

## **PATENTS ACT 1977**

IN THE MATTER OF an  
application by SKF Sverige AB  
for the revocation under section  
72 of patent number GB 2284639  
in the name of NSK Limited

### **INTERIM DECISION**

#### **Introduction**

1 The patent with which this decision is concerned, GB 2284639, was granted to NSK Limited (hereafter “NSK”) in respect of application number GB 9421793.2, which was filed on 28 October 1994 and claimed priority from a Japanese application filed on 29 October 1993. The invention is concerned with steels for the rolling elements of rolling bearings for use in automobiles, construction machinery, railroad vehicles and other industrial machinery.

2 Claim 1 of the patent reads:

“A rolling bearing comprising an inner ring, an outer ring, and a plurality of rolling elements interposed between said inner ring and said outer ring, wherein each of the plurality of rolling elements is made of a continuously cast bearing steel, a center segregation rate of carbon,  $C/C_0$ , of said bearing steel satisfies a condition,  $0.9 \# C/C_0 \# 1.1$ , where  $C$  is a carbon concentration (wt%) in a center portion, and  $C_0$  is an average carbon concentration (wt%), and said bearing steel contains oxygen in amounts of 10 ppm or less and sulfur in amounts of 80 ppm or less.”

The centre segregation rate is, in effect, a measure of the homogeneity of the continuously cast steel so far as the distribution of the constituent substances is concerned.

3 Dependent claim 2 additionally features a centre segregation rate of sulphur satisfying the condition  $0.9 \# S/S_0 \# 1.1$ . The only other claim is an “omnibus” claim, claim 3, to a rolling bearing substantially as described with reference to the drawings.

4 SKF Sverige AB (hereafter “SKF”) filed an application for revocation of the patent on 31 December 1998 on the grounds that the invention was lacking in novelty and inventive step and that the specification did not disclose the invention clearly enough and completely enough for it to be performed by a person skilled in the art (“sufficiency”). NSK filed their counter-statement on 11 March 1999. Thereafter the proceedings became protracted as the parties pursued their dispute by the exchange of a number of further submissions and supplementary statements, and this in turn delayed the completion of the evidence rounds. Eventually, after a postponement to allow NSK

to file evidence in reply to further evidence filed by SKF, the matter came before me at a hearing on 30 July 2001. Mr Daniel Alexander, instructed by Boulton Wade Tennant, appeared as counsel for SKF. Mr Colin Birss, instructed by Gill Jennings & Every, appeared as counsel for NSK.

5 At the hearing Mr Alexander - rightly in my view - chose not to run the issue of sufficiency. He contented himself with the observation that because, in his view, the patent disclosed so little about how to actually produce a rolling element with the characteristics of the claim, including determining when one has got within the claims, the inventive concept that could be claimed for the patent without its being clearly insufficient was very limited and general, but that argument goes more to the question of what amendments might be permissible than to whether the patent as it stands is insufficient. I therefore need say no more about the allegation of insufficiency. As Mr Birss conceded that claim 2 possessed no independent validity over claim 1 at least as regards obviousness, the issues remaining between the parties therefore essentially boil down to whether the claims are novel, and whether claim 1 is obvious.

6 In addition, NSK have proposed two amendments:

C first, said to be for clarity, because the patent quotes values to two places of decimals, to specify the limiting values of  $C/C_0$  as 0.90 and 1.10 instead of 0.9 and 1.1;

C second, said to be in order to distinguish even more clearly from the prior art, to restrict the scope of the claims to the rolling elements being balls.

Balls are the preferred form of rolling element in the patent, and NSK say that problems with centre segregation are particularly relevant for these. A similar restriction would appear to have been allowed for the corresponding US patent.

7 Both amendments are opposed by SKF. Moreover, the second has not yet been advertised, having been proposed only in correspondence and filed too late to allow the prescribed two-month period for opposition before the hearing. Before the hearing I suggested that, rather than postpone the hearing yet again, I should allow the parties to address me on the allowability of the further amendment and the validity of the patent thus amended at the hearing. If I concluded on the basis of their submissions that the second amendment was allowable and that the patent thus amended was valid, I would not give a final ruling until the amendment had been advertised and any opposition by some other party considered. Of course, if on the basis of their submissions I found the amendment was not allowable and/or the amended patent still invalid, there would be no point in advertising. Both parties have accepted this approach. I will therefore first consider novelty and obviousness in relation to the claims both as granted and as proposed to be amended, and come back later to the question of allowability of the amendments.

## **Evidence**

- 8 The evidence for SKF took the form of two witness statements from a Dr Graham E Hollox and two affidavits from a Mr Martyn M Whitwood. Mr Whitwood was not available to attend the hearing for cross-examination and in any case Mr Alexander developed his case for SKF without reliance on his evidence. I do not therefore need to consider it further.
- 9 Dr Hollox was present at the hearing. I found him to be a credible and reliable witness concerning the metallurgy of bearing steels. Under cross-examination he was careful not to be drawn into supporting propositions with which he disagreed, and was equally careful to acknowledge the possibility of opinions which conflicted with his own. It emerged during cross-examination that Dr Hollox's direct involvement with the metallurgy of bearings ended in 1987. However, I am satisfied that he has been working since then in closely related fields, presenting similar technical problems to ball bearings, and so I do not think that this detracts significantly from his evidence.
- 10 The evidence for NSK consisted of an affidavit from a Mr Hiroshi Narai. However, despite a request from SKF, Mr Narai was not available on account of his business commitments to attend the hearing. It is clearly not a satisfactory state of affairs, as Mr Alexander rightly pointed out, that Mr Narai's evidence should be admitted without affording SKF an opportunity for cross-examination, particularly when the hearing had been postponed specifically at NSK's request to allow the evidence to be filed. However, I put it to Mr Alexander that he had in fact relied on Mr Narai's evidence in his own arguments by pointing out that it did not actually deny certain things, and I could not refuse to admit the evidence while still allowing Mr Alexander to take account of it for his own benefit. Mr Alexander accepted this, and accordingly I admitted Mr Narai's evidence and have taken it at its face value.

### **Technical background**

- 11 At this stage, it will be helpful for me to explain the background to the invention in a little more detail. As the patent explains it, and I do not think there is any disagreement between the parties on this, continuously cast, or "CC", steels have gained acceptance over ingot cast, or "IC", steels for use in the inner and outer rings of rolling bearings on account of low cost and excellent cleanness and streak flaw characteristics. However, the continuous casting process as applied to bearing steels has the disadvantage that various elements, including carbon and sulphur, tend to become locally segregated and concentrated in the centre portion of the steel to form an area of weakness. Such segregation can be overcome by techniques such as electromagnetic stirring, light reduction with pinch rolls, and continuous forging and rolling, though obviously this increases costs. It can be tolerated in the case of the *bearing rings*, where the normal manufacturing process from rods and tubes either conceals or removes the segregated portion. However, the *rolling elements* are normally made from wire, and then the segregated portion becomes exposed at the surface of the elements where it is susceptible to flaking and cracking. This has tended to make bearing manufacturers more reluctant to use continuously cast steels for the rolling elements, though whether it stopped them doing so altogether is disputed.
- 12 According to the patent specification, based on an analysis of the relationship between the centre segregation rate  $C/C_0$  and the rolling life, the inventors concluded that, using

continuously cast steel, the rolling life of the rolling element can be improved by reducing  $C/C_0$  to 1.1 or less whilst keeping the oxygen and sulphur content of the steel below certain limits. The lower limit of 0.9 for  $C/C_0$  would appear to have been selected as the lowest value which can be obtained at a reasonable cost. The analysis is supported by 25 examples of specific compositions of continuously cast and ingot cast bearing steel, of which only four fall fully within the boundaries of the claims of the patent, the remainder being comparative examples. These four examples are stated to have rolling lives (measured as a 10% failure probability life) in the range of 585 - 720 hours, compared with 275 - 501 hours for the remainder.

### **Documents relied on**

- 13 Before I deal with novelty and obviousness, I should explain that the pleadings have drawn forth a large number of prior art documents in support of the case for revocation. A number of these seem to me to be of only secondary relevance at best, and as they were not relied on at the hearing I do not need to refer to them now. The key documents are the following. (I have retained the identification used by the parties as a convenient shorthand.)
- D1 “Production of High-Carbon Chromium Bearing Steel in Vertical Type Continuous Caster”, T Uesugi, Transactions ISIJ, Vol 26, 1986, pages 614 - 620
  - D2 “Fatigue Life of High-Carbon Chromium Ball Bearing Steel Produced by Electric Furnace - Vacuum Slag Cleaner - Ladle Furnace - RH Degassing - Curved Continuous Caster”, K Kumagai et al, in *Effect of Steel Manufacturing Processes on Quality of Bearing Steels, ASTM STP 987*, J C Hoo, Ed, American Society for Testing and Materials, Philadelphia, 1988, pages 348 - 359
  - D3 “Production and Quality of High Cleanliness Bearing Steel”, K Tsuboto and I Fukumoto, Proceedings of the 6<sup>th</sup> International Iron and Steel Congress, 1990, ISIJ, Nagoya, pages 637 - 643
  - D5 “Solidification Process in 52100 Grade”, M Bobadilla et al, Proceedings of Ascometal Bearing Steel Symposium, Arles, France, 25/27 September 1989
  - D7 “Production of High Quality Rod and Bar by Applying Continuous Forging Process”, F Yanagishima et al, Kawasaki Steel Giho, Vol 23(2), 1991, pages 91 - 97
  - D9 “Improvement in Center Segregation of High Carbon Steel Continuous Casting Blooms”, M Suzuki et al, La Revue de Metallurgie - CIT, January 1992, pages 84 - 92
  - GH2 (Exhibited to Dr Hollox’s second witness statement) “Advances in the Production of Bearing Steels by Modern Secondary Metallurgy and Continuous Casting”, K-J Kremer et al, American Society for Testing and

## Novelty

- 14 I now turn to the issue of novelty. As pleaded this was based on document D1, in which the oxygen content of a high-carbon chromium bearing steel is reduced to an average level of 5.8 ppm by a continuous casting process. The rolling contact fatigue life of a high-carbon chromium bearing steel is said to be doubled to tripled, testing on a thrust type machine, compared with the results of a conventional ingot cast steel. Table 7 lists the chemical composition of the samples tested, from which it can be seen that a number of the samples have both oxygen and sulphur contents within the range of claim 1. Although the document is concerned essentially with testing of steel samples from which bearings can be made rather than the bearing constructions themselves, it is stated in the introductory paragraph that (emphasis added)

“Improvement in the rolling contact fatigue life of *rolling bearings* .... is of great importance in designing the bearings of greater reliability, smaller size, lighter weight and higher performance.”

Use of the steel in a rolling bearing would therefore seem to be implicitly, if not explicitly disclosed, and there appears to be no dispute that a rolling bearing consists of inner and outer rings plus the rolling elements, as required by claim 1.

- 15 I am satisfied, and on this there also appears to be no dispute between the parties, that D1 fulfils the requirements of the claims for a rolling bearing, continuous casting, oxygen content and sulphur content. The issue therefore is whether D1 discloses (a) the required  $C/C_0$  ratio, and (b) the use of the steel specifically for the rolling elements of the bearings.
- 16 As to the  $C/C_0$  ratio, SKF based themselves on the following passage in D1, at the foot of the left-hand column on page 619:

“Whereas the degree of carbon segregation,  $C/C_0$ , (where C: carbon at the center,  $C_0$ : ladle analysis carbon) is approx. 1.15 in the CC steel, it is 0.9 to 1.15 in the IC steel depending upon the location of the ingot. This tells that carbon segregation is not so high in the CC steel as is generally expected.”

They sought to bridge the gap between the “approx. 1.15” disclosed in this document and the upper limit of 1.1 in the present claim by arguing that the ratio in claim 1 was to just one decimal place, and that the upper limit of 1.1 was impliedly less precise than 1.10. Thus a value of approximately 1.15 was within claim 1 when measurement accuracies and the degree of precision implied by the patent were taken into account. It is this argument, of course, that triggered the patentee’s proposal to define the upper limit in claim 1 as “1.10”.

- 17 NSK took the view that, whether or not claim 1 was amended to specify the limits of the  $C/C_0$  range to two decimal places instead of one, those limits should be interpreted literally, and therefore D1 was not within the claims. In this they drew support from the decision of Peter Prescott Q.C. (sitting as a Deputy Judge in the Patents Court) in

*Auchincloss v Agricultural & Veterinary Supplies Ltd* [1997] RPC 649, where he said at page 689 from line 41 onwards:

“In my judgment the departure from the defined numerical range is not a variant at all in the *Catnic* sense. .... Where the patentee has expressed himself in terms of a descriptive word or phrase, there may be room for supposing that he was using the language figuratively, and did not intend to restrict himself to the purely literal meaning. But where the patentee has defined an integer of his claims in terms of a range with specific numerical limits at each end, his purpose must be taken to have been to claim thus far and no further.”

- 18 NSK in their pleadings accepted that this decision was given in relation to infringement, rather than novelty, proceedings, but I agree with them that this does not weaken its significance for the present case. However, they also accepted that the interpretation of ranges might be subject to a degree of rounding in the light of the Deputy Judge’s further comments at page 690 line 13:

“In science and engineering the use of numbers may indicate the degree of precision intended; there may be rounding; thus a chemist who says “3 to 8” may not be intending to say “3.0 to 8.0”. However that may be it makes no difference in this case. I do not have evidence of how those skilled in the art use this language, and the defendant’s revised composition is outside those numerical limits even allowing for the possibility.”

Of course, the fact that rounding or measurement accuracy made no difference in *Auchincloss* does not mean it will necessarily be of no significance in other cases.

- 19 For novelty the test is whether the prior publication contains “clear and unmistakable directions to do what the patentee claims to have invented” (*General Tire v Firestone* [1972] RPC 457). I must therefore consider whether D1 gives such directions in the light of the Deputy Judge’s comments on precision and rounding in *Auchincloss*.
- 20 In the 25 examples in the patent specification, the  $C/C_0$  ratio is given to the nearest 0.05, so *prima facie* all the figures are subject to  $\pm 0.025$ . This must raise the question of whether the upper limit of 1.1 should be strictly interpreted as 1.100... or whether it stretches to 1.125, always assuming that one could if one chose measure to this degree of accuracy. The former interpretation sits ill at ease with the description, since of the four examples of the invention two are on the limits of the range and therefore, if  $C/C_0$  were measured more accurately, have a 50% chance of being outside the scope of the claim. The latter interpretation is also unsatisfactory, since it requires the reader to dig around in the description, without any clear signpost being provided, to work out what the limit in a claim actually means.
- 21 In the event I do not actually need to decide which of these interpretations is right. For the purposes of assessing novelty I will take the meaning most favourable to SKF - that the quoted range of 0.9 to 1.1 should in fact be interpreted as 0.875 to 1.125. D1 says “about 1.15” which, by the same token in the absence of any further information in the document, must be quoting to at least the nearest 0.05 and might therefore stretch to 1.125. Thus whilst the two ranges just touch at the very limits, they do not overlap and

I do not consider that this can be regarded as the clear and unmistakable directions to do something within the ambit of the claims required by *General Tire v Firestone*.

- 22 In this respect a considerable amount of documentation - including the evidence from Mr Whitwood - was filed by the parties in trying to establish the accuracy of the limits of the range specified in claim 1 and whether the value of 1.15 for  $C/C_0$  was likely to fall within it. Wisely in my view neither Mr Alexander nor Mr Birss relied on this at the hearing. Also, in his evidence Dr Hollox suggested that the skilled man would regard a value of 1.15 as “effectively” or “for all practical purposes” the same as 1.1. Again I think this misses the point. The fact that two different values produce similar effects may be a significant factor in assessing obviousness, but it does not make the two values identical for novelty purposes.
- 23 As to whether D1 discloses the use of the steel in the rolling elements, it does not appear to be in dispute that the document does not mention rolling elements because it does not distinguish between the rolling elements and the rings. It is also not disputed that the impact of centre segregation on the rings and the rolling elements is different, rings not having the same problems with centre segregation as the rolling elements. Against this background, in the absence of any specific indication in D1 that the steel is to be used for the rolling elements, the novelty objection fails on this count also.
- 24 Although it was not originally pleaded, the issue of novelty over document D7 was raised in evidence. However, it was not pressed at the hearing and rightly so, because while D7 discloses the continuous casting of a bearing steel having the required  $C/C_0$  and sulphur content (table 2 for instance disclosing a continuously-cast SUJ2 steel with 40 ppm sulphur), it does not disclose the required oxygen content. It may well be the case that there is nothing remarkable about this, but that sort of argument goes to obviousness, not novelty. Again, there are no clear and unmistakable directions to work within the claims, and so a novelty objection based on D7 would have been bound to fail.
- 25 The novelty attack therefore fails, even against the unamended claims.

### **Obviousness: Claim 1**

- 26 I turn now to obviousness. The essence of Mr Alexander’s argument is that homogeneity of the steel, which *inter alia* implies a  $C/C_0$  value close to 1, was always desirable if continuously cast steel was to be used for the rolling elements of rolling bearings, and that low oxygen and sulphur were both known requirements for high quality steels. The claims are not limited to any particular standard of rolling life and so the patent does no more than monopolise exactly that quality of continuously cast steel which a person skilled in the art would have regarded as the most desirable candidate for the rolling elements. It is no more than a collocation of obvious desiderata, made worse by its silence as to how these were to be achieved.
- 27 Mr Birss argued that the invention goes deeper than this, because there was a prejudice against using continuously cast steel for the rolling elements. Even SKF conceded that, at best, continuously cast steel was not widely used for making rolling bearings, but NSK submitted that there was no evidence of anyone actually doing it at all: although

there were proposals for development in this area, the problem of fatigue life had not been solved.

- 28 Both sides accept that the four-step approach in *Windsurfing International v Tabur Marine* [1985] RPC 59 to the analysis of inventive step is appropriate, and I will therefore proceed on this basis.
- 29 Step 1: identify the inventive concept. Mr Birss argued that the inventive concept was an inexpensive, high quality rolling bearing whose rolling elements were made from continuously cast steel and had long life owing to the properties of the steel used. I disagree. At best this was no more than the inventors' objective, not the inventive concept, and the test for obviousness is not whether the claimed invention would have been an obvious way to achieve the inventors' objective. As is explained in *Hallen v Brabantia* [1991] RPC 195 at lines 11 - 20 of page 216, and as Mr Alexander pointed out, the patent will be invalid if the invention is obvious for any reason, even if there is an unexpected benefit.
- 30 I must also observe that in any case it seems to me questionable what the inventors' objective really was. Mr Alexander drew my attention to a passage in the patent specification which suggests the objective was to analyse the importance of  $C/C_0$ , and indeed the specification proceeds on the basis that there has been no full analysis of the relationship between  $C/C_0$  and rolling life. However, it is not clear how such an objective ties in with the claims.
- 31 With no other clear guidance to be had, and basing myself on the claims, I have come to the conclusion that I must take the inventive concept to be the use of continuously cast steel having specified ranges of values for  $C/C_0$ , oxygen content and sulphur content for the rolling elements of rolling bearings.
- 32 Step 2: impute to the skilled man the common general knowledge in the art at the priority date of the patent. In the present case I am satisfied that the skilled person must be a specialist in steels for bearings. I am content to regard both Dr Hollox and Mr Narai as such specialists, even though (as I have explained above) Dr Hollox had not been directly involved with bearings for some time. As Mr Birss correctly pointed out, referring to the judgment of Aldous LJ in *Beloit v Valmet* [1997] RPC 489 at pages 494 - 495, I must bear in mind that evidence that a fact is well-known to a witness does not establish that fact forms part of the common general knowledge, and I am aware there is no information before me to as to how representative of the "ordinary" skilled person Dr Hollox and Mr Narai are. However, Dr Hollox at least was clearly aware of the views of others working in the art, and accordingly I found his comments on those views very helpful in assessing the knowledge of the notional skilled person.
- 33 I am mindful of the test in *British Acoustic Films* (53 RPC 221 at 250) as to whether scientific papers form part of the common general knowledge of the art, approved by Aldous LJ in *Beloit v Valmet*. Nevertheless, I am satisfied that in this area, a specialist in bearing steels would keep up to date with the relevant publications and conferences. I am therefore satisfied that all the documents relied on can be regarded as part of the common general knowledge, especially as most of the key ones relate to exactly the same grade of steel (alternatively described as SUJ2 or SAE 52100), or very similar

compositions. Although the patent itself does not identify a specific grade of steel, it is not disputed that the examples it quotes are also of this grade.

- 34 Step 3: identify the differences between the matter cited and the alleged invention. The pleaded case was that the claims were obvious if document D1 was combined with common general knowledge, demonstrated by a number of the other documents. During the proceedings an alternative argument appeared, namely that obviousness was also established on the basis of D7 combined with common general knowledge. Since Mr Birss dealt with both arguments, I will consider both of them.
- 35 As I have stated above in considering novelty, D1 differs from claim 1 in having a different  $C/C_0$  ratio and in not specifying use of the steel specifically for the rolling elements. D7 differs only in not specifying oxygen content.
- 36 Step 4: are the differences obvious? Taking D1 as the starting point, there are two differences to consider. As far as the difference in  $C/C_0$  is concerned, I am quite satisfied on the evidence that the generally-accepted wisdom amongst specialists in bearing steels was to make  $C/C_0$  as low as possible in continuously cast steels for use in bearings. This emerged not only quite strongly from Dr Hollox's evidence but also from D3 and D7, and is reinforced by the fact that a low value, 1.15, is already disclosed in D1 itself.
- 37 Mr Birss devoted much effort to arguing that the prior art, and particularly documents D1, D3 and D7, actually taught away from the notion that reducing  $C/C_0$  was the thing to do if rolling life was to be improved. As he saw it, D1 looked to reducing oxygen content and D7 to improving purity in order to improve life, whilst paragraphs 4.5 and 4.6 of document D3 conclude that centre segregation does not affect fatigue life. However, it follows from the comments I made when considering step 1 that the test is not whether the skilled person would or would not have concluded from these documents that reducing  $C/C_0$  would improve fatigue life. The more relevant question is whether the skilled person would have considered reducing  $C/C_0$ . On this basis, in my view D3 clearly undermines Mr Birss's case, not supports it, because even after concluding (rightly or wrongly) that oxide inclusions, not centre segregation, determine fatigue life, it still states that an improvement of macrostructure in terms of centre segregation is desirable if you are going to use the steel for balls. D7 too expressly stresses the importance of reducing  $C/C_0$  in paragraph 3.2.
- 38 I feel compelled to say in passing that I am left with some doubts as to whether the connection between  $C/C_0$  and fatigue life is as straightforward as the patentees suggest in view of comparative example 10 of the patent specification when compared with embodiment 1. Both these are continuously cast steels having a  $C/C_0$  of 1.00 and similar low sulphur contents, but example 10 is said to have only 66% of the rolling life of embodiment 1, even though the oxygen contents are very close - 11 ppm and 8 ppm respectively - and that of example 10 is only outside the limits of claim 1 by a whisker. When I put this to him, Mr Birss emphasised that *all* the features of the claim had to be satisfied to get the improved rolling life, not just  $C/C_0$ . Under cross-examination Dr Hollox suggested that there was likely to be a significant variation in rolling life when testing a batch of identical components, thus making the figures in the examples unreliable. I have to say Dr Hollox's line seems more plausible than Mr

Birss's on this, but in the event I do not need to decide the point.

- 39 There is one other point I must make. As is clear from the judgements in *Windsurfing* [1985] RPC at page 72 and *Hallen v Brabantia* [1991] RPC at page 213, the fact that it might not seem commercially sensible to put too much effort into making C/C<sub>0</sub> very low is irrelevant.
- 40 As far as using continuously cast steel for the rolling elements is concerned, D7 at paragraph 3.2 states that the application of a continuously cast steel to the balls of the bearing is under examination. This is reinforced by a number of other documents. As just indicated, paragraphs 4.5 and 4.6 of D3 specifically contemplate the use of continuously cast steel for bearing balls, whilst paragraph 3.3 of D5 talks about investigating the “quality of wire and balls manufactured from such optimised [continuously cast] products”. Further, GH2 also suggests that the requirements for balls can be satisfied by continuous casting, and despite the date of this document, it is not disputed that this is the publication of open conference proceedings actually held in 1991 and attended by one of the present inventors.
- 41 Mr Birss pointed out that some of these documents suggest future development rather than immediate application. However, that is irrelevant when considering whether it was obvious to make rolling elements from continuously cast steel, as are the questions of whether or not rolling elements had actually been made from continuously cast steel (Dr Hollox and Mr Narai disagree on this). I should also refer to a further paper “Progress in Through-Hardening Bearing Steels: User’s Experience” co-authored by the present inventors and published in 1998, but suggesting that continuously cast steels had been recognised for adoption (and perhaps even used, although the paper is not very clear on this) as the material of bearing balls by 1991. This was introduced at a late stage by SKF, and clearly does no favours to NSK’s case. However, Mr Birss disputed that this was in the public domain, and I do need not rely on it in reaching my conclusion.
- 42 Mr Birss, referring to *Hallen v Brabantia*, suggested that the test is not whether the skilled man *could* take the required step, but whether he *would*. However, I do not read Slade LJ’s judgment at [1991] RPC 211 - 212 this way. He accepts that “could” is a minimum condition to be satisfied, but goes on to say that the proper question depends on the facts in the particular case.
- 43 Considering all the evidence, I am satisfied that by the priority date of the patent not only the possibility but also the desirability of (a) reducing C/C<sub>0</sub> of a continuously cast bearing steel to the levels required by the claims and (b) using continuously cast steel for the rolling elements as well as the rings of rolling bearings were sufficiently in the public domain for it to be obvious for the skilled man faced with the disclosure of the steel composition in D1 at least to try to achieve them. Claim 1 is therefore obvious in the light of D1 and the other evidence I have considered.
- 44 If I take D7 as the starting point instead of D1, this document discloses all the features of claim 1 except an oxygen content within the required range. However, Dr Hollox at paragraph 15(d) of his first witness statement states it to be accepted in the art that reducing oxygen content increases the fatigue life of bearings, and this is not disputed

by Mr Narai. It is borne out by a number of the prior art documents, particularly D1, D3 and also D2, which taken together clearly indicate that oxygen contents below 10 ppm are nothing unusual in continuously cast bearing steels. Claim 1 is therefore also obvious in the light of D7 and common general knowledge in the art.

- 45 I therefore find claim 1 to be obvious, whether D1 or D7 is taken as the starting point. Whilst I would not, as Mr Alexander suggested, go so far as to say this is a case of what Laddie J at first instance in *Raychem Corp.'s Patents* [1998] RPC 31 at pages 41 - 42 called "parametritis", the patentees seem to have done no more than select the obviously useful products out of the range that can be made with existing technology, and I can find no inventive concept or technical contribution in the materials or methods used to make the product of claim 1 which would validate it. Further, as Aldous LJ stated on appeal in *Raychem* ([1999] RPC 497 at 502 lines 34 - 38:

"The specification contains general teaching to enable the skilled man to produce the product of the invention. It contains no detail. It assumes that the skilled man, having been told what to make, would be able to do so. Thus if the product be obvious the method of production was also obvious."

I agree with Mr Alexander's view that that is also the position in this case.

### **Obviousness: Claim 2**

- 46 Mr Birss has conceded that claim 2 possesses no independent validity. I believe he was right to do so in view of the acknowledgement in the patent at lines 7 - 12 of page 25 that the centre segregation rate of sulphur exhibits substantially the same tendency as that of carbon. This is supported by the data for the samples in Table III of document D9, which shows the  $S/S_0$  ratio to vary in broadly the same way as  $C/C_0$ . Although the values for carbon and sulphur do not exactly correspond, one sample shows  $S/S_0$  ranges of 0.8 - 1.4 and  $C/C_0$  of 1.0 - 1.15 and so in the absence of further argument I do not believe the range of  $S/S_0$  in claim 2 would be unexpected for a steel having the  $C/C_0$  range of claim 1. I therefore find claim 2 to be obvious.

### **Amendment**

- 47 I must now turn to the question of whether or not I should allow either or both of the two amendments put forward by the patentee. Given the discussion above on the question of the extent to which limits in claims must be construed as subject to tolerances or measurement inaccuracies, I would have been reluctant to allow the amendment in respect of the  $C/C_0$  values, since this could render the claim less clear, not more clear, when read against the description. However, the main problem with both amendments is that neither overcomes the obviousness objection, because whether the  $C/C_0$  limit is 1.1 or 1.10, it would have been obvious to try and get below it, whilst all the references to using continuously cast steel for rolling elements actually refer specifically to balls. On that ground alone I refuse them. I do not therefore need to consider any other elements that may enter into the discretion of the Comptroller in the matter, nor is there any point in advertising the second amendment.

### **Order**

48 In summary, I find the claims to be novel but claims 1 and 2 to be invalid for obviousness both as unamended and as amended. I refuse the amendments which have been offered.

49 Whilst I have some doubts as to whether the specification could support any valid claim, I will give the proprietors NSK an opportunity to submit amendments to overcome my findings. Any amendments should be filed within a period of six weeks from the date of this decision. If amendments are offered, I will give directions as to how the case should proceed after allowing the claimants SKF an opportunity to comment. If no amendments are forthcoming, I will revoke the patent.

### **Costs**

50 SKF have won and in principle are therefore entitled to a contribution towards their costs. I am minded to award them costs on the comptroller's normal scale that applies to actions commenced before 22 May 2000. If either side thinks there are reasons for departing from that scale, they should make submissions within the same period of six weeks. I will then make a formal costs award, taking account of any submissions.

### **Appeal**

51 As this decision does not relate to matters of procedure, the period for appeal is six weeks.

Dated this 11<sup>th</sup> day of September 2001

**P HAYWARD**

Divisional Director acting for the comptroller

**THE PATENT OFFICE**