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Patent claim construction: Numerical limitations

Patent attorneys spend a great deal of time trying to find the 'perfect' word for a technical element of an apparatus or method in patent applications. They are required to conduct the same analysis for numerical limitations, including, numerical ranges. The construction of both words and numerals needs to take place in patent attorneys' daily practices; with the latter equally applying to all fields of technology: Electrical, chemical, mechanical, biotechnological, etcetera.

Using *Smith & Nephew Plc v ConvaTec Technologies Inc* [2015] EWCA Civ 607, this article will examine numerical limitations in patent claims in the United Kingdom (UK) (and by implication, South Africa (SA)), given their impact on patent drafting and prosecution, as well as on patent enforcement/litigation.

Facts of the case

The critical issue for the court was deciding the numerical limits of the first claim of ConvaTec's UK method Patent No. 1, 343, 510, entitled 'Light Stabilized Antimicrobial Materials' (the patent). This contained a third integer, which read –

'(c) subjecting said polymer, during or after step (b) to one or more agents selected from the group consisting of ammonium salts, thiosulphates, chlorides and peroxides which facilitate the binding of said silver on said polymer [the agent being present in a concentration between 1% and 25% of the total volume of treatment], which material is substantially photostable upon drying, but which will dissociate to release said silver upon rehydration of said material.'

Smith & Nephew had developed a process that it thought would not infringe the patent, by changing the concentra-

tion of binding agent to no more than 0,77%, and this required an interpretation of the numerical limitations of the bracketed phrase in the above integer.

In a nutshell: Did Smith & Nephew's 'modified process' infringe on NovaTec's patent, which allowed for a range, namely, between 1% and 25%?

Court of Appeal's judgment

The Court of Appeal dealt, ultimately, with one principal issue: The correct construction of the phrase 'the agent being present in a concentration of between 1% and 25%.'

The court began its assessment by restating the approach to interpretation of patent claims as considered by Lord Hoffman in *Kirin-Amgen Inc v Hoechst Marion Roussel Ltd & Ors* [2004] UKHL 46.

As explained, interpretation of claims is objective and the question is always 'what would a skilled person have understood the patentee's words (or numerals) to mean?'

Furthermore, Lord Hoffman's principles were summarised by Jacob L.J. in *Virgin Atlantic Airways Ltd v Premium Aircraft Interiors UK Ltd* [2009] EWCA Civ 1062 at para 5 as follows:

- The first overarching principle is that contained in art 69 of the European Patent Convention, which provides that the monopoly conferred by the patent must be determined by the claims. However, the description and drawings may be used to interpret the claims. In short the claims are to be construed in context. It follows that the claims are to be construed purposively – the inventor's purpose being ascertained from the description and drawings. The question to ask is what a skilled person having the

necessary skill and expertise would have understood from the patent, including the description and drawings?

- It follows that the claims must not be construed as if they stood alone – the drawings and description only being used to resolve any ambiguity. Purpose is vital to the construction of claims.

- When ascertaining the inventor's purpose, it must be remembered that he or she may have several purposes depending on the level of generality of his or her invention. Purpose and meaning are different concepts. The patentee may have several purposes depending on the generality of his or her invention. Generally, a patentee may have one or more specific embodiments of his or her invention, as well as a generalised concept. However, there is no presumption that the patentee intended the widest possible meaning consistent with the purpose to be given to the wording he or she used in the patent.

- Thus purpose is not the be-all and end-all. One is still at the end of the day concerned with the meaning of the language used. Hence the other extreme of protocol – a mere guideline – is also ruled out by art 69 itself. It is the words or terms of the claims that delineate the patentee's monopoly.

- It follows that if the patentee has included what is obviously a deliberate limitation in these claims, it must have a meaning. One cannot disregard obviously intentional elements or limitations.

- It also follows that where a patentee has used a word or phrase that, acontextually, might have a particular meaning (narrow or wide), it does not necessarily have that meaning in context.

- It further follows that there is no 'doctrine of equivalents'.

- On the other hand, purposive con-

struction can lead to the conclusion that a technically trivial or minor difference between an element of a claim and the corresponding elements of the alleged infringement nonetheless falls within the meaning of the element when read purposively. This is not because there is a doctrine of equivalents: It is because that is a fair way to read the claims in context.

- Finally, purposive construction needs one to eschew the kind of meticulous verbal analysis, which lawyers are too often tempted by their training to indulge.

The Court of Appeal went on to add two further principles to the above principles:

- First, the reader comes to the specification with the benefit of the common general knowledge of the art and on the assumption that its purpose is to describe and demarcate an invention.

- Second, the patentee is likely to have chosen the words appearing in the claim with the benefit of skilled advice and, insofar as he or she has cast his or her claim in specific rather than general terms, is likely to have done so deliberately.

The court went on to say that the above principles are just as applicable to a claim containing a numerical range or limitation as they are to one containing words or phrases. In the UK (as in SA), the objective of art 69 is achieved by ‘contextual interpretation’ or ‘purposive construction’, namely, what would a skilled person have understood the words (or numerals) to mean?

The court emphasised three possible ways to construe numerical values in a claim:

- an ‘exact values’ approach, where anything below ‘1’ or above ‘25’ (exactly ie, absolute numerical values) does not infringe;

- a ‘significant figures’ approach, where ‘1’ to one significant figure or value, which includes all values greater than or equal to 0,95 and less than 1,5, such that 0,77 does not infringe; and

- a ‘number rounding’ approach, where ‘1’ includes all values greater or equal to 0,5 and less than 1,5, such that 0,77 infringes.

Discussing several previous judgments on numerical limitations, the Court of Appeal distilled certain points of particular relevance to these types of claims:

- Whether one is considering infringement or validity, the scope of any such claim must be exactly the same.

- There can be no justification for using rounding or any other kind of approximation to change the disclosure of the prior art or modify the alleged infringement.

- The meaning and scope of a numerical range in the patent claim must be

ascertained in light of common general knowledge and in the context of the specification as a whole.

- It may be that a skilled person would understand that the patentee has chosen to express the numerals in the claim to a particular but limited degree of precision, and so intends it to include all values within the claimed range when stated with the same degree of precision.

- Finally, whether this is so will depend on all of the circumstances, including the number of decimal places to which the numerals in the claim have been expressed.

The critical phrase in the patent claim is ‘the agent being present in a concentration between 1% and 25% of the total volume of treatment’, which raised two questions for the court:

- Would a skilled person believe that the patentee intended the values of 1% and 25% to be taken as exact/absolute values, or would this person understand that the patentee used a standard number convention to express the limits of the claim to a lesser degree of accuracy?

- On the assumption that the numerical limits in the claim did not define exact/absolute values, would a skilled person understand the numbers to be expressed in terms of whole numbers (zero decimal places) or in terms of significant figures?

The court affirmed the court *a quo*’s rejection of Smith & Nephew’s primary case, that the limits of the claim be the range exactly between 1% and 25%. This left the court in no doubt that a skilled reader would not believe that this is how the patentee intended the claim limits to be understood. Instead, a skilled reader would believe that the patentee intended the limits to be understood in a less precise way.

Number rounding vs significant figures approaches

The court went on to discuss the ‘number rounding’ or ‘whole number’ approach.

At the bottom of the range, 1% includes all those values, which round to 1% when expressed to the nearest whole number. At the top of the range, 25% includes all those values, which round to 25% when expressed to the nearest whole number. Looking at the claimed range as a whole, it embraces all values greater than or equal to 0,5% and less than 25,5%.

The court held the ‘significant figures’ approach to be a little more complex, summarising the relevant rules as follows –

- i) non-zero digits are always significant;

- ii) zeros between non-zero digits are always significant;

- iii) leading zeros are never significant ...; and

- iv) in the absence of a decimal point, trailing zeros are not generally significant unless stated otherwise’

Taking first the bottom of the range, 1%, and the top of the range, 25%, there is asymmetry around these numbers (in relation to ‘1’ – greater than or equal to 0,95% and less than 1,5%; and ‘25’ – greater than or equal to 24,5% and less than 25,5%).

The court opined that the ‘significant figures’ approach gives rise to ‘very strange results if applied to the teaching in the body of specification’, citing examples from ConvaTec’s diagrams. On the contrary, the ‘number rounding’ approach produces a symmetrical distribution of random errors around a number (namely, ‘1’ incorporates all values greater than or equal to 0,5% and less than 1,5%).

The court stated that there can be no logical basis for preferring the ‘significant figures’ approach over the ‘whole number’ (or zero decimal place) approach in interpreting numerals in claims, ultimately siding with ConvaTec’s view that it is not the number of significant figures that is important in this context, but the precision with which the number is written.

Comments

In this judgment the UK Court of Appeal has shown a preference for the ‘number rounding’ approach over the ‘exact values’ and ‘significant figures’ approaches, unless the description of the specification indicates expressly otherwise.

However, the ‘number rounding’ approach, although simple to apply when construing numerical limitations and ranges, is not without its weaknesses. In this case, the result led to 0,5% being the lowest value to be below (relative to the number ‘1’) in order to overcome the patent, which is a relatively large margin to overcome (0,5%), in my view.

Other foreign jurisdictions may interpret numerical ranges and limitations differently. Therefore, there is the possibility for variation in solutions on the same inquiry – territory by territory. This is important to take into account, as South African courts, driven by the constitutional imperative, may refer to any foreign judgments in its own assessment of a particular case. This is of particular relevance in intellectual property (including patent) matters.

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