

Inventive step in the EPO The “problem and solution” approach Julian Crump EPA

According to the European Patent Convention, an invention involves an inventive step, if, having regard to the state of the art, it is not obvious to a person skilled in the art (EPCa.56). The Technical Boards Appeal of the EPO almost invariably apply the so-called “problem and solution” approach to the assessment of inventive step. In this paper, I will examine what the “problem and solution” approach is and how, and why, it is used with such affection by the EPO. However, I do not have the space to consider ancillary details such as who is the “skilled person”, secondary indicia of non-obviousness, such, for example, as commercial success, the affect of disclaimers on examination of inventive step or the like.

The “problem and solution” approach adopted by the Technical Boards of Appeal of the EPO, and thus also by the Examining and Opposition Divisions, involves a systematic, methodical examination of a claimed invention in relation to the state of the art at the relevant priority date of the invention. The “problem and solution” approach involves the following four key steps:

- 1 Identify the “closest prior art”
- 2 Assess the technical results achieved by the invention when compared with the “closest prior art”
- 3 Define the technical problem to be solved as the object of the invention to achieve those results.
- 4 Examine whether a skilled person, having regard to the state of the art, would have suggested the claimed technical features for obtaining the results achieved by the invention

An important presumption underpinning the “problem and solution” approach is that if an invention involves an inventive step over the objectively determined “closest prior art” then it must also be inventive over all other, more remote publications, without the need for detailed examination of those documents or disclosures.

I should mention that whilst the “problem and solution” approach is adopted by the Technical Boards of Appeal in substantially all cases, the EPO itself recognises that the “problem and solution” approach is not the only way of determining whether or not an invention involves an inventive step and, indeed, in decision T 465/92, the Board said that the “problem and solution” approach was not *sine qua non*.

Basis for the “problem and solution” approach can be found in the implementing regulations which form part an integral part of the European Patent Convention, in particular EPCr.27(1)(c), which provides that an invention must be disclosed in such terms that the technical problem (even if not expressly stated as such) and its solution can be understood.

1 Closest prior art

The first step in the assessment of inventive step according to the “problem and solution” approach, as mentioned above, is to identify the closest prior art. The closest prior art is a single disclosure forming part of the state of the art at the priority date of the invention which, on an objective view, is **closest** to the claimed invention. As one might expect, as identification of the closest prior art forms the starting point for determination of the inventive step, it has been hotly debated in many cases before the Technical Boards. The Boards have consistently held that the closest prior art must lie in the same technical field as the claimed invention and must address the same technical problem (see, e.g. T 989/93). By “technical problem” here I do not mean necessarily mean a technical problem expressly stated in the patent under consideration, but rather the so-called “objective technical problem” assessed in accordance with the “problem and solution” approach. I will come on to that shortly. The Boards have also held that the similarity of the closest prior art to the claimed invention in the field of use is more important than similarity in structure (see, e.g. T 273/92). Thus, for example, in the case of an invention relating to the use of a new chemical compound as a polymerisation initiator, a document disclosing a structurally similar compound would not qualify as the closest prior art unless the use of the prior art compound as an initiator for the same or a similar reaction was also mentioned. It is also necessary that the purported closest prior art should **realistically** have been consulted by the skilled person (see, e.g. T 870/96). A document which is silent on a technical problem at least related to that

which is derivable from the patent cannot qualify as the “closest prior art” regardless of the number of technical features that that document has in common with the claimed invention (see, e.g. T 644/97).

T 989/93 Scintillation media/FISHER SCIENTIFIC

This case concerned a scintillation medium comprising a fluor and at least one diisopropylnaphthalene, wherein the diisopropylnaphthalene was liquid at a temperature of 5 °C. One prior art document, which was called D1 in the proceedings, disclosed a scintillation medium comprising different alkylnaphthalenes, namely dimethylnaphthalene and 2-ethylnaphthalene. Another document, D9, disclosed properties of diisopropylnaphthalene for use as a carbonless copy paper solvent. The opponents argued that it would have been obvious from D9 that diisopropylnaphthalene was suitable for use as a scintillation medium. However, the Board held that in spite of the disclosure of diisopropylnaphthalene in D9, D1 was nevertheless the closest prior art because it disclosed the use of alkylnaphthalenes as scintillation media.

T 870/96 Philips Electronics NV

In this case, an LCD image projector was claimed comprising an illumination system with two lens plates and a third lens. One prior art document, called D17, disclosed an LCD projector with two Fresnel lenses. D1 disclosed a film projector with two lens plates and a third lens, and the illumination system of D1 was thus arguably closer structurally to the illumination system as claimed. However, the Board held that D1 was generically different from the invention and would not realistically have been consulted by a person skilled in the art. Accordingly the Board held that D17 was the closest prior art.

2/3 The “objective problem”

Having established the single prior art document which qualifies as the “closest prior art”, the next step in the “problem and solution” analysis is to identify the “objective problem” that is solved by the invention. As I have already said, the “objective problem” is not necessarily a problem which might be mentioned in the patent, and often reformulation of the problem is necessary in view of the prior art not known to the inventor at the time of filing the application. In determining what is the “objective problem” in any particular case, it is necessary to examine the differences between the claimed invention and the closest prior art and to identify what technical effects are provided by the invention which are not present in the closest prior art. The objectively determined problem in the closest prior art can then be seen as the problem which is solved by the invention in providing those technical effects.

The “objective problem” should be interpreted broadly. It does not necessarily imply technical **improvement** over the closest prior art and could, for example, simply be to seek an alternative to a known device or process. Furthermore, it is possible for the objective problem to have more than one aspect or part, each relating to a different technical effect of the invention. Thus, if a claimed invention provides two technical effects over and above the closest prior art, then the invention may, in fact, solve two different objective, technical problems, and each must be considered separately.

Reformulation of the objective problem

The Technical Boards of Appeal have consistently held, in considering the objective problem, that one should normally start from the problem described by the applicant and only deviate from that if it is unsolved by the invention as claimed or is inaccurate in view of more relevant prior art (see, e.g. T 644/97). This is important, because, as will be appreciated, the formulation of the objective problem, whilst objective, relies on *ex post facto* analysis of the invention in comparison with the closest prior art. By requiring the Boards to start from the problem described in the patent, *ex post facto* analysis of the invention is avoided unless the problem expressly set out in the patent itself is inaccurate.

I should also say that it is not necessary for a problem to be set out expressly in the patent. In reformulating the objective problem, it is only necessary that the problem should be deducible from the application in the light of the closest prior art. Redefinition of the problem is allowed and, in fact, frequently occurs, but only to the extent that the skilled person would recognise it as implied or related to the original problem (see, e.g. T184/82).

Technical effects that are unrelated to, and not deducible from, the application cannot be taken into account when reformulating the objective problem (see, e.g. T 344/89, T 386/89). However, additional advantages **related** to the original problem can be put forward to show an inventive step over a newly identified prior art (see, e.g. T 440/91).

T 386/89 Wheels/GKN SANKEY

This case related to a manually adjustable wheel for high powered tractors. The wheel comprised a hub, a rim and an interconnecting disc in the shape of an irregular octagon as shown in the figure:

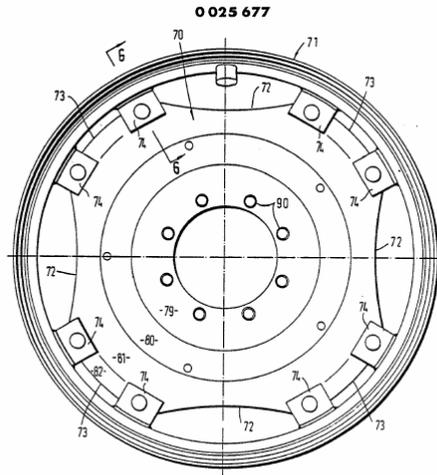
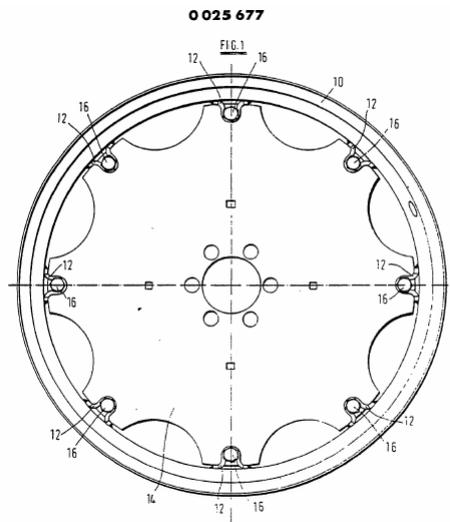


FIG. 5

The original problem was to reduce the quantity of material needed for the disc. As will be seen from the above figure, the disc, which is numbered (72), has the general shape of a square with its corners cut-off to form the irregular octagon. However, in view of prior art, the applicants submitted further evidence that the irregular, circumferential spacing of the lugs (76) around the rim for attaching the disc to the rim improved the fatigue life of the wheel. As will be seen, each "short side" of the irregular octagon carried two lugs, such that the eight lugs are arranged in four pairs.

Although the amendments to the claim to specify the irregular spacing of the lugs was deemed admissible under EPCa.123(2), it was held that the problem of enhancing the fatigue life of such a wheel was not related to the problem originally disclosed and fundamentally changed the character of the invention. Accordingly, the Technical Board of Appeal refused to consider the problem of enhancing the fatigue life of wheels in assessing the inventive step in relation to the closest prior art which, as shown in the following figure, also taught a wheel having a disc with arcuate cut-outs:



T 440/91 Mucolytic salts/PHARLYSE

In T440/91, the patentees sought protection for salts of N-acetyl-1-cysteine and one of arginine, lysine, histidine and ornithine for use as a mucolytic agent. The original problem was to improve the solubility of acetyl cysteine in water. However, in view of prior art, the patentees adduced further evidence that the claimed salts also had a reduced tendency to produce bronchospasms and also had enhanced mucolytic activity. Accordingly, the objective problem was reformulated as the problem of providing salts of N-acetyl-1-cysteine with improved solubility in water, enhanced mucolytic activity and reduced bronchospasms, the technical solution, of course, being the salts of amino acids as mentioned above. The Technical Board of Appeal held that it was appropriate to consider the "supplementary advantages" in this case, because they were related to the original problem for providing a pharmaceutical composition, and a skilled person would naturally have taken them into account as related to the original problem.

4 Obviousness of the solution (or problem)

The next stage in the "problem and solution" approach is to determine, in the light of the state of the art, whether the technical solution provided by the claimed invention to the objective problem would have been obvious to the person skilled in the art at the relevant date, which is the priority date (see T 24/81). The Technical Boards of Appeal have recognised that, in some cases, the solution provided by the invention may be inventive as such. This must always be the case to show patentability of an invention having a known or obvious problem. I will call these "solution inventions". However, there are also instances where the problem itself would not have been obvious to the person skilled in the art, although, once the problem is formulated, the solution itself may be trivial. Nevertheless, such "problem inventions" are also patentable.

Problem Inventions

A trivial solution to a previously unrecognised problem might be inventive as in the case T 2/83. In this case, the invention was based on a previously unrecognisable problem in the closest prior art. The patent related to a drug dosage form comprising separate volumes of antacid and an anti-forming agent, simethicone. It was known that it was desirable to avoid mixing of the two agents, but physical barriers were undesirable. The closest prior art apparently solved the problem without the use of a barrier, and so the skilled person might have regarded the barrier as superfluous. However, the patentees discovered that further improvements could be made if a physical barrier was present. Once the objective problem of providing a dosage form with the improved properties afforded by physically separating the two volumes was known, then the solution, namely the provision of the physical barrier was trivial. However, in the absence of information that further improvements over the closest prior art were possible, there was no incentive for the skilled person to incorporate such a physical barrier in the dosage form.

T 540/93 Pet doors/REILOR

This case concerned cat flaps as can be seen from the following figure:

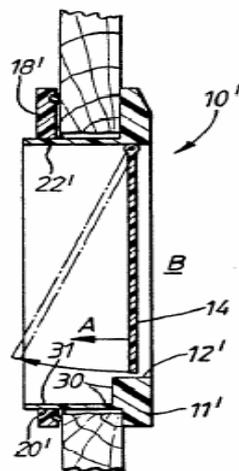


FIG. 5.

A cat flap was claimed comprising a member (11') adapted to define a "tunnel" for a cat or other pet to pass through. The member (11') was adapted to be mounted in an aperture formed in a door. The member carried a flap member (14) which was hinged at its upper end for closing the passage way. The flap (14) could be pushed open by a cat or a pet in at least one direction to enable the animal to pass through the tunnel. The problem of "paw trapping" was known in the art. However, in spite of testing, it was not possible to tell which prior art cat flaps would cause paw trapping and which would not. "Experienced" cats would be able to operate cat flaps without getting their paws trapped, presumably having learnt from experience, whereas even though inexperienced cats might get their paws trapped, they would be unable to explain to their owners what had happened and which cat flaps were "dangerous" and which were not. The Technical Board of Appeal noted that even the testing carried out by the cat flap manufacturers would inevitably have used experienced cats. The claimed invention, as seen in the figure, was to provide a ledge (31) just inside the flap which was spaced from the lower end of the flap so that a cat would not trap his or her paws between the flap and the member (11'). Accordingly, the Technical Board of Appeal held that the problem of providing a cat flap which avoided paw trapping was not obvious.

Solution inventions

The majority of inventions can be thought of as "solution inventions", that is unobvious solutions to known problems. As noted above, technical progress or improvement is not a requirement for an inventive step (see, e.g. T 92/92). Thus, a perfectly acceptable problem over the closest prior art might be to provide an alternative solution to that disclosed in the art. However, the mere modification of an existing device, for example, by means having no technical significance would not be inventive. In T 72/95 for example, the Board held that the concept of an "invention" was related to "non-obviousness" following the wording in EPCa.56, and that the concept of invention was linked to "technical character" following the concepts of "state of the art" and the "person skilled in the art". Thus, a technically non-functional modification, whilst "unobvious" would be irrelevant to the question of inventive step.

The Technical Boards of Appeal have also held on numerous occasions that the relevant question is not whether a person skilled in the art **could** have modified the closest prior art to provide the solution represented by the claimed invention, but whether he **would** have suggested the technical solution (see, e.g. T203/90, T 280/95). Thus, according to the Technical Boards of Appeal, the technical feasibility of a claimed invention at the relevant priority date is not sufficient to deprive the invention of its inventive step. That merely shows that the person skilled in the art could have applied the claimed solution, not that he would have. To be obvious, there must be a "recognisable pointer" in the state of the art to the claimed solution.

The person skilled in the art must also have a "reasonable expectation of success" before suggesting a solution to an objective problem. Thus, T 60/89 related to fusing heterologous genes to a bacterial leader sequence for expression in bacteria and secretion through the membrane to enable recovery of expressed proteins without destroying the bacterial cells which would render isolation of the desired proteins difficult. There were prior art disclosures of the use of leader sequences for incorporation of proteins into a bacterial membrane, but these were held not to give the person skilled in the art the reasonable expectation of success required to render the claimed method obvious.

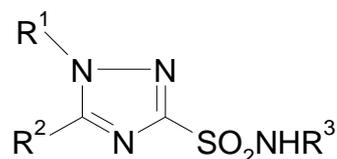
Over-broad claims

In decision T 589/95 the Technical Board of Appeal stated that it was "axiomatic for the recognition of an inventive step that there is no embodiment falling within the scope of a claim that is obvious". This case concerned the use of a two-layer polymer film for shrink-wrapping bundled products without sticking to the product upon shrinking. However, the nature of the product was unspecified, and the Board pointed out therefore that for many products the problem simply did not exist. Accordingly, the feature of non-sticking could not be used to distinguish the invention from the prior art and, the use of the polymers being obvious *per se*, the Board found the film to lack inventive step. Thus, generally claims must be restricted to the technical field of use in which the objective problem arises.

Furthermore, in a landmark case, namely T 939/92, the Technical Board of Appeal held that arbitrarily selected from many possibilities are not inventive.

T939/92 Triazoles/AGREVO

Before the technical Board appeal in T939/92, the patentees presented claims directed to triazole sulfonamides of the formula:



wherein R¹ is H... or substituted or unsubstituted pyrimidin-2-yl;

R² is...;

R³ is optionally substituted phenyl;...

The claim before the Technical Board of Appeal was thus not limited to compounds with herbicidal activity. Accordingly, the Board noted the word “substituted” should be given its ordinary meaning, i.e. substituted by **absolutely anything**. The Board held that the claim was not objectionable under EPCa.84¹ “merely because it was unreasonably broad”.

However, the Technical Board of Appeal did hold that the technical effect of claimed subject-matter was linked to the issue of inventive step because the “extent of patent monopoly” had to be justified by the technical contribution made by the invention to the art. Thus, what the skilled person **would** have done depended on the technical result he set out to achieve. The Board stated that the person skilled in the art did not act out of “idle curiosity”. Thus, the Board doubted whether any invention which did not solve a technical problem could ever involve an inventive step. However, the Board did consider the possibility that the invention solved the hypothetical problem of the provision of new compounds, regardless of their function. In that regard, the Board found that any compound that was structurally similar to any of the compounds falling within the claim could be regarded as a suitable starting point, and no inventive step could be recognised in merely selecting the structurally closest compound. In the absence of any technical effect associated with the claimed compounds, the Board held that all compounds which were structurally similar to the closest prior art and which could be made by known synthetic methods would suggest themselves equally to the skilled person. Accordingly, an arbitrary selection of those compounds to form a sub-set constituting the scope of a claim could not involve an inventive step. Accordingly, the Board found that an inventive step in respect of a selection of a range of compounds could only be justified by a technical effect, and that technical effect must be produced by **substantially all the selected compounds**.

Furthermore, in consideration of inventive step, the Board found that a technical problem corresponding to the closest prior art could only be taken into account if it was actually solved by the claimed invention. In T 939/92 the Board held that it was **inherently unlikely** that the technical problem, namely that of providing new herbicidal agents was solved by substantially all of the selected compounds. Thus, the Board held that the invention as claimed lacked inventive step.

Advantages and disadvantages of the “problem solution” approach

Advantages

To sum up, the “problem and solution” approach clearly has a number of substantial advantages. It provides a systematic analysis of non-obviousness which is bound to encourage a uniform approach by examiners, Examining and Opposition divisions and the Technical Boards of Appeal. It must be remembered that in contradistinction to common law countries, such as the UK and the US, there is no system of precedent in the EPO, other than in respect of decisions of the Enlarged Board of Appeal. Accordingly, decisions of a Technical Board of Appeal are only binding in respect of the particular case in which they arise. In the absence of a precedent system, the

¹ EPCa.84 requires that the claims of a patent should be supported by the description

systematic application of a structured approach to inventive step is clearly advantageous ensuring an harmonised and consistent approach throughout the EPO.

Additionally, the “problem and solution” approach has the advantage that it ensures an objective assessment of inventive step rather than one which is vulnerable to *ex post facto* analysis.

Disadvantages

On the other hand, I wonder if the “problems and solution” approach is too rigid. In spite of a number of statements by various Boards of Appeal that they recognise that the “problem and solution” approach is not *sine qua non*, it is nevertheless applied in the vast majority of cases. This may give rise to cases where the EPO will hold an invention to involve an inventive step if there is no express “pointer” in the prior art to adopt a claimed solution, even where that solution might be thought otherwise to be “obvious” having regard to the prior art. In a recent case of mine before the Opposition Division involving an electrode for iontophoretic delivery of pharmaceutical agents through a patient’s skin, the use of polyoxypropylene as the binder material for the electrode was found to involve an inventive step over the prior art which taught the use of polyoxyethylene. Thus, the difference between the claimed subject-matter and the closest prior art was one methyl group per monomeric unit of the polymer. Technically the polymer binder plays no part in the operation of the device other than to hold the other functional components together and, accordingly, given the disclosure of polyoxyethylene, polyoxypropylene as the next member of the homologous series might be thought to be self-suggesting to any skilled person having a rudimentary knowledge of organic chemistry. However, in the absence of an express pointer in the prior art to substitute polyoxypropylene for polyoxyethylene, and even the absence of any unexpected technical advantages associated with polyoxypropylene as compared with polyoxyethylene, the Opposition Division nevertheless found the use of polyoxypropylene to involve an inventive step. I am not saying that this decision was wrong, but it might be surprising to those of you from other jurisdictions where a different approach to obviousness is usual.

Without going into detail, I would also question whether the presumption that only the closest prior art needs to be examined in detail is valid.

Lastly, I wonder if the “problem and solution” approach to inventive step in the EPO is being asked to achieve too much. Actually, within the European Patent Convention, there is no express provision that the scope of a granted patent claim should correspond to the technical contribution made by the inventive to the art. Such a principle underpins the concept of “fair basis” in Australian patent law, for example, and is related to the question of “utility” in the US and elsewhere. However, there is no such provision in the EPO, even though I am sure no one would disagree that it is a correct and valid principle. It seems to me to be problematic to try and stretch the concept of inventive step to accommodate a kind of “fair basis” principle which does not inherently rely on the state of the art. In other words, inventive step is inherently a relative ground depending on the state of the art at the relevant date, whereas issues of “fair basis” and “utility” are non-relative or absolute grounds which do not, or indeed should not rely on any external factors.