Patent Law

- Slides for Module 2
- Patent Eligibility

The first element of Patentability – Patent eligibility

- ***Patentable subject matter***, i.e., patent eligibility
- ***Useful/utility*** (operable and provides a tangible benefit)
- ***New*** (statutory bar, novelty, anticipation)
- ***Nonobvious*** (not readily within the ordinary skills of a competent artisan at the time the invention was made)
- ***Specification requirements***

claims

Claims

- Claims are the heart of the patent system
- Inventors are those who thought of something covered by the claims, no those who learned it from someone else (may not know who they are until claims are drafted)
- Claims define the scope of coverage of the right to exclude
- Those who operate within the language of the claim are subject to an infringement action

35 USC §101

Whoever invents or discovers any
new and useful

process,

machine, manufacture, or composition of matter,

or any new and useful improvement thereof,

may obtain a patent therefor, subject to the conditions and requirements of this title

"Product" claims or inventions

35 USC §101

- Need a tangible, practical advance in the *useful arts*
- Traditionally, discoveries in three areas do not qualify:
  - natural laws
  - phenomena of nature
  - abstract principles

- The statutory terms refine and define "useful arts"
  - A "process" is a series of acts which are performed upon subject matter to produce a given result
  - A "machine" means any apparatus
  - A "composition of matter" means synthesized chemical compounds and composite articles
  - An article of "manufacture" is a broad term that can capture almost any useful technology

Patent Eligibility - Process

- 35 U.S.C. 100(b)
  - The term "process" means process, art or method, and includes a new use of a known process, machine, manufacture, composition of matter, or material.

- Modern test of the bounds of the broad term "process" has been in relation to computer software
  - Is software more like abstract principles and mental steps or like implemented electronic circuits?

Gottschalk v. Benson – Difference between "BCD" & binary	
Eight "bits" interpreted via "binary"	Eight "bits" interpreted via BCD
1001 1001 Eight "Spots": 2^7 2^6 2^5 2^4 2^3 2^2 2^1 2^0	1001 1001 Two Decimal "Spots": 2d Decimal | 1st Decimal
$(1) * 2^7 + (1) * 2^4 + (1) * 2^3 + (1) * 2^0 =$ $128 + 16 + 8 + 1 =$	1st: $2^3 + (1) * 2^0 = 9$ 2d: $2^3 + (1) * 2^0 = 9$
153	99

Gottschalk v. Benson

- "claims are not limited to any particular art or technology, to any particular apparatus or machinery, or to any particular end use"
- Paraphrasing denied <u>Morse</u> claim 8:
  - Use of magnetism for printing or marking characters/symbols at any distance
    - Not applied to any particular process
- A scientific truth, mathematical expression is not patentable, but a novel and useful structure created with the aid and knowledge of scientific truth is
  - "Idea itself is not patentable"
  - A principle in the abstract cannot be patented
  - A process is a mode of treatment of certain materials to produce a given result
  - It is an act, or a series of acts, performed upon the subject-matter [an article] to be transformed and reduced to a different state or thing

Gottschalk v. Benson

- A certain level of definiteness is required to meet the definition of a process
  - For tanning process, particular chemicals and specific acts
  - For flour purification process, a certain substance is to be reduced to a powder
  - For manufacturing fat acids, a particular mode of brining about the desired chemical union between fatty elements and water (as opposed to claiming the chemical fact that such a union can occur)
- In sum [under <u>Benson</u>], a process patent must:
  - Be tied to a particular machine or apparatus, OR
  - Change articles or materials to a "different state or thing"

Gottschalk v. Benson

- In practical effect, granting patent on this claim would be granting a patent on the formula/algorithm itself
  - Formula has no application outside of digital computers
  - Claim is so abstract and sweeping as to cover both known and unknown uses of the BDC to binary conversion
  - What is the court really concerned about?
    - Is it that the court suspects that the algorithm is in the public domain, and it expresses a novelty or obviousness concern in terms of patent eligibility?

- Claim 8 versus claim 13?

- Mental steps doctrine

Essential Problem for Patent Eligibility

Where does a patent eligible "process" stop and where does a "law of nature" or "abstract idea/principle" (such as a mathematical algorithm) begin? Benson, Diehr, Flook

process ◁▷ law of nature or abstract idea

Where does a patent eligible product (machine, manufacture, composition of matter) stop and where does a "natural phenomena" (such as a heart rhythm) begin? Arrhythmia, Chakrabarty (to a lesser degree)

product ◁▷ natural/physical phenomena

Parker v. Flook (US 1978) [note 6, pg. 67-68]

- Claim is to method for updating alarm limits
- PTO rejected, CCPA reversed, Supreme Court reversed – rejecting the claim as not patent eligible
- Court considered the application to be of an abstract nature and wholly focused upon the calculation of the alarm limit
  - It did not save the claim that it was limited to the specific process of catalytic conversion and had "post-solution" activity to adjust the alarm limit
- Dissent accused majority of applying novelty and nonobviousness criteria in place of patent eligibility

Diamond v. Diehr

- Claimed method for operating a rubber molding press with a digital computer such that articles are in the press for the proper amount of time

- Examiner rejected claims as nonstatutory subject matter under §101

- PTO Board affirmed, CCPA (Rich, J.) reversed, concluding that the claims were not directed to a mathematical algorithm, but to an improved process for molding rubber articles

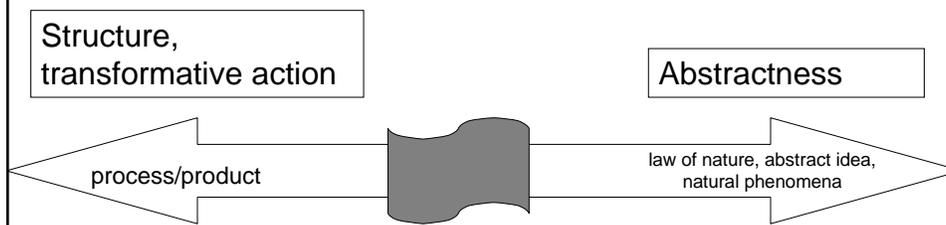|	1. A method of operating a rubber-molding press for precision molded compounds with the aid of a digital computer, comprising:	
Diamond v. Diehr	"providing said computer with a data base for said press including at least,	A
	"natural logarithm conversion data (ln),	A.1
	"the activation energy constant (C) unique to each batch of said compound being molded, and	A.2
	"a constant (x) dependent upon the geometry of the particular mold of the press,	A.3
	"initiating an interval timer in said computer upon the closure of the press for monitoring the elapsed time of said closure,	*B*
	"constantly determining the temperature (Z) of the mold at a location closely adjacent to the mold cavity in the press during molding,	*C*
	"constantly providing the computer with the temperature (Z),	*D*
	"repetitively calculating in the computer, at frequent intervals during each cure, the Arrhenius equation for reaction time during the cure, which is	*E*
	"$\ln v = CZ + x$	*E.1*
	"where v is the total required cure time,	*E.2*
	"repetitively comparing in the computer at said frequent intervals during the cure each said calculation of the total required cure time calculated with the Arrhenius equation and said elapsed time, and	*F*
	"opening the press automatically when a said comparison indicates equivalence.	*G*

Diamond v. Diehr

- Is this claimed process patentable subject matter?
- Background statutory arguments
  - Give statute's words plain, broad meaning
  - Legislative history: "anything under the sun that is made by [humans]"
  - History: this type of industrial process is historically patentable subject matter
- How to analyze a claim for §101 analysis
  - consider claim as a whole – inappropriate to dissect for purposes of §101 patent eligibility analysis
    - New process may be patentable even if all steps known and in common use before the combination is made (pg 73 – is the court confusing novelty with patent eligibility here?)
    - Word "new" in "new and useful" does not mean that the novelty analysis is a part of §101 and patent eligibility

Diamond v. Diehr

- Holding(s)
  - a mathematical formula as such is not protectable, <u>Benson</u>
  - this principle cannot be circumvented by attempting to limit the use of the formula to a particular technological environment, <u>Flook</u>
  - when a claim containing a mathematical formula implements or applies that formula in a structure or process which, when considered as a whole, is performing a function which the patent laws were designed to protect (*e. g.*, transforming or reducing an article to a different state or thing), then the claim satisfies the requirements of § 101

Structure, transformative action		Abstractness

process/product   law of nature, abstract idea, natural phenomena

Arrhythmia Research Tech. Inc. v. Corazonix

- Patent is to method of detecting and measuring "late potentials" [certain shaped waveforms] in the "QRS complex" [heart's ventricular contraction cycle], and associated apparatus

- Duly issued patent challenged in District Court, so 35 U.S.C. 282, presumption of validity, is in the backdrop of the court's review

Fig. 2

TIME = m s
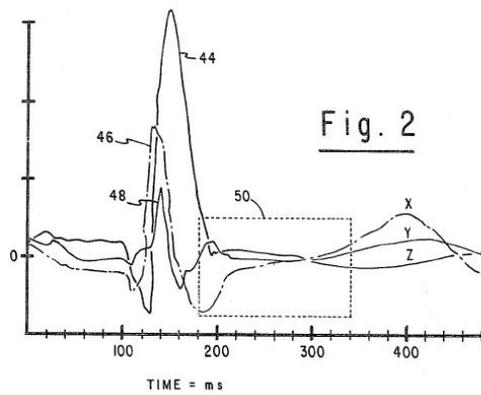
Arrhythmia on the (now mostly defunct) Freeman-Walter-Abele ("F-W-A") test

- First, does the claim directly or indirectly recite a "mathematical algorithm"
  - Think more broadly than a math formula
  - "mathematical algorithm" in this context can mean a variety of items, expressed in words or mathematical symbols, for example, items such as "calculating procedures" or "comparative step-wise analysis" of data
- Second, is the claimed invention as a whole no more than the algorithm itself, i.e., is the claim directed to a mathematical algorithm that is not limited by or applied to physical elements or process steps
  - need more "circumscription" of the mathematical algorithm than a field of use limitation or non-essential post solution activity.
  - emphasis is on what the steps do (looking at the claim as a whole), rather than how the steps are performed
  - Need significantly more than the algorithm alone

Arrhythmia

- Outcome – process claims (claim 1)
  - There is structure to implement the steps of converting, applying, determining and comparing the electrical signals
    - signals do have something "physical" about them
  - So, F-W-A met, otherwise statutory process whose mathematical procedures are applied to physical process steps
- Outcome – apparatus claims (claim 7)
  - Impact/analysis of "means plus function" ("M+F") claims
  - Once the structure is "mapped" from the specification to inform the meaning of the M+F claims, there is sufficient structure to meet the F-W-A test
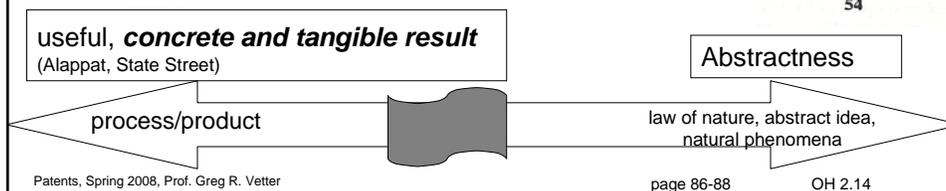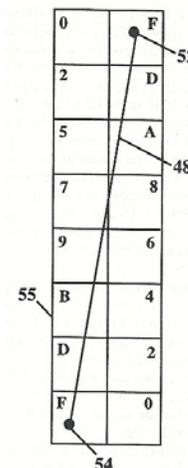
Arrhythmia – HYPO of Claim 7

Claim Element		Meaning
7. Apparatus for analyzing electrocardiograph signals to determine the level of high frequency energy in the late QRS signal comprising:		
converter which transforms electrocardiograph input signals into digital representations;	A	Plain meaning to a POSITA of the language "converter . . ." as determined via claim interpretation canons of constructions and procedure
comparator to examine said digital representations with capability to select and extract QRS waveform portions thereof;	B	
. . .;	C	
high pass filter;	D	
. . . ; and	E	
. . . .	F	

Arrhythmia – M+F claim 7

Claim Element		§112¶6 meaning – first step of analysis
7. Apparatus for analyzing electrocardiograph signals to determine the level of high frequency energy in the late QRS signal comprising:		
means for converting X, Y, and Z lead electrocardiographic input signals to digital valued time segments;	A	Conventional analog to digital converter and minicomputer as configured in the specification
means for examining said X, Y, and Z digital valued time segments and selecting therefrom the QRS waveform portions thereof;	B	. . .
means for signal averaging a multiplicity of said selected QRS waveforms for each of said X, Y, and Z inputs and providing composite, digital X, Y, and Z QRS waveforms;	C	. . .
high pass filter means;	D	Minicomputer configured to . . .
means for applying to said filter means, in reverse time order, the anterior portion of each said digital X, Y, and Z waveform; and	E	
means for comparing the output of said filter means with a predetermined level to obtain an indication of the presence of a high frequency, low level, energy component in the filter output of said anterior portions.	F	

Alappat (Fed. Cir. 1994) (en banc)

- Claimed invention is to a method of calculating a "more smooth" display pattern for showing a curved signal line in a pixel display such as that in an oscilloscope
- Holding(s)
    - Is the "mathematical algorithm" nothing more than a "disembodied mathematical concept"
        - Does it represent nothing more than "law of nature" "natural phenomena" or "abstract idea"
    - This claim is to a machine
        - many, or even all elements of the claim are circuitry that performs calculations (true of all circuits)
        - The claimed invention as a whole is a combination that is a machine – it gives a useful, concrete and tangible result

useful, *concrete and tangible result*
(Alappat, State Street)

Abstractness

process/product

law of nature, abstract idea, natural phenomena

35 USC §101

Whoever invents or discovers any new and useful

    process,

    machine, manufacture, or composition of matter,

or any new and useful improvement thereof,

may obtain a patent therefor, subject to the conditions and requirements of this title

"Product" claims or inventions

State Street Bank

- Mutual funds (spokes) pooled into a single portfolio (hub, a partnership)
- System of '056 patent allows for daily allocation and balancing of assets amounts
- Needs computing power to operate because of deadlines to recalculate share prices under securities regulations
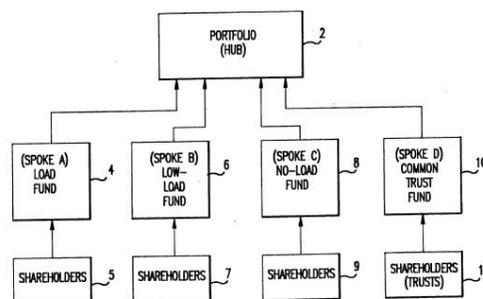
State Street Bank

Claim element/limitation	Embodiment in the specification / Structure to use to construe the M+F claim element/limitation	
1. A data processing system for managing a financial services configuration of a portfolio established as a partnership, each partner being one of a plurality of funds, comprising:		
(a) computer processor means for processing data;	[a personal computer including a CPU]	A
(b) storage means for storing data on a storage medium;	[a data disk]	B
(c) first means for initializing the storage medium;	[an arithmetic logic circuit configured to prepare the data disk to magnetically store selected data]	C
(d) second means for processing data regarding assets in the portfolio and each of the funds from a previous day and data regarding increases or decreases in each of the funds, [sic, funds'] assets and for allocating the percentage share that each fund holds in the portfolio;	[an arithmetic logic circuit configured to retrieve information from a specific file, calculate incremental increases or decreases based on specific input, allocate the results on a percentage basis, and store the output in a **1372** separate file]	D
(e) third means for processing data regarding daily incremental income, expenses, and net realized gain or loss for the portfolio and for allocating such data among each fund;	[an arithmetic logic circuit configured to retrieve information from a specific file, calculate incremental increases and decreases based on specific input, allocate the results on a percentage basis and store the output in a separate file]	E
(f) fourth means for processing data regarding daily net unrealized gain or loss for the portfolio and for allocating such data among each fund; and	[an arithmetic logic circuit configured to retrieve information from a specific file, calculate incremental increases and decreases based on specific input, allocate the results on a percentage basis and store the output in a separate file]	F
(g) fifth means for processing data regarding aggregate year-end income, expenses, and capital gain or loss for the portfolio and each of the funds.	[an arithmetic logic circuit configured to retrieve information from specific files, calculate that information on an aggregate basis and store the output in a separate file]	G

State Street Bank

- Does claim 1 meet one of the four statutorily designated patent eligible categories?
  - Means plus function claims are not method claims when there is sufficient structure to support the means clause
  - Upon implementing the §112¶6 claim interpretation, the court concludes that the claim clearly covers a "machine"
  - In addition, the expansive term "any" in §101 suggests Congress' intent to not place restrictions on patent eligibility beyond those recited in §101
  - As a result, the issue becomes whether either of two traditional exceptions apply:
    - Mathematical algorithm
    - Business methods

State Street Bank

- Mathematical algorithm exception
  - The traditional three exceptions apply
    - must analyze the mathematical algorithm exception within the framework of these
  - Specifically, a mathematical algorithm is "unpatentable only to the extent that it represents an abstract idea"
    - Eligible subject matter if the claim produces a "useful, concrete and tangible result"
  - They are shown to be unpatentable when
    - merely abstract ideas constituting disembodied concepts or
    - Truths that are not "useful"
      - Divergence into the "utility" patentability requirement?
  - Here, there is a useful, concrete and tangible result
  - F-W-A test is not applicable, nor generally useful after <u>Diehr</u> and <u>Chakrabarty</u>
    - Every process is algorithmic
    - The term "process" has a broad definition in §100(b)
  - Does the "useful, concrete and tangible result" test diverge into the utility requirement, effectively merging the two?

State Street Bank

- Business methods exception
  - "lay this ill-conceived exception to rest"
  - Since the 1952 patent act, business methods should be analyzed under the same standards as any other process
  - Never used
    - Source case for the exception was really a novelty case
  - District court's concern with the claim rings of novelty, not patent eligibility
    - "the '056 Patent is claimed [sic] sufficiently broadly to foreclose virtually any computer-implemented accounting method necessary to manage this type of financial structure"
  - PTO de-emphasis of business methods exception in MPEP and Examination Guidelines for Computer Related Inventions
    - Deleted it from the MPEP as a listed basis for rejection

AT&T v. Excel (Fed. Cir. 1999) (note 3, pg. 96-97)

- process claims for method of inserting data into a long distance call record in order to enable proper billing of the call

- Alappat and State Street had M+F claims, so the claims could easily be characterized as a "machine"

- AT&T process/method claims solely involved information exchange
  - held patent eligible subject matter under Alapatt & State Street, completing State Street's dismantling of the business methods exception and final cabining of the mathematical algorithm exception

Chakrabarty

- Patent application for genetically engineered bacteria
  - It had the property of breaking down multiple components of crude oil
  - Its intended application was to treat oil spills (never field tested or applied)
- Claim to the bacteria itself:
  - "a bacterium from the genus *Pseudomonas* containing therein at least two stable energy-generating plasmids, each of said plasmids providing a separate hydrocarbon degradative pathway."
- Various other claims in other claim formats
- Issue – is the bacteria a "manufacture" or "composition of matter" within the meaning of those terms as they apply from 35 U.S.C. §101?

Claim illustration – Chakrabarty, Pat. No. 4,259,444

From the originally allowed claims:

14. An inoculated medium for the degradation of liquid hydrocarbon substrate material floating on water, said inoculated medium comprising a carrier material able to float on water and bacteria from the genus Pseudomonas carried thereby, at least some of said bacteria each containing at least two stable energy-generating plasmids, each of said plasmids providing a separate hydrocarbon degradative pathway and said carrier material being able to absorb said hydrocarbon material.

Claim illustration – Chakrabarty, Pat. No. 4,259,444

- **in·oc·u·late** *v. tr.* **in·oc·u·lat·ed in·oc·u·lat·ing in·oc·u·lates 1.** To introduce a serum, a vaccine, or an antigenic substance into (the body of a person or an animal), especially to produce or boost immunity to a specific disease. **2.** To communicate a disease to (a living organism) by transferring its causative agent into the organism. **3.** To implant microorganisms or infectious material into (a culture medium). **4.** To safeguard as if by inoculation; protect. **5.** To introduce an idea or attitude into the mind of.

Claim illustration – Chakrabarty, Pat. No. 4,259,444

Broad Claim Language	Embodiment (embody – "To represent in bodily or material form")
14. An inoculated medium for the degradation of liquid hydrocarbon substrate material floating on water, said inoculated medium comprising	Material such as straw acting as an "inoculation medium" by floating on water and degrading oil
a carrier material able to float on water and	Straw
bacteria from the genus Pseudomonas carried thereby, at least some of said bacteria each containing at least two stable energy-generating plasmids, each of said plasmids providing a separate hydrocarbon degradative pathway and	Chakrabarty's "oil eating" bacteria mixed in with other, more general bacteria from a specific genus of bacteria
said carrier material being able to absorb said hydrocarbon material.	The straw (or whatever "carrier material" is used) must be able to absorb the oil

Chakrabarty

- Mode of analysis (in essence common to all of the patent eligibility cases)
  - First, determine whether the claim is "within" the meaning of one of the four statutory terms
    - Apply statutory interpretation "argument categories"
      - Meaning of the words (statutory definitions, plain meaning, canons of construction, past court opinions on the meaning)
      - Inferences from the provisions or structural characteristics of the statute or other related statutes (same word used in other places in the statute, significance of sectioning, divisions, cross-references, etc.)
      - Legislative History (a number of principles and "canons" are sometimes used to structure use of legislative history; for example, the sometimes employed doctrine that the legislative history should only be authoritative if the statutory language is ambiguous)
      - Policy and/or historical arguments
  - Second, even if the analysis from the first step seems to indicate that the claim is within one of the terms, evaluate whether the claim fits into one of the three remaining exceptions to patent eligibility
    - These exceptions are judicially created, so the mode of analysis looks more like the common law than like statutory interpretation (for example, the line of cases dealing with the now mostly defunct "mathematical algorithm" exception)
  - One always needs the first step; even if its dubious whether an exception applies courts often (and it is advisable) to at least mention that

Chakrabarty

- PTO rejection
  - Examiner rejected bacterial claims on two grounds
    - micro-organisms are "products of nature"
    - that as *living things micro-organisms are not patentable subject matter under § 101*.
      - A new "proposed" exception, or does it fit within one of the three exceptions? (natural phenomenon? but, human-made)
- Meanings of terms
  - Manufacture
    - produce articles for use from raw or prepared materials by giving these materials new forms, qualities, properties, or combinations
  - Composition of matter
    - all compositions of two or more, all composite articles – whether chemical or mechanical union/mixture, whether gases, fluids, powers or solids
  - Both "wide scope" terms

Chakrabarty

- Legislative History
  - Language of 101 tracks closely with Jefferson's originally-authored 1793 patent act
  - Embodies Jefferson's philosophy that "ingenuity should receive a liberal encouragement"
  - Congress intended patentable subject matter to include "anything under the sun that is made by [humans]"
- Exceptions - Physical phenomena?
  - Compare to Funk (US 1948):
    - Applicant discovered certain bacteria whose characteristics where such that when mixed together they assisted the process of nitrogen fixation in plant roots
    - In rejecting the application the court said that the "use in combination does not improve in any way their natural functioning"
    - "they perform in their natural way"
  - Chakrabarty's bacteria has "markedly different characteristics" from those in nature
  - Charkabarty *transformed* the natural bacteria into his own handiwork
- Other considerations
  - Consider the definition of "invention" in §100, which says that "invention" means both "invention and discovery"

Chakrabarty

- First counter argument
  - 1930 Plant Patent Act (seedless "asexual" reproduction)
  - 1970 PVPA (sexual reproduction, excluded bacteria)
  - Passage of both acts evidences congressional understanding that "manufacture" or "composition of matter" do not include living things – if they did, neither act necessary
    - Only one specific PPA legislative history provision stating that "the patent laws . . . at the present time are understood to cover only . . . inanimate nature"
- Not persuasive because there were other reasons to pass both acts
  - PPA – work of the breeder "in aid of nature" was patentable
    - Prior to 1930, even artificially bred plants considered "products of nature" (an instance of "natural phenomena")
    - Written description problem for plant patent (may differ only by color or perfume) (relaxed by PPA)
    - ***Relevant distinction is not between living and inanimate things, but between products of nature, whether living or not, and human-made inventions***
  - PVPA – sexually reproduced plants not included in PPA because new varieties could not be reproduced true-to-type through seedlings in 1930
    - PVPA excluded bacteria (i) simply in agreement with a court case that held that bacteria were not plants under PPA, or (ii) because prior to 1970 the PTO had granted some patents on bacteria

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Chakrabarty

- Second counter argument – need Congress to authorize patents on micro-organisms, genetic technology unforeseen when §101 enacted

  - Flook: the judiciary "must proceed cautiously when . . . asked to extend patent rights into areas wholly unforeseen by Congress"

  - Congress has spoken, court says it is simply doing its Marbury duty to say what the law is – high policy choice is not for the court and has already been made by congress

    - Congress is free to amend to exclude these inventions, and has similarly done so for nuclear weapons technology

Statutory Subject Matter Exercises

1. A three-dimensional cube-shaped puzzle. Each face of the puzzle consists of eight smaller cubelets of differing colors. The user attempts to solve the puzzle by rotating rows of cubelets around one of several internal axes until a preselected pattern is obtained.	???
2. A technique for counting playing cards that supposedly makes its user an unbeatable blackjack player.	???
3. As the menu at a local restaurant proudly proclaims, "Every dish comes with a wonderful complement, our patented banana hollandaise sauce."	???
4. A method of lifting heavy weights through a modified "clean-and-jerk" technique, suitable for use by Olympic athletes.	??? * —
5. A new perfume, cologne or scent.	??? * —
6. A method of preventing repetitive stress injuries during computer keyboard usage by holding one's hand, wrists and forearms in a straight and fluid line.	??? * —
7. A character assessment method comprising (1) instructing the person to produce a drawing which includes a pictorial representation of a hand, eye, flower, star, half-circle and other objects; and (2) subjecting the drawing to a psychological interpretation.	??? * —
8. A method of remodeling a building, comprising (1) presenting design ideas to a client; (2) allowing the client to select her favorite design; (3) taking a photograph of the building; and (4) preparing a drawing of the proposed remodeled building employing the photograph and the preferred design.	??? * —
9. The "Human Wave" commonly performed by spectators at sporting events.	??? * —