecution, when the applicant can usually respond to a rejection by adding clarifying language to the claim.

It is more strictly applied when the ambiguity of the claim creates the potential that it will encroach on prior art.

A patentee may be able to save a claim by showing that potentially fatal ambiguity in the claim language can be alleviated by consulting the specification.

And, instead of declaring an ambiguous claim invalid, a court may adopt a narrow interpretation of it.

A patentee, of course, would prefer to avoid these shoals altogether. The best way to do so is to be precise and claim when drafting claim language.

Now that you've seen how the disclosure requirements work, we can return to the general policy issues with which I began this portion of the lecture. So how well does the doctrine, construed in this fashion, do when measured against these policy goals?

In an important article, Professor Ben Roin argued: not very well. One reason is that the rules just surveyed leave patent drafters too much wiggle room. They exploit that latitude in two ways. First, in the specifications, they deliberately omit information that would be essential to actually practicing the invention at issue. So, for example, applicants for software patents are not required by the courts to reveal the source code of their programs, so they don't – forcing competitors, once the patents have expired, to rely on imperfect de-compilation systems to try to reverse engineer the source code from the object code of the program.

Second, they draft their claims in ways that not only encompass as much territory as possible, but also do their best to obscure their technological advances.

Their success in these regards makes patents less useful as sources of technological information than you would think. Partly as a result, it's unusual for scientists in one firm to review the patents or patent applications filed by the firm's competitors to learn how the technological frontier is advancing. Their reluctance to do so is reinforced by an aspect of the system of remedies for patent infringement that I will examine toward the end of this lecture series: namely, the system of enhanced damages. For the time being, all you need to know is that, if a defendant's infringement is deemed to have been willful, the defendant will have to pay the patentee substantially more than if it was not willful. The defendant's conduct is more likely to be willful if he was aware of the patents at issue than if he was not. As you might expect, a regrettable side effect of this rule is that scientists are loathe to read the patents of their competitors.

The upshot: patents are much less effective than one thinks in disseminating technological information or in letting competitors know they are and are not allowed to do.

How could the disclosure rules be modified to improve this situation?

One option, of course, would be to amend the rules concerning enhanced damages. Keep that in mind when we get to that subject.

Professor Colleen Chien offers the following additional suggestions:

Require applicants to reveal contextual information that would enable competitors to determine more reliably and quickly which patents are worth reading and which are not.

And make all patents more effectively searchable.

I suggest you give some thought to other ways in which disclosure doctrine could be altered to increase the likelihood that it will promote its ostensible goals.