

ANGELIC II Domain Model: Inventive Step in European Patent Law

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1 Introduction

This document presents an ANGELIC Domain Model (ADM) for the legal domain of assessing the inventive step of a patent, based on the European Patent Office (EPO) Guidelines. The model is constructed following the ANGELIC II methodology, which structures legal knowledge into a hierarchy of issues, abstract factors, and base-level factors. This work is based on the ANGELIC II paper (Atkinson & Bench-Capon 2023) and on a handcrafted document of extensive defeasible inference rules for the domain. Gemini-2.5-pro was used to help create the questions for instantiating the blfs, and to help with assigning the values to the blfs and abstract factors.

2 Values Ideas

- Legal Certainty (LC) - The public, including competitors, needs to know what is patented and what is not so they can innovate freely without unknowingly infringing. This value requires that patent claims are clear, supported by the description, and that the technical contribution is reproducible.
Purpose: To provide a clear and predictable legal framework for third parties, allowing them to understand the scope of a patent and the state of the art.
Promoted by: Rules concerning Sufficiency of Disclosure (AF12) and the reproducibility of the technical effect. For example, denying an inventive step because the claimed effect is not reproducible (\neg F37) promotes legal certainty because the public is not prevented from using an invention that doesn't work as claimed.; GPT-5 - Legal Certainty – ensuring patents are granted only when claims are clear, reproducible, and supported (links to sufficiency of disclosure, reproducibility, claim scope).
- Upholding Patent Quality (UPQ) - This is the foundational value. The patent system's integrity relies on granting patents only for genuine, non-obvious inventions. This value is promoted by rules that prevent trivial or straightforward developments from being patented.
Purpose: To ensure patents are only granted for inventions that represent a meaningful technical advance over the prior art.
Promoted by: Rules that establish obviousness, such as those for Known Measures (AF2), Obvious Combination (AF3), and Obvious Selection (AF4). For example, finding that an invention is just an obvious combination of known parts upholds the quality of the patent system by denying a patent.
- Reliability – requiring that inventions actually work as claimed, reproducibly (links to F36 credible effect, F37 reproducible, sufficiency).
- Fair Competition – preventing monopolies on trivial, obvious, or non-technical advances (links to obviousness tests, known measures, simple extrapolation).
- Technical Progress – rewarding inventions that make a real technical contribution beyond the state of the art (links to credible technical effect, synergy, problem-solution).

3 Main Analysis: Inventive Step

This section details the primary logical flow for determining if an invention involves an inventive step, assuming the perspective of the "Skilled Person" defined above.

3.1 Issue Table

The Issue Table contains the highest-level legal questions for the main analysis. **NEED TO DO**

Table 1: Issue Table for Inventive Step

ID	Issue	Children	Acceptance Conditions	Source
I1	InvStep	I2, F29, F27, F28, I3	REJECT IF F29 REJECT IF I2 ACCEPT IF F27 AND F28 AND I3 REJECT	r43, r44 [p. 21]
I2	Obvious	F55, AF12	ACCEPT IF F55 ACCEPT IF AF12 REJECT	r42 [p. 21]
I3	Novelty	F25	ACCEPT IF F25 REJECT	r9 [p. 6]

3.2 Abstract Factor Table: Skilled Person

Table 2: Abstract Factors for Foundational Concepts

ID	Factor	Children	Acceptance Conditions	Source
AF1	Person	F5, F6, F7	ACCEPT IF F5 ACCEPT IF F6 ACCEPT IF F7 REJECT	r1 [p. 3]
AF2	SkilledPerson	F1, F2, F3, F4, AF1	ACCEPT IF F1 AND F2 AND F3 AND F4 AND AF1 REJECT	r1 [p. 3]
AF3	CommonKnowledge	F8, AF4	ACCEPT IF AF4 REJECT IF F8 ACCEPT	r2 [p. 3]
AF4	DocumentaryEvidence	F9, F10, F11, F12	REJECT IF F9 ACCEPT IF F10 ACCEPT IF F11 ACCEPT IF F12 REJECT	r3 [p. 3]

3.3 Abstract Factor Table: Closest Prior Art

Table 3: Abstract Factors for Main Analysis

ID	Factor	Children	Acceptance Conditions	Source
AF5	RelevantPriorArt	F13, F14, F15, F16	ACCEPT IF F15 ACCEPT IF F16 ACCEPT IF F13 ACCEPT IF F14 REJECT	r4 [p. 4]

Continued on next page

Table 3 – continued from previous page

ID	Factor	Children	Acceptance Conditions	Source
AF6	ClosestPriorArt	AF5, F19, F20, F21	ACCEPT IF AF5 AND F19 AND F20 AND F21 REJECT	r5 [p. 5]
AF7	CombinationDocuments	F22, F17, F18, F23, F24	ACCEPT IF F22 AND F17 AND F23 AND F24 ACCEPT IF F22 AND F18 AND F23 AND F24 REJECT	r6 [p. 5]
AF8	ClosestPriorArtDocuments	AF6, AF7	ACCEPT IF AF6 ACCEPT IF AF7 REJECT	r7 [p. 6]

3.4 Abstract Factor Table: Problem-Solution Approach

Table 4: Abstract Factors for Main Analysis

ID	Factor	Children	Acceptance Conditions	Source
AF9	Combination	F28, F45, F46	ACCEPT IF F28 AND F45 AND F46 REJECT	r22 [p. 12]
AF10	PartialProblems	AF9	REJECT IF AF9 ACCEPT	r25, r26 [p. 13, p. 14]
AF11	CandidateOTP	AF9, AF10	ACCEPT IF AF9 ACCEPT IF AF10 REJECT	r24, r26 [p. 13, p. 14]

3.5 Abstract Factor Table: Secondary Indicators

Table 5: Abstract Factors for Main Analysis

ID	Factor	Children	Acceptance Conditions	Source
AF12	SecondaryIndicator	AF13, AF14, AF15, AF17, F75, AF19	ACCEPT IF AF13 ACCEPT IF AF14 ACCEPT IF AF15 ACCEPT IF AF17 ACCEPT IF F75 ACCEPT IF AF19 REJECT	r35 [p. 18]
AF13	PredictableDisadvantage	F59, F60, F61	REJECT IF F61 ACCEPT IF F59 AND F60 REJECT	r32 [p. 17]
AF14	BioTechObvious	F63, F62, F67, F68	REJECT IF F62 ACCEPT IF F63 AND F67 ACCEPT IF F63 AND F68 REJECT	r33 [p. 17]
AF15	AntibodyObvious	AF16, F65, F66	REJECT IF F66 ACCEPT IF AF16 AND F65 REJECT	r34 [p. 17]
AF16	SubjectMatterAntibody	F63, F64	ACCEPT IF F63 AND F64 REJECT	r34 [p. 17]

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Table 5 – continued from previous page

ID	Factor	Children	Acceptance Conditions	Source
AF17	KnownMeasures	F69, F70, AF18	ACCEPT IF F69 ACCEPT IF F70 ACCEPT IF AF18 REJECT	r36, r37, r39 [p. 18, p.19]
AF18	KnownUsage	F71, F72, F73, F74	ACCEPT IF F71 ACCEPT IF F72 ACCEPT IF F73 AND F74 REJECT	r38 [p. 19]
AF19	ObviousSelection	F76, F77, F78, F79	ACCEPT IF F76 ACCEPT IF F77 ACCEPT IF F78 ACCEPT IF F79 REJECT	r41 [p. 20]

3.6 Sub-Model 1 - Technical Contributions

Table 6: Abstract Factors for Sub-Model 1

ID	Factor	Children	Acceptance Conditions	Source
I4	FeatureReliableTechnical Effect	AF23, F42, F43, AF22, AF20, AF21	REJECT IF AF21 REJECT IF AF22 REJECT IF AF20 ACCEPT IF AF23 AND F42 AND F43 REJECT	r10 [p. 7]
AF20	ImpreciseUnexpectedEffect	F56, F57	REJECT IF F57 ACCEPT IF F56 REJECT	r10 [p. 7]
AF21	SufficiencyOfDisclosureIssue	F43, F44	REJECT IF F43 ACCEPT IF F44 REJECT	r19 [p. 10]
AF22	Bonus Effect	AF23, F56, F58	ACCEPT IF AF23 AND F56 AND F58 REJECT	r20 [p. 11]
AF23	FeatureTechnicalContribution	AF24, AF26, AF27	ACCEPT IF AF24 ACCEPT IF AF26 ACCEPT IF AF27 REJECT	r10 [p. 7]
AF24	NormalTechnicalContribution	F30, F31, F32, AF25	REJECT IF F32 REJECT IF AF25 ACCEPT IF F30 ACCEPT IF F31	r10 [p. 7]
AF25	ExcludedField	F33, F34, F35, F36	ACCEPT IF F33 ACCEPT IF F34 ACCEPT IF F35 ACCEPT IF F36 REJECT	r11 [p. 7]
AF26	ComputationalContribution	F33, F41, F34, F38	ACCEPT IF F33 AND F41 ACCEPT IF F33 AND F37 ACCEPT IF F34 AND F37 ACCEPT IF F34 AND F38 REJECT	r12 [p. 7]

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Table 6 – continued from previous page

ID	Factor	Children	Acceptance Conditions	Source
AF27	MathematicalContribution	F35, AF28,F41	ACCEPT IF F35 AND AF28 ACCEPT IF F35 AND F41 REJECT	r13 [p. 8]
AF28	AppliedInField	F39, F40	ACCEPT IF F39 AND F40 REJECT	r14 [p. 8]

3.7 Sub-Model 2 - Objective Technical Problem

Table 7: Abstract Factors for Sub-Model 2

ID	Factor	Children	Acceptance Conditions	Source
I5	WouldHaveArrived	AF29, F53, F54	ACCEPT IF F53 AND AF29 ACCEPT IF F54 AND AF29 REJECT	r30 [p. 16]
AF29	ObjectiveTechnicalProblemFormulation	AF31, AF30	ACCEPT IF AF31 ACCEPT IF F26 REJECT	r29 [p. 15]
AF30	ConstrainedProblem	AF31, F26	ACCEPT IF AF31 AND F26 REJECT	r28 [p. 15]
AF31	WellFormed	F51, F52, AF32	REJECT IF F52 ACCEPT IF F51 AND AF32 REJECT	r27 [p. 14]
AF32	BasicFormulation	F48, F49, F50	ACCEPT IF F48 AND F49 AND F50 REJECT	r24, r26 [p. 13, p. 14]

4 Base-Level Factor Table & Question List

4.1 Base-Level Factor Table

Table 8: Base-Level Factor Table

ID	Factor	Value	Dimension	Required Answer	Dependencies
F1	SkilledIn			Q6(a)	AF5
F2	Average			Q7(a)	
F3	Aware			Q8(a)	AF3
F4	Access			Q9(a)	AF5
F5	Individual			Q10(a)	
F6	ResearchTeam			Q10(b)	
F7	ProductionTeam			Q10(c)	
F8	Contested			Q4(a)	
F9	SinglePublication			Q5(d)	
F10	Textbook			Q5(a)	
F11	TechnicalSurvey			Q5(b)	

Continued on next page

Table 8 – continued from previous page

ID	Factor	Value	Dimension	Required Answer	Dependencies
F12	PublicationNewField			Q5(c)	
F13	SimilarPurpose			Q2(a)	
F14	SimilarEffect			Q3(a)	
F15	SameField			Q4(a)	
F16	SimilarField			Q4(b)	
F17	SameFieldCPA			Q14(a)	AF6
F18	SimilarFieldCPA			Q14(b)	AF6
F19	SingleReference			Q11(a)	
F20	MinModifications			Q12(a)	
F21	AssessedBy			Q12(a)	AF2
F22	CombinationAttempt			Q13(a)	AF6
F23	CombinationMotive			Q15(a)	AF6, ??
F24	BasisToAssociate			Q16(a)	AF6, ??
F25	DistinguishingFeatures			length of DistinguishingFeaturesList > 1	AF8
F26	NonTechnicalContribution			accept if factor FeatureTechnical-Contribution not present in ≥ 1 sub-model instantiation	(Sub-Model 1: 6)
F27	TechnicalContribution			accept if factor FeatureTechnical-Contribution present in ≥ 1 sub-model instantiation	(Sub-Model 1: 6)
F28	ReliableTechnicalEffect			accept if accept root in ≥ 1 sub-model instantiation	(Sub-Model 1: 6)
F29	SufficiencyOfDisclosure			accept if factor SufficiencyOfDisclosureIssue present in ≥ 1 sub-model instantiation	(Sub-Model 1: 6)
F30	IndependentContribution			Q17(a)	AF2
F31	CombinationContribution			Q18(a)	AF2
F32	CircumventTechProblem			Q21(a)	
F33	ComputerSimulation			Q20(a)	
F34	NumericalData			Q20(b)	
F35	MathematicalMethod			Q20(c)	

Continued on next page

Table 8 – continued from previous page

ID	Factor	Value	Dimension	Required Answer	Dependencies
F36	OtherExclusions			Q20(d)	
F37	IntendedTechnicalUse			Q23(a)	
F38	TechUseSpecified			Q24(a)	
F39	SpecificPurpose			Q26(a)	
F40	FunctionallyLimited			Q27(a)	
F41	TechnicalAdaptation			Q22(a)	
F42	Credible			Q31(a,c)	AF23
F43	Reproducible			Q31(b,c)	AF23
F44	ClaimContainsEffect			Q32(a)	
F45	FunctionalInteraction			Q34(a)	F28
F46	Synergy			Q33(a)	F28
F47	ObjectiveTechnicalProblem			accept if factor ObjectiveTechnical-ProblemFormulation present in ≥ 1 sub-model 2 instantiation	(Sub-Model 2: 7), AF11
F48	Encompassed			Q35(a)	AF11
F49	Embodied			Q36(a)	AF11
F50	ScopeOfClaim			Q37(a)	AF11
F51	WrittenFormulation			Q38(a)	AF32,
F52	Hindsight			Q39(a)	AF32, AF2
F53	WouldModify			Q40(b)	AF2, AF5, AF6, AF29
F54	WouldAdapt			Q40(a)	AF2, AF5, AF6, AF29
F55	OTPObvious			accept if reject for sub-model 2 is < 1	(Sub-Model 2: 7)
F56	UnexpectedEffect			Q28(a)	AF23
F57	PreciseTerms			Q29(a)	AF23
F58	OneWayStreet			Q30(a)	AF23, AF2, AF6
F59	DisadvantageousMod			Q40(a)	AF6
F60	Foreseeable			Q41(a)	AF2
F61	UnexpectedAdvantage			Q42(a)	AF2

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Table 8 – continued from previous page

ID	Factor	Value	Dimension	Required Answer	Dependencies
F62	InventionUnexpectedEffect			accept if factor UnexpectedEffect present in ≥ 1 sub-model 1 instantiation	(Sub-Model 1: 6)
F63	BioTech			Q43(a)	
F64	Antibody			Q44(a)	
F65	KnownTechnique			Q47(a)	AF5
F66	OvercomeTechDifficulty			Q48(a)	
F67	PredictableResults			Q45(a)	
F68	ReasonableSuccess			Q46(a)	
F69	GapFilled			Q49(a)	AF5, AF2
F70	WellKnownEquivalent			Q50(a)	AF5
F71	KnownProperties			Q51(a)	
F72	AnalogousUse			Q52(a)	
F73	KnownDevice			Q53(a)	
F74	AnalogousSubstitution			Q55(a)	
F75	ObviousCombination			Q54(a)	F73
F76	ChooseEqualAlternatives			Q56(a)	
F77	NormalDesignProcedure			Q57(a)	
F78	SimpleExtrapolation			Q58(a)	AF5
F79	ChemicalSelection			Q59(a)	

4.2 Question List

1. Relevant Prior Art

These questions establish the relevant prior art to the invention.

Q1 Do the candidate relevant prior art documents have a similar purpose to the invention?

- (a) They have the same or a very similar purpose.
- (b) They have a different purpose.

Q2 Do the candidate relevant prior art documents have a similar purpose to the invention?

- (a) They have the same or a very similar purpose.
- (b) They have a different purpose.

Q3 Are there similar technical effects between the candidate relevant prior art documents and the invention?

- (a) It produces a similar technical effect.
- (b) It produces a different technical effect.

Q4 What is the relationship between the candidate relevant prior art documents and the invention's technical field?

- (a) It is from the exact same technical field.
- (b) It is from a closely related or analogous technical field.
- (c) It is from an unrelated technical field.

2. Common General Knowledge (CGK)

These questions establish the source and status of the background knowledge in the field.

Q4 Is the assertion of what constitutes Common General Knowledge being contested?

- (a) Yes
- (b) No

Q5 (if Q4(a)) What is the primary source of evidence cited for the CGK?

- (a) A standard textbook
- (b) A broad technical survey
- (c) A single publication in a very new or rapidly evolving field.
- (d) A single publication in an established field.
- (e) No documentary evidence is provided.
- (f) Other

3. The Skilled Person

These questions define the person who is skilled in the art. This a hypothetical concept rather than a real person, nevertheless this must be established and reasoned through.

Q6 Is the practitioner skilled in the relevant technical field of the prior art?

- (a) Yes
- (b) No

Q7 Does the practitioner possess average knowledge and ability for that field?

- (a) Yes
- (b) No

Q8 Is the practitioner presumed to be aware of the common general knowledge in the field?

- (a) Yes
- (b) No

Q9 Does the practitioner have access to all documents comprising the state of the art?

- (a) Yes
- (b) No

Q10 What is the nature of this 'skilled person'?

- (a) An individual practitioner
- (b) A research team
- (c) A production or manufacturing team

4. The Closest Prior Art

These questions help to identify the closest prior art (CPA) documents

Q11 Is the closest prior art document a single reference?

- (a) Yes
- (b) No

Q12 Does the closest prior art document require minimal modifications to the invention as assessed from the perspective of the skilled person??

- (a) Yes
- (b) No

Q13 Is there a reason to combine other documents with the CPA to attempt to demonstrate obviousness?

- (a) Yes
- (b) No

Q14 (if Q13(a)) How are the other documents to be combined related to the CPA's technical field?

- (a) They are from the same technical field.
- (b) They are from a similar technical field.
- (c) They are from an unrelated field.

Q15 (if Q13(a)) Would the skilled person have a clear and direct motive to combine these specific documents?

- (a) Yes
- (b) No

Q16 (if Q13(a)) Is there a reasonable basis for the skilled person to associate these specific documents with one another?

- (a) Yes
 - (b) No
-

5. Technical Contribution & Effect

These questions analyse the nature of the invention's technical differences from the prior art.

Q17 Does the feature make an independent technical contribution to the invention?

- (a) Yes
- (b) No

Q18 Does the feature make a contribution in combination with other technical features to the invention?

- (a) Yes
- (b) No

Q19 Does the feature make a contribution in combination with other technical features to the invention?

- (a) Yes
- (b) No

Q20 What is the primary nature of the distinguishing feature?

- (a) A computer simulation.
- (b) The processing of numerical data.
- (c) A mathematical method or algorithm.
- (d) Other excluded field
- (e) None of the above

Q21 Is the feature a technical implementation of a non-technical method i.e. game rules or a business method, and does it circumvent the technical problem rather than addressing it in an inherently technical way?

- (a) Yes
- (b) No

Q22 Is the feature a specific technical adaptation which is specific for that implementation in that its design is motivated by technical considerations relating to the internal functioning of the computer system or network.

- (a) Yes
- (b) No

Q23 (If Q20(a) or Q20(b)) Is there an intended use of the data resulting from the feature?

- (a) Yes
- (b) No

Q24 (If Yes Q23) Is the potential technical effect of the numerical data either explicitly or implicitly specified in the claim?

- (a) Yes
- (b) No

Q25 What gives this feature its technical character? (select all that apply)

- (a) intended technical use
- (b) specific purpose
- (c) functionally limited

Q26 Does the technical contribution have a specific technical purpose i.e. produces a technical effect serving a technical purpose. Not merely a 'generic' purpose i.e. "controlling a technical system".

- (a) Yes
- (b) No

Q27 Is the claim functionally limited to the technical purpose stated either explicitly or implicitly?

- (a) Yes
- (b) No

Q28 Is the technical effect unexpected or surprising?

- (a) Yes
- (b) No

Q29 (If yes to Q28) Is this unexpected effect described in precise, measurable terms?

- (a) Yes
- (b) No

Q30 (If yes to Q28) Is the unexpected effect a result of a lack of alternatives creating a 'one-way street' situation? I.e. for the skilled person to achieve the technical effect in question from the closest prior art, they would not have to choose from a range of possibilities, because there is only one-way to do x thing, and that would result in unexpected property y.

- (a) Yes
- (b) No

Q31 Are the technical effects credible and/or reproducible?

- (a) Credible
- (b) Reproducible
- (c) Both
- (d) Neither

Q32 (if Q31(a,d)) Does the claim contain the non-reproducible effect i.e. if the claim says the invention achieve effect E, but this is not reproducible.

- (a) Yes
- (b) No

Q33 How do the invention's features create the technical effect?

- (a) As a synergistic combination (effect is greater than the sum of parts).

(b) As a simple aggregation of independent effects.

Q34 (if Q33(a)) Is the synergistic combination achieved through through a functional interaction between features?

(a) Yes

(b) No

6. The Objective Technical Problem

This section covers the establishment and solution of the objective technical problem.

Q35 Would the skilled person, consider the the technical effects identified to be encompassed by the technical teaching?

(a) Yes

(b) No

Q36 Would the skilled person, consider the the technical effects identified to be embodied by the same originally disclosed invention?

(a) Yes

(b) No

Q37 Are the technical effects achieved across the whole scope of the claim, and is this claim limited in such a way that substantially all embodiments encompassed by the claim show these effects?

(a) Yes

(b) No

Q38 Can we construct a written formulation of the objective technical problem?

(a) Yes

(b) No

Q39 Has the objective technical problem been formulated in such a way as to refer to matters of which the skilled person would only have become aware by knowledge of the solution claimed?

(a) Yes

(b) No

Q40 Would the skilled person have arrived at the proposed invention by adapting or modifying the closest prior art, not simply because they could, but because they the prior art would have provided motivation to do so in the expectation of some improvement or advantage?

(a) Would have adapted from the prior art

(b) Would have modified from the prior art

(c) Neither

7. Common Obviousness Arguments

This section covers standard lines of reasoning used to establish that an invention is obvious.

Q40 Does the invention involve a disadvantageous modification of the prior art?

(a) Yes

(b) No

Q41 (if Q40) Was this disadvantageous modification of the prior art foreseeable to the skilled person?

(a) Yes

(b) No

Q42 (if Q40) Did the disadvantageous modification result in an unexpected technical advantage?

- (a) Yes
- (b) No

Q43 Is the subject matter of the invention biotech?

- (a) Yes
- (b) No

Q44 (if Q43) Does the subject matter concern antibodies?

- (a) Yes
- (b) No

Q45 (if Q43) Were the results obtained clearly predictable?

- (a) Yes
- (b) No

Q46 (if Q43) Was there a 'reasonable' expectation of success in obtaining the results?

- (a) Yes
- (b) No

Q47 (if Q44) Were the antibodies arrived at exclusively by applying techniques known in the art?

- (a) Yes
- (b) No

Q48 (if Q44) Does the application of the antibodies overcome technical difficulties in generating or manufacturing them?

- (a) Yes
- (b) No

Q49 Does the invention merely fill an obvious gap in an incomplete prior art document which would naturally occur to the skilled person?

- (a) Yes
- (b) No

Q50 Does the invention differ from the prior art in regard to substituting one well-known equivalent for another (e.g., a hydraulic for an electric motor)?

- (a) Yes
- (b) No

Q51 Is the invention merely the new use of known properties of a well-known material i.e. A washing composition containing as detergent, a known compound having the known property of lowering the surface tension of water.

- (a) Yes
- (b) No

Q52 Does the invention just apply a known technique in a closely analogous situation?

- (a) Yes
- (b) No

Q53 Does the invention rely on known devices?

- (a) Yes
- (b) No

Q54 (if Q53(a)) Is the invention a simple juxtaposition of the known devices, with each performing their normal, expected function?

- (a) Yes
- (b) No

Q55 (if Q53(a)) Does the invention rely within a known device, simply substituting in a recently developed material suitable for that use?

- (a) Yes
- (b) No

Q56 Does the invention result from a choice between equally likely alternatives?

- (a) Yes
- (b) No

Q57 Does the invention consist in choosing parameters from a limited range of possibilities arrived at through routine design procedures?

- (a) Yes
- (b) No

Q58 Is the invention a result of a simple, straightforward extrapolation from the known art?

- (a) Yes
- (b) No

Q59 Does the invention just consist in selecting a specific chemical compound or composition from a broad field?

- (a) Yes
- (b) No