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**D E C I S I O N**  
**of 24 June 1998**

**Case Number:** T 1081/96 - 3.2.3  
**Application Number:** 90304081.4  
**Publication Number:** 0393970  
**IPC:** F27D 9/00, F27D 1/18, F27D 1/12,  
F27B 14/12

**Language of the proceedings:** EN

**Title of invention:**  
Cooling of hot bodies

**Patentee:**  
Davy McKee (Stockton) Limited

**Opponent:**  
Voest-Alpine Industrieanlagenbau GmbH  
Mannesmann AG

**Headword:**  
Re-establishment/MANNESMANN

**Relevant legal provisions:**  
EPC Art. 122, 108, 56  
EPC R. 78, 83

**Keyword:**  
"Re-establishment of rights"  
"Isolated mistake"  
"All due care (yes)"  
"Inventive step (yes)"

**Decisions cited:**  
G 0001/86, J 0002/86, J 0003/86

**Catchword:**  
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Case Number: T 1081/96 - 3.2.3

**D E C I S I O N**  
of the Technical Board of Appeal 3.2.3  
of 24 June 1998

**Appellant 1:** Voest-Alpine Industrieanlagenbau GmbH  
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**Representative:** Kopecky, Helmut, Dipl.-Ing.  
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**Appellant 2:** Mannesmann AG  
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**Representative:** Meissner, Peter E., Dipl.-Ing.  
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**Respondent:** Davy McKee (Stockton) Limited  
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**Representative:** Kirk, Geoffrey Thomas  
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**Decision under appeal:** Interlocutory decision of the Opposition Division  
of the European Patent Office posted 28 October  
1996 concerning maintenance of European patent  
No. 0 393 970 in amended form.

**Composition of the Board:**

**Chairman:** C. T. Wilson  
**Members:** H. Andrä  
M. K. S. Aúz Castro

## Summary of Facts and Submissions

- I. European patent No. 0 393 970 was granted on 6 July 1994 on the basis of European patent application No. 90 304 081.4.
- II. Notices of opposition against the granted patent were filed on 6 April 1995 by Appellant 1 (Opponent 1) and by Appellant 2 (Opponent 2). They requested revocation of the patent in its entirety on the grounds that its subject-matter lacked novelty and/or inventive step with respect to the prior art reflected *inter alia* by the following documents:
- D1: WO-A-89/03011,
- D2: DE-B-2 444 613,
- D3: EP-A-0 077 448.
- III. In its decision given at the oral proceedings on 16 September 1996 and issued in writing on 28 October 1996, the Opposition Division found that the patent was to be maintained in amended form on the basis of Claims 1 to 4 and 6 to 10 received on 12 October 1995 and of Claim 5 received on 16 September 1996.

The Opposition Division was of the opinion that the subject-matter of independent Claim 1 and independent Claim 4, respectively, was novel and inventive over the cited prior art, in particular since the cited documents did not provide any pointer in the direction towards the features according to the characterising portions of Claim 1 and Claim 4, respectively.

Independent Claims 1 and 4 read as follows:

"1. A method of cooling a hot metal body (2,12) which forms part of a vessel containing molten metal in which an additional metal body (6,17) is arranged with a surface thereof substantially parallel to, and spaced from, an outer surface of the hot metal body (2,12) which is to be cooled to form a space (7,19) open to the atmosphere, a quantity of liquid coolant is atomised by a gaseous medium and is discharged in overlapping sprays (10) in the space between the two surfaces so that the entire surface to be cooled receives droplets of atomised coolant liquid, the volume of liquid coolant applied in a given time period being controlled so that it does not exceed the volume of liquid coolant which is vaporised by contact with the surface of the hot body in the given time period, characterised in that the liquid coolant sprays (10) are substantially flat and are directed in the space in directions substantially parallel with the surfaces."

"4. A vessel for containing molten metal having a metal body (2,12) which forms part of the vessel and which in use has to be cooled with liquid coolant, said metal body having an additional metal body (6,17) arranged with a surface thereof substantially parallel to, and spaced from an outer surface of the metal body to be cooled to form a space (7,19) open to the atmosphere, a plurality of nozzles (9,22) arranged to receive a gaseous medium and a liquid coolant and to discharge the liquid coolant in the form of atomised overlapping sprays (10) of coolant in the space between the two surfaces, so that the entire surface to be cooled receives droplets of atomised coolant liquid, characterised in that the nozzles (9,22) are arranged to discharge the sprays, which are substantially flat, in directions substantially parallel with the surfaces."

IV. Notices of appeal were filed against this decision by Appellant 1 on 11 December 1996 and by Appellant 2 on 23 December 1996, the appeal fees having been paid on the same respective days. The Statement of Grounds of Appeal was filed by Appellant 1 on 25 February 1997 and by Appellant 2 on 10 March 1997.

V. Following a communication of the Registry pursuant to Article 108 and Rule 65(1) EPC dated 21 March 1997 to Appellant 2 in which it was set out that it appeared from the file that a written statement setting out the grounds of appeal was not filed in due time, Appellant 2 with a letter dated and received on 21 May 1997 filed a request for re-establishment of rights under Article 122 EPC and paid the appropriate fee.

As grounds for its request Appellant 2 submitted that its representative had a strict monitoring system for all time limits which were entered manually in special books as well as recorded on the incoming relevant post itself, always without taking into consideration the ten days time limit according to Rule 78(3) EPC, this time limit being used internally as an additional safety measure in exceptional cases.

Appellant 2 filed a copy of the first page of the appealed decision on which the date of 28 December 1996 was noted as time limit for filing the appeal, and the date of 28 February 1997 for filing the Statement of Grounds.

Furthermore, it was submitted, that the representative's assistant, Mrs Heidke, was responsible for controlling the time limits concerning proceedings according to the EPC and the PCT.

She had started working with the Appellant's 2 representative's office on 1 August 1988 and was trained as a patent agent assistant (Patentanwaltsgehilfin). She passed the corresponding examination in June 1991 and has proved to be an absolutely reliable clerk in all these years. Mrs Heidke was supervised by occasional spot checks which always led to a positive result.

Nevertheless, in the case under consideration, where, because of work pressure, it was necessary to make use of the 10 days time limit she committed the genuine error of miscalculating the four months time limit for filing the Statement of Grounds of Appeal by adding the 10 days to it instead of adding them to the date of posting the decision. A copy of the relevant page of the book for time limits was filed with an entry of 6 March 1997 that the last day for filing the Statement of Grounds was 10 March 1997 ("Beschwerdebegründung: 10.03.1997 allerletzte!"). Additionally, a declaration of the assistant was submitted in which she declares that she is absolutely familiar with the calculation of time limits and cannot explain why, in the present case, she noted the wrong date as deadline for filing the Statement of Grounds of Appeal.

- VI. The other parties did not comment on Appellant's 2 request for re-establishment.
  
- VII. In a communication issued in preparation for oral proceedings, the Board expressed its provisional opinion with regard to the subject-matter of Claims 1 and 4, respectively. Further according to this communication, it seemed that the request of Appellant 2 for re-establishment of rights could be accorded.

VIII. Oral proceedings before the Board were held on 24 June 1998. During the oral proceedings, Appellant 1 submitted the document

E. Herrmann: "Handbuch des Stranggießens", Aluminium-Verlag GmbH, Düsseldorf, 1958, pages 188 and 189, setting out that this document was introduced for the purpose of presenting the common knowledge in the field of continuous casting.

IX. Appellants 1 and 2 requested that the decision under appeal be set aside and the patent be revoked.

In support of their requests for revocation of the patent, the Appellants relied essentially on the following submissions:

Appellant 1:

In the field of cooling hot metal bodies, the use of water and air for generating sprays is already known as shown in (D3), in particular page 6, or in the document "Handbuch des Stranggießens". The latter citation discloses that an intensive cooling is obtained by atomising the water such that every droplet is evaporated already during its approach to the metal body.

Reference signs 14a, b and c of (D3) designate an additional metal body which is spaced from the hot metal body and there is no difference between the additional metal body according to (D3) and that according to the invention. When cooling hot bodies by water the "Leidenfrost" phenomenon is always observed at temperatures above the boiling point of the water.

The subject-matter of Claim 1 and Claim 4 is anticipated by a combination of (D1) with (D3) and the newly introduced "Handbuch".

Appellant 2:

(D3) describes already the spraying of coolant sprays parallel to the surface of the hot metal body, the sprays being flat, and there is no water remaining on the surface to be cooled.

Taking account of the object underlying the patent in suit which consists in avoiding coolant water remaining on the surface of the body to be cooled, the teaching of (D2) has to be considered.

From (D2), column 2, line 10 it is known that liquid coolant is applied in a homogeneous distribution to the surface of the continuous casting slab whereby roaming water is to be avoided. Whenever water provided for cooling a body is atomised to form a fog no water will remain on the surface to be cooled.

Hence, the subject-matter of Claim 1 lacks an inventive step over the combination of (D1), (D2) and (D3).

- X. The Respondent (Patentee) requested that the appeal be dismissed. His arguments in support of his request can be summarized as follows:

(D1) which forms the starting point of Claim 1 of the patent in suit does not describe the application of the coolant sprays in the space between the hot metal body and the additional metal body in directions substantially parallel with the surfaces. The effect obtained by the invention is the creation of a swirling



action in the space between the two surfaces as shown by Figure 1. The combination of all the features contained in Claim 1 is required to achieve this effect.

(D3) which was cited by the Appellants to disclose an additional body spaced from the body to be cooled describes bodies 14a, b and c spaced from the casting slab which are deflectors for directing the coolant sprays on to the body to be cooled. Thus, the sprays produced are not parallel with the surfaces and cannot solve the problem of the invention. The cited passage of the newly introduced "Handbuch" discloses only that it was known to apply atomised water by means of a nozzle with a spraying angle of 40° onto a slab having a temperature of 1100°C. The disclosure does not correspond with the features of Claim 1, in particular the idea of spraying flat liquid coolant sprays into the space between the surfaces of the metal body and of an additional metal body.

Claim 1 is not, therefore, obvious from the prior art cited by the Appellants.

## **Reasons for the Decision**

### **1. Admissibility of the appeal**

#### **1.1 Appellant 1:**

The appeal of Appellant 1 is admissible.

1.2 Appellant 2:

1.2.1 Under Article 108, third sentence EPC, a written statement setting out the Grounds of Appeal must be filed within four months of the date of notification of the decision. In the present case, this period elapsed on 7 March 1997 (Rules 78(3), 83(1), (2) and (4) EPC).

1.2.2 The appeal's admissibility, therefore, depends on whether re-establishment of rights in respect of the time limit for filing the statement of grounds is allowed or not.

1.2.3 According to the wording of Article 122(1) EPC, only the applicant for or proprietor of a European patent who was unable to observe a time limit vis-à-vis the European Patent Office shall, upon application, have his rights re-established. The Enlarged Board of Appeal, however, held in its decision G 1/86 (OJ EPO 1987, 447) that an Appellant may as Opponent also have his rights re-established under Article 122 EPC if he has failed to observe the time limit for filing the Statement of Grounds of Appeal. Therefore, Article 122 EPC is applicable in the present case.

1.2.4 The application for re-establishment complies with the formal requirements of Article 122(2) EPC. The cause of non-compliance with the time limit was removed by the registrar's communication of 21 March 1997 and the application was filed on 21 May 1997 which is within the two months time limit prescribed. The omitted act, i.e. failure to file the Statement of Grounds of Appeal, had been completed one day after the expiration of the time limit for filing the Statement (the 8 and 9 March being a week-end, Rule 85(1) EPC).

1.2.5 Since, furthermore, the grounds and facts on which the application is based, have been filed within the prescribed time limit together with the payment of the fee for re-establishment, the application complies also with Article 122(3) EPC and is, therefore, admissible.

1.2.6 As to the allowability of the application, Article 122(1) EPC makes it a condition for re-establishment of rights that the person applying for re-establishment shows that "all due care required by the circumstances" was taken.

It is the established jurisprudence of the Boards of Appeal that Article 122 EPC is intended to ensure that, in appropriate cases, the loss of substantive rights does not result from an isolated procedural mistake within a normally satisfactory system (J 2 and 3/86, OJ EPO 1987, 362). In a case such as the present, a first consideration is whether the system for observing such a time limit can be shown by the party concerned to be normally satisfactory. The Board is satisfied that the monitoring system of the Appellant's representative seems to ensure a proper observance of the various time limits under the EPC and to correspond to reasonable requirements.

The representative's assistant, entrusted with noting and controlling the time limits was, according to her own declaration as well as to the representative's submissions a carefully trained and experienced person.

The fact that she had passed the examination as a patent agent assistant is sufficient to show that she was indeed familiar with all the time limits of the European Patent Convention and their calculation. To this the experience of several years of practice is to be added. Random controls of the assistant's work have never given rise to criticism.

These factors permit the Board to conclude that the miscalculation of the time limit for filing the Statement of Grounds of Appeal constitutes a single human error for which no reasonable explanation can be found.

Because of the quality of the assistant's work in general, the representative could limit his supervision to occasional spot checks, thereby fulfilling his obligation to due care. He can, therefore, not be blamed for the failure to meet the time limit concerned.

In conclusion, the Board is satisfied that the condition, that all due care required by the circumstances was taken, is met by the representative himself as well as by his assistant, with the consequence that the Appellant has to have his rights re-established.

- 1.2.7 The application for re-establishment is allowed and the statement setting out the grounds of appeal shall consequently be deemed to have been filed in time.

The appeal of Appellant 2 is also admissible.

## 2. *Amendments*

- 2.1 In Claim 1, the wording "A method of cooling a hot metal body (2, 12) which forms part of a vessel containing molten metal in which an additional metal body (6, 17) is arranged..." has been substituted for the wording of granted Claim 1 "A method of cooling a hot body (1, 12) having a surface of an additional body (6, 17) arranged..."

In Claim 4, the wording "A vessel for containing molten metal having a metal body (2, 12) which forms part of the vessel..." has been substituted for the term of granted Claim 4 "A body (1)...".

These amendments to Claims 1 and 4 are supported by page 1, paragraph 2, page 6, paragraph 1 and page 8, lines 5 to 14 of the original description and by the original Claim 6.

Claim 3 corresponds with granted Claim 3. Claims 5 to 10 correspond in substance with Claims 5 and 8 to 12 in the indicated order.

The restrictive amendments made in the claims lead to a narrower protection being conferred than in the claims as granted.

Thus, the claims comply with the requirements of Article 123(2) and (3) EPC.

2.2 The description of the patent was brought into agreement with the subject-matter now claimed. It is, therefore, suitable for maintenance of the patent in amended form.

3. *Novelty*

The novelty of the subject-matter of the independent Claims 1 and 4, respectively, can be confirmed since none of the prior art documents cited in the proceedings discloses a method of cooling a hot metal body which forms part of a vessel containing molten metal and a vessel for containing molten metal having a metal body which forms part of the vessel, the method and the vessel comprising all the features of Claims 1 and 4, respectively.

The novelty of the subject-matter of the claims on file was in fact no longer contested by the Appellants in the appeal proceedings.

4. *Inventive step*

4.1 The nearest prior art with regard to the subject-matter of Claim 1 and Claim 4, respectively, is disclosed by (D1).

The slag shedder plate (7) according to the embodiment of Figure 1 of (D1) forms an additional metal body the surface of which is substantially parallel to, and spaced from, an outer surface of the metal body to be cooled, i.e. shell section 2', to form a space open to the atmosphere. A quantity of liquid coolant is atomised and is discharged through nozzles located in the space between the shell section and the shedder plate in normal direction and overlapping relation onto the surface of the shell section such that the volume of coolant applied in a given time period does not exceed the volume of coolant which is vaporised by contact with the surface of the shell section.

Hence, Claims 1 and 4 are correctly delimited with regard to the disclosure of (D1).

4.2 The technical problem to be solved by the patent in suit is seen in reducing the number of spray nozzles required to bring about a uniform evaporation cooling as compared to the relevant prior art whilst safeguarding that no water runs off the surface being cooled into possible contact with the molten metal contained within the vessel (see column 2, lines 7 to 31 of the patent in suit).

This problem is solved by Claim 1 and Claim 4, respectively. In particular, liquid coolant sprays which are substantially flat and nozzles discharging such sprays, respectively, are provided and directed in the space substantially parallel with the surfaces. As explained in the description of the patent in suit (see column 2, lines 20 to 31 and column 4, lines 3 to 9), the features of spraying the liquid coolant in flat sprays and in the directions parallel with the surfaces of the hot metal body and the additional metal body of the vessel lead to the effect that the coolant droplets initially travel parallel to the surfaces and spread over a greater area which enables the number of nozzles used for spraying to be reduced as compared to the process and apparatus described by (D1).

- 4.3 (D3) relates to a process and an apparatus for cooling elongated hot metal stock, in particular for continuously cast steel billet or bloom castings, in which by the spraying of one or several cooling media, heat is removed and the coolant is applied by sprays extending parallel with the longitudinal axis of the metal stock. The coolant sprays are produced by nozzles 7a, 7b, 7c to which guiding devices (14a, 14b, 14c) for directing the sprays onto the surface to be cooled are associated (see page 5, paragraph 2 and Claim 9 of (D3)).

The subject-matter of the patent in suit concerns metallurgical vessels containing molten metal whereas (D3) relates to continuous casting plants, these two technical fields requiring distinct technical expertise. The designer of a cooling process or device for a metallurgical vessel will, however, basically consider suggestions made in the neighbouring technical

field of cooling equipment for continuous casting plants and will investigate whether he receives there any suggestions for solving the problem he is faced with.

The problem underlying (D3) consists in creating the conditions for an improved cooling and a simplified cooling device. In particular, the controllability of the cooling process is to be improved by homogenizing the coolant distribution on the metal surface without abrupt changes in the cooling action (see page 2, last paragraph of (D3)).

This object does not comprise the aim according to the patent in suit of reducing the number of spray nozzles required to bring about a uniform evaporation cooling whilst avoiding any contact between the coolant liquid and the molten metal. Such an aim will not come into the forefront in the continuous-casting technology firstly, since due to the relative movement between the spraying nozzles and the slab ingot the number of nozzles required for impinging the slab surface is small as compared to spraying nozzles provided on the surface of a vessel and secondly, since the surface of a slab ingot to be cooled has already solidified so far that contact of coolant with molten metal is excluded.

Thus, from the point of view of the inherent problems, the skilled person striving for possible suggestions for solving the problem underlying the patent in suit is not led to consult the disclosure of (D3).

Having regard to the solution offered by (D3), the Appellants argue that the guiding devices (14a, 14b, 14c) constitute an additional metal body enabling the sprays to travel further and in a more uniform manner than in an apparatus without such an additional body.



This argument is not convincing. When investigating the function of the known guiding devices, (D3) on page 5, paragraph 2 teaches that these devices serve the purpose of bringing the sprays to bear on the body to be cooled. This statement is confirmed by the drawing of (D3) (sheet 1/1) which shows that the sprays are concentrated by means of the guiding devices having an oblique position with regard to the surface of the body (1) to be cooled such that the sprays impinge on the surface a short distance downstream of the nozzles. Thus, contrary to the Appellants' argument, the sprays according to the disclosure of (D3) are not directed in the space in directions substantially parallel with the surfaces, that is parallel with the surface of the hot metal body and the surface of the additional metal body. The coolant droplets do not, therefore, initially travel essentially parallel to the surfaces so as to be spread over a greater area in the sense of affording a decrease in the number of nozzles required for a uniform cooling.

Hence, it follows that even if the skilled person were to combine the teachings of (D1) and (D3) for whatever reason, he would not arrive at the subject-matter of Claim 1 or of Claim 4.

4.4 The newly submitted "Handbuch des Stranggießens" reflects the common technical knowledge in the field of continuous casting. It is set out therein as indicated by Appellant 1 that an effective cooling of a bloom casting is achieved by atomising water such that every droplet is evaporated already on its approach to the metal body and that for verifying the cooling effect the atomised water was sprayed by means of an air pressurized nozzle with a spraying angle of 40° on to a slab of 5 t having a temperature of 1100°C.

The citation teaches thus that cooling a slab by atomising water whilst avoiding an intensive contact between the liquid and the surface to be cooled leads to a more effective cooling than the application of liquid coolant to the surface to be cooled which latter method would lead to the formation of an insulating layer of vapour known as the "Leidenfrost" phenomenon. However, apart from the fact that the "Handbuch des Stranggießens" does not relate to a hot metal body which forms part of a vessel containing molten metal, it also does not describe the features that the liquid coolant sprays are substantially flat and are directed in the space in directions substantially parallel with the surface of the hot metal body and the surface of an additional metal body.

Thus, also the combination of the new citation with (D1) and (D3) cannot suggest the subject-matter of Claim 1 or of Claim 4.

4.5 The above comments to the citation "Handbuch des Stranggießens" apply basically also to (D2) which tackles the problem of creating a method of and an apparatus for spraying a coolant onto a continuous casting slab whereby a homogeneous distribution of the coolant and the avoidance of the "Leidenfrost" phenomenon is to be achieved.

(D2) relates to the field of continuous castings in which due to the relative movement between the spraying nozzle(s) and the casting slab the problem of reducing the number of nozzles required for cooling the slab surface is not addressed. The skilled person striving for solutions to this problem has, therefore, no reason to take this citation into closer consideration.

Moreover, (D2) does not suggest the features according to the characterising portion of Claim 1 and Claim 4, respectively, and in particular the arrangement of an additional metal body comprising a surface which is substantially parallel to, and spaced from, an outer surface of the hot metal body to be cooled.

Hence, (D2), even in combination with the disclosure of (D3), cannot suggest to modify the relevant prior art described by (D1) such as to arrive in an obvious manner at the claimed subject-matter.

The remaining document (D4) to (D6) cited in the opposition proceedings were not discussed in the appeal proceedings. The Board is satisfied that these documents can also not jeopardize the validity of the patent in the version as amended.

- 4.6 To summarize, the Board considers that the solutions to the technical problem underlying the invention as defined in the independent Claims 1 and 4, respectively, involve an inventive step and therefore these claims as well as their respective dependent Claims 2, 3 and 5 to 10, relating to particular embodiments of the invention in accordance with Rule 29(3) EPC, are to be maintained.

**Order**

**For these reasons it is decided that:**

1. Appellant 2 is re-established in his rights with regard to missing the time limit for filing the Statement of Grounds of Appeal.
2. The appeal is dismissed.

The Registrar:



N. Maslin

The Chairman:



C. T. Wilson