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Inventive step:
Entry level

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Introduction

This publication, "Inventive step, Entry level", is part of the "Learning path for patent examiners" series edited and published by the European Patent Academy. The series is intended for patent examiners at national patent offices who are taking part in training organised by the European Patent Office (EPO). It is also freely available to the public for independent learning.

Topics covered include novelty, inventive step, clarity, unity of invention, sufficiency of disclosure, amendments and search. Also addressed are patenting issues specific to certain technical fields:

- patentability exceptions and exclusions in biotechnology
- assessment of novelty, inventive step, clarity, sufficiency of disclosure and unity of invention for chemical inventions
- the patentability of computer-implemented inventions, business methods, game rules, mathematics and its applications, presentations of information, graphical user interfaces and programs for computers
- claim formulation for computer-implemented inventions

Each publication focuses on one topic at entry, intermediate or advanced level. The explanations and examples are based on the European Patent Convention, the Guidelines for Examination in the EPO and selected decisions of the EPO's boards of appeal. References are made to the Patent Cooperation Treaty and its Regulations whenever appropriate.

The series will be revised annually to ensure it remains up to date.

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All references to natural persons are to be understood as applying to all genders.

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1. Learning objectives

Participants to this course will learn:

- The definition and the legal basis of inventive step
- Which prior art is to be used for assessing inventive step
- The meaning of the concept of "the person skilled in the art"
- How to apply the problem-solution approach for assessing inventive step
- How to apply the could-would approach

2. Why is novelty not enough?

Novelty is not enough and an additional requirement is necessary because it is relatively easy to make something which is new. For instance, adding minor workshop details to something that is already known would be considered new.

These kinds of minor workshop details do not deserve a patent – only when an invention makes a significant contribution to what is already known should a patent be granted.

The requirement of inventiveness was thus developed to exclude these details from patentability.

Examples

Invention: a razor with four blades	Prior art: a razor with three blades

The invention of claim 1 is new because of the fourth blade. But does it deserve a patent? The answer is no because there is no merit in the idea of having a razor with four blades when having razors with one, two or three blades is already known.

3. The legal basis for inventive step

Article 56 EPC specifies what is meant by "inventive step":

"An invention shall be considered as involving an inventive step if, having regard to the state of the art, it is not obvious to a person skilled in the art."

This definition is based on three concepts, namely:

- "state of the art"
- "person skilled in the art"
- "obviousness"

The first two concepts – "state of the art" and "person skilled in the art" – are also relevant for other requirements like novelty or sufficiency of disclosure.

The third concept of "obviousness" is specific for assessing the involvement or lack of an inventive step. Obviousness means what does not go beyond the normal progress of technology but merely follows plainly or logically from the prior art, i.e. something which does not involve the exercise of any skill or ability beyond that to be expected of the person skilled in the art.

In other words, the concept of the person skilled in the art is used to assess the concept of obviousness.

Legal references:
Art. 52(1) EPC, Art. 56 EPC, GL G-VII, 1, GL G-VII, 2, GL G-VII, 3, GL G-VII, 4

4. State of the art to be used for assessing inventive step

Article 54(2) EPC defines the "state of the art" for assessing inventive step as follows:

"The state of the art shall be held to comprise everything made available to the public by means of a written or oral description, by use, or in any other way, before the date of filing of the European patent application."

The state of the art for assessing inventive step is almost the same as for novelty. The only difference is that it does not include the state of the art under Article 54(3) EPC, which is only for novelty.

The state of the art may reside in the relevant common general knowledge available to the skilled person before the filing or priority date valid for the claim, which need not necessarily be in writing and needs substantiating only if challenged.

Examples

Invention **EP2** filed on **1 January 2020** Claim 1: a razor with four blades	Document **EP1**, filed on **1 January 2019**, was **published on 30 June 2020.** EP1 discloses a razor with three blades.

The invention of claim 1 is new because of the fourth blade. Document EP1 is prior art under Article 54(3) EPC and therefore cannot be used against inventive step.

Legal references:
Art. 54(2) EPC, Art. 54(3) EPC, GL G-VII, 2

5. The person skilled in the art

Article 56 EPC states that the question of inventive step must be assessed from the standpoint of "a person skilled in the art".

The person skilled in the art is an imaginary person, specific to patent law, who has been created to avoid subjective assessments as far as possible – what seems "not obvious" to one person may seem obvious to another. By referring to a single person, namely "the person skilled in the art", the decision can be more objective.

This means that examiners have to put themselves in the place of the person skilled in the art to assess whether or not an invention is obvious. To do so, it should be borne in mind that the skilled person has the following abilities:

- They are presumed to be a skilled practitioner in the relevant field of technology who is possessed of average knowledge and ability.
- They are aware of what was common general knowledge in the art at the relevant date.

- They are presumed to have had access to everything in the "state of the art", in particular the documents cited in the search report.
- They are also presumed to have been in possession of the means and capacity for routine work and experimentation which are normal for the field of technology in question.
- They are involved in constant development in the relevant technical field.

The skilled person is capable of recognising technical effects that are produced by adding new features to an already known combination of features **if said effects produced by said new features are also known from the available prior art.**

Legal references:
GL G-VII, 3, GL G-VII, 3.1

6. The problem-solution approach

Relying on the person skilled in the art helps assess inventive step objectively to some extent. However, there is still a risk of not being objective because, once knowledge of the invention is acquired, it is often easy to demonstrate that this invention can be arrived at in apparently easy steps.

Therefore, there needs to be an approach that would minimise the risk of hindsight distorting the assessment of inventive step (due to knowledge of the invention). This approach is the "problem-solution approach", developed by the EPO boards of appeal in one of their very first cases.

In line with the case law of the boards of appeal of the EPO, the problem-solution approach was enshrined in the EPO Guidelines for Examination (G-VII, 5). The Guidelines define three main stages:
- determining the "closest prior art"
- establishing the "objective technical problem" to be solved
- considering whether the claimed invention, starting from the closest prior art and the objective technical problem, would have been obvious to the skilled person

It is worth mentioning that the concept of the skilled person is *in practice* mostly applied (or most useful) at the third stage, for deciding on "obviousness".

The problem-solution approach is not a test that gives a "yes/no" answer to the question of whether the invention is obvious. It is a procedure guiding examiners through several steps to a final decision, which is ultimately the examiner's to take.

Although there are no explicit instructions mandating the application of the problem-solution approach, for reasons of legal certainty the EPO applies it systematically for assessing inventive step.

Legal references:
GL G-VII, 5, GL G-VII, 5.1, GL G-VII, 5.2

7. The problem-solution approach in practice

In practice, the three main stages of the problem-solution approach defined in the Guidelines are carried out in five steps by answering the following questions:

1. What is the closest prior art?
2. What is the difference between the claimed invention and the closest prior art?
3. What is the technical effect caused by this difference?
4. What is the technical problem corresponding to this effect?
5. Would it be obvious for the skilled person starting from the closest prior art and seeking to solve this problem to arrive at the claimed invention?

Steps 1 and 5 are the same as the first and third stages of the problem-solution as defined in the Guidelines (see above).

The second stage mentioned in the Guidelines (establishing the problem solved by the invention) is quite often the critical stage of the problem-solution approach and is tackled by working through steps 2, 3 and 4.

Legal references:
GL G-VII, 5, GL G-VII, 5.1, GL G-VII, 5.2, GL G-VII, 5.3

8. Selecting the closest prior art

The first step of the problem-solution approach is selecting the closest prior art.

The closest prior art is the single piece of prior art from which an inventive step objection would be most convincing. The closest prior art is often described as the most promising starting point that may lead the skilled person to develop the invention.

The important criteria for selecting the closest prior art are the following:

a. It must be in the field of the invention, i.e. it must disclose subject-matter conceived for the same purpose or aiming at the same objective as the claimed invention.
b. It requires the minimum of structural and functional modifications to arrive at the claimed invention, i.e. it has the most technical features in common with the claimed invention.
c. In some cases there may be several equally valid starting points for the assessment of inventive step resulting in different workable solutions. If a patent is **to be granted**, it may be necessary to apply the problem-solution approach to each of these starting points in turn, i.e. in respect of all workable solutions. When disputing an inventive step, it is sufficient to show that the claimed subject-matter lacks an inventive step on the basis of one relevant piece of prior art.

The closest prior art can be what the applicant indicated as its starting point for developing the invention. In practice, however, the closest prior art is often a document found during the prior-art search that comes closer to the invention than the prior art indicated by the applicant.

Examples

Invention	Prior-art document D1	Prior-art document D2
An electric toothbrush comprising: - an electric motor - a battery - ***a low-charge indicator***	An electric toothbrush comprising: - an electric motor - a battery	An *electric shaver* comprising: - an electric motor - a battery - ***a low-charge indicator***

The invention is about an electric toothbrush, so the closest prior art cannot be an electric shaver even though it has the most features in common with the invention. The closest prior art will be document **D1** disclosing an electric toothbrush.

Legal references:
GL G-VII, 5.1

9. The difference over the closest prior art

In the second step of the problem-solution approach, the difference between the claimed subject-matter and the closest prior art is established.

Once the closest prior art has been selected, the claimed invention can be compared with it to identify the **distinguishing features** of the invention.

The features of the claimed invention and the closest prior art are compared in the same way as when examining novelty.

The claimed invention must of course be novel over the closest prior art, i.e. there must be at least one distinguishing feature, otherwise the question of inventive step would not arise.

Examples

Invention	Closest prior-art document D1
An electric toothbrush comprising: - an electric motor - a battery - ***a low-charge indicator***	An electric toothbrush comprising: - an electric motor - a battery

The **distinguishing feature** is the "***low-charge indicator***".

Legal references:
GL G-VII, 5.2

10. The technical effect caused by this difference

The third step of the problem-solution approach is defining the **technical effect** of the distinguishing features.

The technical effect can be defined according to what the applicant states is the effect of the invention in the description.

However, as the closest prior art might be different from the prior art indicated by the applicant, the technical effect might also be different. In this case, the technical effect needs to be derived directly from the effects provided by the distinguishing features.

Only distinguishing features contributing to the technical character of the invention should be considered.

It may be that the claimed invention and the closest prior art both achieve the same technical effect but in different ways.

Examples

Invention	**Closest prior-art document D1**
An electric toothbrush comprising: - an electric motor - a battery - ***a low-charge indicator***	An electric toothbrush comprising: - an electric motor - a battery

The distinguishing feature is ***the low-charge indicator***.

The **technical effect** provided by the distinguishing feature is to indicate that the charge of the battery is low and that the electric toothbrush might run out of power.

Legal references:
GL G-VII, 5.2

11. The objective technical problem

The fourth step of the problem-solution approach is defining the **objective technical problem.**

This is very often the critical stage of the problem-solution approach because, once the solution of the invention is known, there is a risk of pointing to the solution or even including part of it in the definition of the technical problem. This risk is minimised by formulating the technical problem on the basis of the technical effect of the distinguishing features.

The objective technical problem is the reason for modifying or adapting the closest prior art to provide the technical effects that the claimed invention provides over the closest prior art, as well as the task of making those modifications or adaptations.

If the closest prior art does not provide all the effects of the invention, then the objective technical problem is how to modify or adapt the closest prior art to achieve the technical effect(s) which the invention provides over the closest prior art.

If the closest prior art provides all the effects of the invention, then the objective technical problem is how to modify or adapt the closest prior art to provide an alternative way of obtaining the technical effect(s) that the closest prior art achieves, or even how to improve an already existing technical

effect (e.g. how to improve the low battery indication system of a toothbrush, how to improve the cooling system of a household appliance etc.).

Examples

Example 1:

Invention	**Closest prior-art document D1**
An electric toothbrush comprising: - an electric motor - a battery - ***a low-charge indicator***	An electric toothbrush comprising: - an electric motor - a battery

The distinguishing feature is ***the low-charge indicator***.

The technical effect provided by the distinguishing feature is to indicate that the charge of the battery is low and that the electric toothbrush might run out of power.

The **objective technical problem** is how to modify the electric toothbrush of D1 to prevent it from running out of power.

Example 2:

Invention	**Closest prior-art document D3**
An electric toothbrush comprising: - an electric motor - a battery - *a low-charge indicator* ***light***	An electric toothbrush comprising: - an electric motor - a battery - *a low-charge indicator* ***beeper***

The distinguishing feature is the *low-charge indicator* ***light***.

The technical effect provided by the distinguishing feature is to indicate that the charge of the battery is low and that the electric toothbrush might run out of power.

The closest prior art already provides this technical effect with an alternative feature, namely a ***beeper***. Therefore, the **objective technical problem** is how to modify the electric toothbrush of D3 to **provide an alternative way** of warning the user that the charge of the battery is low.

Example 3:

Invention	**Closest prior-art document D4**
An electric household appliance comprising: - an electric motor - a casing - ventilation holes provided in the casing - ***a cooling fan inside the casing***	An electric household appliance comprising: - an electric motor - a casing - ventilation holes provided in the casing

The distinguishing feature is ***the cooling fan inside the casing***.

The technical effect provided by the distinguishing feature is to enable more efficient cooling of the household appliance, i.e. the technical effect is that the already existing cooling system is improved.

The closest prior art already provides the solution for cooling of the household appliance. Therefore, the objective technical problem is how to modify the household appliance of D4 to provide an improved way of cooling the household appliance.

Legal references:
GL G-VII, 5.2

12. Assessing obviousness

The fifth and last step of the problem-solution approach assesses whether or not the solution to the objective technical problem that falls within the scope of the claim is obvious.

It is important to understand what is meant by the "solution" at this stage. The solution is not the invention as a whole but merely the way in which the closest prior art must be modified to fall within the scope of the claim.

In other words, the inventive step – if any – lies in the step between the objective technical problem and the solution to the objective technical problem, i.e. the modification of the closest prior art. In other words, the inventive step is an assessment, from the skilled person's point of view, whether the solution to the technical problem, defined by the distinguishing features, would be obvious or not to the skilled person.

To fall within the scope of the claim, the closest prior art will have to be combined with the distinguishing features of the invention. An important aspect here is whether these distinguishing features are already known in the art.

There are basically three possibilities as to where the skilled person can look for the solution to the problem:

1. in the closest prior-art document itself, e.g. when an embodiment of the document is the closest prior art and the document also discloses the distinguishing features, but not in combination with this embodiment
2. in the common general knowledge of the person skilled in the art
3. in a second piece of prior art, e.g. document D2 of the search report

When the distinguishing features are not known from the prior art, meaning there is no prior-art document disclosing them, and they cannot be considered common general knowledge, the claimed subject-matter can usually be deemed inventive.

To decide on inventive step, what needs to be determined is whether **it would be obvious for the skilled person** starting from the closest prior art and seeking to solve the objective technical problem to arrive at the claimed invention. Put another way, would it be obvious for the skilled person to combine the closest prior art with the distinguishing features?

In practice, it is mostly at this stage of the problem-solution approach that the skilled person comes into play. To decide on inventive step, examiners have to put themselves in the place of the skilled person.

The question is then whether, **in order to solve the objective technical problem and arrive at the claimed invention**, it would be obvious to modify the closest prior art by combining it with the

common general knowledge, with a second piece of prior art or even with another embodiment disclosed in the same prior-art document that was used as the closest prior art.

When the modification of the closest prior art is obvious for the skilled person and falls within the scope of the claim, the claimed subject-matter lacks inventive step. On the other hand, when the modification is not obvious, the claimed subject-matter is inventive.

The term "obvious" means what does not go beyond the normal progress of technology but merely follows plainly or logically from the prior art, i.e. something which does not involve the exercise of any skill or ability beyond what is to be expected of the person skilled in the art.

In other words, to assess inventive step it is possible to combine different parts of the closest prior art or to combine the closest prior art with either the common general knowledge or a second piece of prior art. This is in clear contrast with the assessment of novelty where only a combination of features known from a single document can be used to challenge novelty.

Examples

Invention	**Closest prior-art document D1**
An electric toothbrush comprising: an electric motor a battery ***a low-charge indicator***	An electric toothbrush comprising: an electric motor a battery

The distinguishing feature is the low-charge indicator.

The technical effect provided by the distinguishing feature is to indicate that the charge of the battery is low and that the electric toothbrush might run out of power.

The objective technical problem is how to modify the electric toothbrush of D1 to prevent it from running out of power.

Providing a low-charge indicator for batteries powering small electrical appliances is considered to be common general knowledge. The skilled person would modify the toothbrush of D1 by adding a low-charge indicator when faced with the problem of preventing the electric toothbrush from running out of power. Therefore, the claimed subject-matter is **not inventive** with respect to the combination of **D1 with the common general knowledge**.

Legal references:

GL G-VII, 6

13. The could-would approach

The could-would approach is used during the last step of the problem-solution approach to minimise the risk of hindsight distorting the assessment of inventive step (due to knowledge of the invention).

With the could-would approach, the question is whether the prior art as a whole contains any teaching that not just **could,** but **would** have prompted the skilled person faced with the objective technical problem to modify the closest prior art in view of that teaching, leading them to subject-matter falling within the scope of the claims.

In other words, it is not enough to show that it is possible or easy to modify the closest prior art to arrive at the claimed subject-matter. On the contrary, **it is necessary to find an indication in the prior art pointing to this modification of the closest prior art**, or to find an incentive that would prompt the skilled person to modify the closest prior art in such a way as to arrive at the claimed invention.

The point is not whether the skilled person could have arrived at the invention by adapting or modifying the closest prior art but whether the skilled person **would have done so** because the prior art provided motivation to do so in the expectation of some improvement or advantage.

The incentive can be explicitly disclosed in the prior-art documents. For example, it could be explicitly disclosed in another prior-art document, e.g. D5, that "*to improve the cooling of a household appliance a cooling fan may be provided in the casing of the appliance*". The incentive for the skilled person to modify document D4 (from Example 3 above) would come directly from the teachings of D5. The skilled person would modify the appliance disclosed by D4 *to improve the cooling of it*.

Even an implicit prompting or implicitly recognisable incentive is sufficient to show that the skilled person would have combined the elements from the prior art.

The incentive, i.e. the reason for the skilled person to modify the closest prior art, can also come from the common general knowledge. It is in any case very well known to the skilled person from the technical field of household appliances that inserting a fan in the casing of a household appliance would improve the cooling of the appliance, or that providing a low-charge indicator on a toothbrush will prevent it from running out of power.

With the could-would approach, many solutions that appear obvious at first sight are ultimately deemed non-obvious.

Examples

Assuming that a low-charge indicator is not common general knowledge in the field of small electrical appliances

Invention	**Prior-art document D1 (closest prior art)**	**Prior-art document D2**
An electric toothbrush comprising: an electric motor a battery ***a low-charge indicator***	An electric toothbrush comprising: an electric motor a battery	An electric shaver comprising: an electric motor a battery ***a low-charge indicator***

Legal references:

GL G-VII, 5.3

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