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The Patenting of Inventions of Alloys in Germany: the Chrome–Nickel–Alloy Decision of the Federal Supreme Court

If the invention of an alloy is comparable to the creation of a dinner recipe,¹ the Federal Supreme Court confirmed in its decision *Chrome–Nickel–Alloy*² that the ingredients were excellently mixed. The decision permits a restatement of the law on the patentability of inventions relating to alloys. Such inventions have certain features in common which distinguish them from other inventions. Alloys are composed of different ingredients, the proportions of which are indicated by upper and lower limiting values in the percentage scale of each. Taking into account that particularly in the first part of the century, patents were granted for inventions of economically important alloys, the present interest focuses on two main questions: first, whether the patent applicant may, after it has been found that his alloy belongs in part to the state of the art, obtain patent protection for the other part by disclaiming the known ranges of proportion, and, second, whether the inventor may obtain protection for a 'selection invention',³ that is to say an invention where the ranges of proportion of the ingredients of the claimed alloy offering particular advantages, have been found within the wider ranges of an invention which forms the state of the art.

Background

In 1972 the patentee filed an application for his invention of a chrome–nickel alloy. Claim 1 referred to the chrome–nickel alloy consisting of, *inter alia*, 9.5 to 20 per cent cobalt, 7 to 12 per cent molybdenum, and 0 to 0.1 per cent zirconium. The patent was granted in 1984 for a nickel–chrome alloy consisting of, *inter alia*, more than 10 to 20 per cent cobalt, 7 to 12 per cent molybdenum, and 0 to 0.1 per cent zirconium. Upon opposition, the German Patent Office sustained the patent with a claim referring to a nickel–chrome alloy consisting of, *inter alia*, more than 10 to 20 per cent cobalt, 7 to 10.59 per cent molybdenum, and 0 to 0.01 per cent zirconium. Both parties appealed. The appellant argued that a limitation of the original ranges of proportion of the ingredients to narrower limiting values was not admissible. Otherwise the applicant might, after several disclaimers necessitated by the state of the art, obtain patent protection for an invention which he had not envisaged when making the application. In particular, the appellant asserted that the disclaimer of 90 per cent of the range of proportion of

zirconium could not be justified, since there was no reference to it in the original documents. The Federal Patent Court reversed the decision of the German Patent Office. It revoked the patent and rejected the patentee's appeal. The patentee filed an appeal on points of law to the Federal Supreme Court, arguing that the Federal Patent Court had misunderstood the concept of disclosure. The Federal Supreme Court held:

- (1) The constituent amounts of the ingredients of an alloy comprise all possible variations within the indicated ranges, that is to say also those ingredients which are not specifically mentioned in terms of figures, insofar as the characteristic qualities of the alloy are maintained. In the case where the claimed alloy is, in the view of the expert, clearly described in the records with regard to substance and quantity, all possible variations are disclosed without the importance of the individual component for the quality of the alloy carrying weight;
- (2) The limiting values of the constituent amounts of the ingredients of an alloy have, with regard to patent law, only the meaning to delimit the claimed scope of protection. With the indication of a certain range all the intermediate values remaining within the limiting values and any optional formed partial amounts are disclosed.

Disclosure

In the case of alloys, it is generally accepted that due to the great number of individual alloys and the possible variations in their composition, the principle of legal certainty demands a strict interpretation of the concept of disclosure.⁴ This means, in principle, that the patent specification should refer to any ranges of proportion of the important ingredients by indicating the upper and lower percentage limits.

According to the principles established by the Federal Supreme Court in its *Chrome–Nickel–Alloy* decision, the ranges of proportion of the ingredients encompass any variation within the indicated limits, that is to say also those which lie within the indicated limits but which are not expressly mentioned in terms of figures, provided that the characteristic qualities of the alloy are maintained. The limiting values in the sense of patent law thus have the sole purpose of indicating the scope of protection — any values beyond that limit are, in principle, not eligible for patent protection. In consequence, any intermediate value or any range of proportion relating to an intermediate value is sufficiently disclosed.

Considering that it may be difficult to identify the alloy by means of a comprehensive indication of the ranges of proportion of its ingredients, it is accepted that the alloy will be disclosed by an indication of its composition, of its physical qualities, or by the product-by-process method.⁵ Another possibility is to define the alloy by reference to its macro- and/or micro-structure.⁶ The

1 See Greenstreet on Alloys, Trans. Chart. Inst. LXXVIII (1959/1960) B57 to B72, at B70.

2 Federal Supreme Court, decision of 12 May 1992, reference X ZB 11/90, *Chrome–Nickel–Alloy*.

3 On 'selection inventions' see Jeffs, 'Selection Patents', [1988] 10 EIPR 291 to 296.

4 Benkard, *Patentgesetz*, C.H. Beck, Munich, 1988 (8th ed.), 79 to section 1; similarly the *Chrome–Nickel–Alloy* decision of the Federal Supreme Court (see Note 2).

5 Gerber, 'Stoffschutz und Neuheitsbegriff, insbesondere bei Legierungen', Mitt. 1972, 201 to 208, at 206, 207.

6 Accordingly, chrome-nickel steels can be referred to as austenitic, martensitic or ferritic. A steel with 4 per cent chrome may belong to all three groups, subject to the content of nickel — if the content of nickel is 1 per cent, the alloy is ferritic, with 8 per cent martensitic and with more than 16 per cent austenitic, see Gerber, Note 5, at 207. English law seems more reticent; Whynn-Parry, J. said in

Chrome-Nickel-Alloy decision of the Federal Supreme Court confirms that an alloy is sufficiently disclosed without it being necessary to indicate all ingredients in their respective ranges of proportion, if the characteristic quality of the alloy is mentioned in the specification in a manner rendering the composition of the alloy evident to the expert. The invention of an alloy has to be regarded as similar to any other invention in patent law: the problem is not the creation of a new type of alloy but the suggestion of a number of possible compositions of compounds capable of solving the technical problem at the basis of the invention.

Novelty

An alloy will not be new in the sense of patent law if the ranges of proportion of its necessary ingredients coincide, overlap or touch the ranges of proportion of an alloy which belongs to the state of the art.⁷ Thus, an invention of an alloy is not patentable if the claimed range of proportion of only one of its necessary ingredients is identical in its upper limiting value with the lower limiting value of the range of proportion of an ingredient of an alloy which belongs to the state of the art.

This broad understanding of novelty in the case of inventions of alloys is contested in legal literature. Müller⁸ objects that only limiting values or expressly mentioned intermediate values are really disclosed and that, therefore, intermediate values not referred to in the invention belonging to the state of the art, are neither described nor are their qualities indicated. Accordingly, any intermediate value would differ from limiting values and would be new as such.

In the case where the state of the art comprises an invention of an alloy the ranges of proportion of the essential ingredients of which lie within the ranges of proportion of the ingredients of the claimed alloy, the applicant may limit the ranges of proportion of the ingredients concerned. According to the traditional view, a disclaimer was only permitted, if these narrower limits were disclosed in the original documents, such as by reference to a sub-claim or to an example for the execution of the invention.⁹ This was the argument of the appellant in the *Chrome-Nickel* decision.

The *Chrome-Nickel-Alloy* decision of the Federal Supreme Court confirms the previous jurisprudence,¹⁰ according to which the patentee is the 'master of the procedure for the patent grant'. Thus, the patentee may limit the scope of the claims, subject to the condition that this limited claim was disclosed in the original documents. The concept of disclosure, as contained in section 26(2)

of the 1968 German Patent Act, required that the invention be sufficiently described, so that it can be implemented by an expert.¹¹ In consequence, the patentee may disclaim the ranges of proportion which belong to the state of the art and limit the claims of his invention to any intermediate values disclosed in the original specification. The court stressed that it does not matter whether the description in the original documents gives any indication as to what may be useful, advantageous or preferred with regard to other solutions simultaneously disclosed — nor does any gradation exist for the values of the means used for the description of an invention. This general principle relating to the disclosure of inventions is, according to the *Chrome-Nickel-Alloy* decision, also applicable in the case of inventions relating to alloys.

If such a limitation of the ranges of proportion of the ingredients of the claimed alloy is admissible, the question to be examined is whether the invention comprises an inventive step, and here, the adherents of the concept regarding the intermediate values as 'new' in the sense of patent law concede that the obviousness of the invention will probably pose a hurdle to patentability.¹²

Selection Inventions

A selection invention (in the alloy field) is an invention where the ranges of percentage of the proportions of the ingredients of the claimed alloy have been found within the wider ranges of an invention which forms the state of the art, but which offers particular advantages.

In their textbook Bernhardt and Krasser¹³ favour the idea of the patentability of selection inventions in general. They refer to an example described by Beil,¹⁴ which concerns a patented invention for a chemical process and which indicates in the specification a temperature between 50 and 130°C — a selection to choose the temperature between 60 and 65°C would, in their view, be new. They assert that, contrary to current practice of the German Patent Office, similar considerations should be applicable in the case of inventions of alloys, and recommend that a selection invention of an alloy should be patentable, if it has surprising and superior qualities. Pfab¹⁵ asserts that in the case of an invention of an alloy, claiming as ingredient a range of proportion of copper between 10 and 60 per cent, the selection of a particularly suitable addition of 30 per cent would be new — the new and particular success achievable with this selection could be obtained by an expert using the disclosed invention only by accident, but not because the disclosed invention contained the technical instruction.¹⁶ Müller¹⁷ points out that

11 The new German Patent Act of 1981 explains the principle of disclosure in section 35(2): 'The patent application must disclose the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art'.

12 See for example Müller, Note 8, at 466.

13 Bernhardt and Krasser, *Lehrbuch des Patentrechts*, C.H. Beck, Munich, 1986 (4th ed.) at 162, 163.

14 Beil, 'Die Auswählerfindung', GRUR 1971, 53 to 59 and 382 to 389, at 53, 54.

15 Pfab, 'Neuheitsschädlichkeit öffentlicher Druckschriften im Sinne des Patentgesetzes', Mitt. 1972, 3 to 10, at 9, 10.

16 Pfab, Note 15, at 9, 10, admits, however, that in the case where the disclosure of a range of proportion comprises any intermediate values or partial amounts, the indication of an upper and a lower limit of the range of proportion would, in fact, constitute a simplified manner of writing for any intermediate values and partial amounts between the limiting values.

17 Müller, Note 8, at 466.

Mond Nickel's application (1948) 65 RPC 123 at 125:

As an alloy can be completely changed in character as to its properties and uses, by slight additions of a new constituent or even by slight variations in the proportions of its original constituents, it appears to me that the rule that the monopoly may be defined by the result cannot be applicable to the field of alloys.

7 Bayer, Schwarzmaier and Zeiler, 'Zur Patentfähigkeit von Metall-Legierungen', in E. Häusser, ed., *Zehn Jahre Bundespatentgericht, Festschrift*, C. Heymanns, 1971, 201 to 225, at 206.

8 Müller, 'Zum Neuheitsbegriff bei Legierungserfindungen', GRUR 1972, 464 to 467, at 466.

9 Bayer, Schwarzmaier and Zeiler, Note 7, at 208.

10 Federal Supreme Court, GRUR 1990, 510, 'Crackkatalysator I'.

intermediate values not expressly referred to in the specification of an invention belonging to the state of the art will be new, and advocates the application of the rules relating to 'dominant' and 'dependent' patented inventions.¹⁸ Similarly, Eggert¹⁹ is convinced that the presuppositions for patentability are fulfilled where the characteristic qualities of an invention of an alloy are no longer evident in a narrower selected range within which particular advantageous qualities ensue, forming a new type of alloy. This means that protection should be granted to the new selected alloy itself and not to a process patent, which he considers a cold comfort with regard to the narrower scope of protection. Röhl²⁰ argues that technical research could be frustrated if selection patents for alloys were disapproved of; patents which were granted at the beginning of the century contain wide ranges of proportion of the ingredients, and at least traces of half of all the important known metals of the periodic system, so that the patentability of selection inventions would be necessary to ensure the incitement of research and development in the improvement of alloys which belong to the state of the art. Schulte²¹ opts for an intermediate solution: the wider the known ranges and the more carefully calculated the selection, the more likely it is that novelty of the invention will be accepted.

However, the traditional doctrine denies novelty in the case of patent applications for selection inventions of alloys. Bayer, Schwarzmaier and Zeiler²² consider that the lower and upper limiting values of a range of figures merely constitute a simplified manner of writing to indicate any possible intermediate value between the limiting values. Accordingly, a selection of a melting temperature of 60 to 65°C could not be considered new where a patented invention discloses as the state of the art as melting temperature a range between 50 and 130°C, even if the selection invention found a particular qualitative improvement at the temperatures between 60 and 65°C. At least, in the opinion of the legal writers, the selection invention would lack inventiveness. On the other hand, they admit that an invention of new qualities of alloys which is selected from inventions belonging to the state of the art may be patentable — not, however, as a product patent but as a patent for a new method, be it for the use of the alloy or the method of its making.²³

In the case where the claims are broad, the examiner will have to test whether all claimed values achieve the alloy. Arguing the patentability of a new quality of a known alloy, Hillinger²⁴ asserts that this is a mere discovery of a quality which the alloy must have had previously, so that, consequently, the invention would lack inventive step. Hillinger indicates that the practice whereby a disclaimer of limiting values to values which lie within the original range of proportion but which were not expressly referred

to in the original documents or specification would not be permissible, appears doubtful. He argues that in the case of alloys the state of the art could not be defined differently from other fields of technology: if the indication of an upper limiting value and a lower limiting value comprises all intermediate values, any intermediate value will have to be considered as sufficiently disclosed.²⁵

The *Chrome-Nickel-Alloy* decision of the Federal Supreme Court did not deal expressly with the problem of the patentability of selection inventions. However, referring to the concept of disclosure, the court stated:

In the case of alloys as well, whose ranges of proportion of ingredients are indicated by an upper and a lower limiting value, it must not be overlooked that by definition they embrace a multitude of possible variations, whereby it is a question of the individual case whether and in which manner the possible differences in the composition engender differences in the qualities.

The court concludes that in spite of such differences in degree, which may in certain cases engender a particular quality profile, all the possible different variations of the claimed invention possess one quality profile in common. In the view of the court, the same must necessarily apply for any variations formed by narrowing the originally claimed ranges, and the court finds that, accordingly, this general quality profile of the alloy will not be changed in the case where the selection invention asserts narrower ranges of proportion than the originally disclosed alloy. For this reason, it seems that the decision of the court supports the restrictive view on the patentability of selection inventions in the case of alloys.

Conclusion

The implications of the *Chrome-Nickel-Alloy* decision of the Federal Supreme Court are considerably, insofar as the concept of disclosure is concerned. The decision makes clear that the patentee may, by disclaimer, save his invention and obtain patent protection for a narrower range, if the wider range has been found to belong to the state of the art. The limitation of the scope of the claimed invention is at the discretion of the patentee, provided that the invention was disclosed in the original documents. Further, subject to the decision, the indication of limiting values in the specification of patents will disclose any intermediate values which lie within the boundaries claimed by the patent. In consequence, these intermediate values cannot be considered new, but belong to the state of the art, so that the possibility of obtaining patent protection for a selection invention of an alloy is generally limited to an invention which relates to a new process in relation to which the selected alloy is used.

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18 Müller, 'Stoffschutz für Speziallegierungen', Mitt. 1972, 189 to 190.

19 Eggert, 'Chemie-Patentrecht — kein Sonderrecht', GRUR 1972, 453 to 459, at 458.

20 Röhl, 'Zur Auswählerfindung bei Legierungserfindungen', GRUR 1972, 467 to 469, at 469.

21 Schulte, *Patentgesetz*, C. Heymanns, Cologne, 1987 (4th ed), 110 to section 1.

22 Bayer, Schwarzmaier and Zeiler, Note 7, at 211, 212.

23 Bayer, Schwarzmaier and Zeiler, Note 7, at 213.

24 Hillinger, 'Auswählerfindungen auf dem Gebiet der Legierungen', Mitt. 1972, 102 to 105, at 103.

25 Hillinger, Note 24, at 105.