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Datasheet for the decision of 11 November 2025

Case Number: T 1996/23 - 3.2.03

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Title of invention:
FURNACE ASSEMBLY FOR A METAL-MAKING PROCESS

Patent Proprietor:
ABB Schweiz AG
Tenova S.p.A.

Opponent:
DANIELI & C.
OFFICINE MECCANICHE SpA

Headword:

Relevant legal provisions:
EPC Art. 54, 56

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Novelty - main request (yes)
Inventive step - non-obvious alternative - non-obvious combination of known features - main request (yes)
Oral submissions of an accompanying person - no

Decisions cited:
G 0004/95, G 0007/93

Catchword:

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Chambres de recours

Boards of Appeal of the
European Patent Office
Richard-Reitzner-Allee 8
85540 Haar
GERMANY
Tel. +49 (0)89 2399-0

Case Number: T 1996/23 - 3.2.03

D E C I S I O N
of Technical Board of Appeal 3.2.03
of 11 November 2025

Appellant: (Patent Proprietor 1)	ABB Schweiz AG Bruggerstrasse 66 5400 Baden (CH)
Appellant: (Patent Proprietor 2)	Tenova S.p.A. Via Monte Rosa 93 20149 Milano (IT)
Representative:	Kransell & Wennborg KB P.O. Box 27834 115 93 Stockholm (SE)
Appellant: (Opponent)	DANIELI & C. OFFICINE MECCANICHE SpA Via Nazionale 41 33042 Buttrio (Udine) (IT)
Representative:	Petraz, Davide Luigi GLP S.r.l Viale Europa Unita, 171 33100 Udine (IT)
Decision under appeal:	**Interlocutory decision of the Opposition Division of the European Patent Office posted on 5 October 2023 concerning maintenance of the European Patent No. 3580512 in amended form.**

Composition of the Board:

Chairman	C. Herberhold
Members:	R. Baltanás y Jorge
	J. Hoppe

Summary of Facts and Submissions

I. European patent No. 3 580 512 B1 relates to a furnace assembly for a metal-making process.

II. An opposition was filed against the patent under Article 100(a) EPC in conjunction with Articles 54 EPC and 56 EPC.

III. The present appeal is against the interlocutory decision of the opposition division, which found that the subject-matter of the amended main request filed on 18 May 2022 was not novel over D1 whereas the first auxiliary request filed during oral proceedings met the requirements of the EPC.

This decision was appealed by the opponent and by the patent proprietor. For simplicity's sake the appellants and respondents will be referred to in the following as opponent and patent proprietor.

IV. In a communication pursuant to Article 15(1) RPBA, the Board indicated its preliminary opinion.

Oral proceedings were held on 11 November 2025.

V. Requests

The parties' requests at the end of the oral proceedings were as follows.

The patent proprietor requested that the decision under appeal be set aside and the patent be maintained in amended form on the basis of the main request filed on

18 May 2022 or, as an auxiliary measure, on the basis of one of the following auxiliary requests:

- auxiliary request 1, filed during oral proceedings before the opposition division on 8 June 2023
- auxiliary requests 2, 3, 5, 6, 7, 8, 10, 11, 12 or 13 filed on 18 May 2022 (originally labelled as 1A, 1B, 1C, 1D, 2A, 2B, 2C, 2D, 3A, and 3B)
- auxiliary requests 4 or 9 submitted on 11 May 2023 (originally labelled as 1C' and 2C')
- or on the basis of one of auxiliary requests 4a to 6a, 8a to 11a, or 13a, filed with the statement of grounds of appeal

in the order of the numbering of the auxiliary requests, with auxiliary requests 4a to 6a, 8a to 11a and 13a to be inserted after the respective auxiliary request with the corresponding number.

The opponent requested that the decision under appeal be set aside and the patent revoked.

VI. Claim 1 of the amended main request submitted on 18 May 2022 (main request in appeal) corresponds to granted claim 1. Using the numbering of its features as adopted in the contested decision, it reads as follows:

1a *A furnace assembly (1; 1-1; 1-2; 1-3; 1-4) for a metal-making process, comprising:*
an electric arc furnace (3) configured for flat bath operation
1b *and having a bottom (3a),*
1c *and an electromagnetic stirrer (5)*
1d *configured to be arranged underneath the bottom (3a) of the electric arc furnace (3)*

1e *to enable stirring of molten metal (M) in the electric arc furnace (3),*

1f *wherein a metal-charging region (11)*

1g *is located off-centre with respect to a centre point of the bottom (3a) of the electric arc furnace (3),*

1h *and wherein the electromagnetic stirrer (5) comprises coils*

1i *configured to generate a traveling magnetic wave in a first direction along a stirring direction axis,*

1j *wherein the electromagnetic stirrer (5) is configured to be arranged so relative to a central plane (7)*

1k *extending through the centre of the electric arc furnace (3)*

1l *and through a tapping hole (3b) or spout (3b) of the electric arc furnace (3)*

1m *that the stirring direction axis is at an angle (α) relative to the central plane (7),*

1n *wherein the stirring direction axis intersects the central plane.*

The only amendment to the main request with respect to the granted patent is that dependent claim 5 is now dependent on "any of claims 1-3" instead of on "any of the preceding claims".

VII. Prior art

The following documents have been cited, both in the statement setting out the grounds of appeal and during the opposition proceedings, and are relevant to this decision:

D1: JP H09 61065 A

D1a: Machine translation of D1 into English

D2: US 2014/0175715 A1

D10: RU 2 148 291 C1

D10a: Machine translation of D10 into English

D11: "ArcSave®, Innovative Solution for Higher Productivity and Lower Cost in the EAF", Lidong Teng et al., AISTech 2015 Proceedings, AIST

VIII. The patent proprietor's arguments of relevance to this decision can be summarised as follows.

(a) Main request, novelty, D1

Paragraph [0040] of the contested patent disclosed what the skilled person would have understood as a "traveling magnetic wave" within the meaning of feature 1i. Such a travelling magnetic wave required a plurality of coils fed with poly-phase low frequency AC current in order to generate a travelling magnetic field along a stirring direction axis.

Against this background and contrary to the opponent's assertion, the skilled person would not have understood the movement of the molten metal caused by the electric arc and by the static magnetic field generated by the DC electromagnets in D1 to be a "traveling magnetic wave".

The switch disclosed in paragraph [0010] of D1a was not configured to generate a travelling magnetic wave since its only application was to change the polarity of the DC electromagnets (31, 41) and the amount of current supplied to them. The skilled person would have understood that the purpose of the switch was to adjust

the deflection of the electric arc depending on the operational situation. The single magnetic field pulse possibly generated when the switch was occasionally actuated did not constitute a travelling magnetic wave.

(b) Main request, inventive step, starting from D1

The appellant's arguments based on an alleged absence of the technical effect used by the opposition division and by the patent proprietor in their reasoning (resulting, in the appellant's words, in the objective technical problem of "*how to find a more flexible process when the arc is not energized or how to improve the furnace assembly in D1 where the stirrer can work all the time*") had been filed one month before the oral proceedings and should not be admitted into the proceedings because it was late-filed.

In any case, even though the contested objective technical problem was not explicitly disclosed in the patent, it was clear to the skilled person that the metal could not be stirred in D1 in the absence of an electric arc. The skilled person knew that there were moments in furnaces configured for flat bath operation when the electric arc was switched off - namely, during tapping and before an initial charge of material (see paragraph [0002] of the contested patent) - and would realise that, due to the claimed features, stirring could also take place during such phases.

Concerning the admittance of D10 and D11, the opposition division ought not to have admitted these documents on the basis of the *prima facie* relevance criterion, since this criterion implied that the outcome of the proceedings would have been different if

the documents had been admitted, but this was ultimately not the case.

Anyway, even if D10 and D11 were taken into account, they would not prompt the skilled person to modify D1 in the direction of feature 1i. Neither D10 nor D11 discussed the objective technical problem of how to stir the molten metal when the electric arc was switched off.

Moreover, replacing the DC electromagnets (31, 41) of D1 by an AC stirrer would not be an obvious choice for two reasons. Firstly, the bottom electrode (5) of D1 represented an obstacle for it, both in terms of space and because of its interference with the generated magnetic field. Secondly, the replacement would imply that the electric arc of D1 could no longer be steered with precision due to the absence of the DC electromagnets (31, 41) provided for this purpose, which runs counter to the main aim of D1. Instead, the electric arc would oscillate back and forth with each variation of the stirring electromagnetic field.

Adding the AC stirrer to the existing arrangement of D1 would not be possible either, since the DC electromagnets with their ferromagnetic core (31, 41) rendered impossible the necessary non-magnetic window between the AC stirrer and the molten metal. Furthermore, the additional AC stirrer would have to be arranged at a substantial distance from the furnace wall in view of the presence of the DC electromagnets (31, 41). This would prevent the AC stirrer from working properly, since it needs in practice to be arranged as close as possible to the furnace wall, the stirring effect decreasing dramatically with distance.

(c) Main request, inventive step, starting from D2

The objection combining D2 alone with the common general knowledge of the skilled person was late-filed and should not be admitted into the appeal proceedings.

Furthermore, it was based on erroneous assumptions, since features 1m and 1n ("*the stirring direction axis is at an angle relative to the central plane wherein the stirring direction axis intersects the central plane*") were also distinguishing features over D2 for which no arguments were presented concerning their obviousness.

In any case, D2 did not anticipate feature 1a since the electric arc furnace shown therein lacked several necessary features for flat bath operation. One of these was a charging mechanism for charging material continuously or in small batches while the roof part was closed. Another necessary feature was a minimum volume of the furnace shell enabling the submersion of the new material into the existing bath ("hot heel") of molten metal.

Distinguishing feature 1g (off-centre metal charging region) also related to flat bath operation, all the distinguishing features together having the technical effect of improving the quality of the metal by ensuring that certain impurities came sufficiently into contact with the slag layer. The objective technical problem was thus how to produce a cleaner molten metal.

In this context, Mr Patrizio should not be allowed to speak in the oral proceedings as a technical expert for the opponent since the announcement of his presence in

the letter dated 7 October 2025 did not include the information considered necessary in G 4/95.

D2 concerned the technical problem posed and provided a different solution based on avoiding the formation of a vortex while tapping the molten metal. Other different solutions were also available for producing a cleaner molten metal, the large number of structural changes necessary for configuring the furnace of D2 for flat bath operation not being an obvious option among them.

IX. The opponent's arguments relevant to this decision can be summarised as follows.

(a) Main request, novelty, D1

Feature 1i defined coils configured to generate a travelling magnetic wave in a first direction along a stirring direction axis. The claim should be given the broadest technically sensible interpretation when assessing novelty.

According to such a broad interpretation, the "traveling magnetic wave" may correspond to the molten metal movement generated by the DC electromagnets in the furnace of D1. According to this interpretation, the indirect action of the DC electromagnets would generate a travelling magnetic wave as defined in feature 1i.

Alternatively, since the switch discussed in paragraph [0010] of D1 caused the magnetic field to vary over time when actuated, this also resulted in a travelling magnetic wave according to Maxwell's equations.

(b) Main request, inventive step, starting from D1

The only distinguishing feature of claim 1 with respect to D1 was feature 1i (travelling magnetic wave).

The objective technical problem suggested by the opposition division and the patent proprietor could not be accepted since it could not be derived from the patent by the skilled person. The alleged advantage of stirring the molten metal in the absence of an electric arc was clearly inconsistent with the definition of "flat bath operation" provided in paragraph [0002] of the contested patent, which implied continuous operation of the electric arc. The contested patent focused on stirring during the melting process and not during tapping. Therefore, even if the electric arc of a furnace configured for flat bath operation were stopped during tapping, the skilled person would find no information in the contested patent about stirring the molten metal by means of a travelling magnetic wave in the absence of an electric arc. The distinguishing feature therefore did not solve any objective technical problem and was consequently incapable of justifying the presence of an inventive step.

If the posed problem was considered to be the provision of an alternative to the stirring means of D1, the skilled person would find a solution to it in either of D10 or D11. The skilled person would replace the DC electromagnets of D1 with the AC stirrer of D10 or D11 in an obvious manner.

If the problem to be considered was that of increasing the flexibility of stirring, D10 or D11 would likewise prompt the skilled person to modify the device of D1 in the direction of feature 1i by adding an AC stirrer.

The skilled person would have no difficulty in doing so, in particular since D10 shows that the hinges of the AC stirrer allow an adaptation to the space available for its installation (see paragraph [0007] of D10a).

(c) Main request, inventive step, starting from D2

There was no reason not to admit the objection based on D2 as a starting point. This document had been in the proceedings since the beginning and was well known to the parties and to the Board.

Mr Patrizio should be allowed to speak in the oral proceedings as a technical expert in order to give a reply to the patent proprietor's argument relating to the alleged technical effect of providing a cleaner metal. His presence had been announced by letter dated 7 October 2025, sufficiently before the oral proceedings.

Concerning the substance of the objection, nothing in D2 prevented the electric arc furnace described in paragraph [0037] from being used for flat bath operation. Feature 1a was thus fulfilled. In particular, the fact that the furnace shown in D2 comprised a tapping hole and was tilted did not prevent flat bath operation, since the contested patent itself confirmed that tap-to-tap cycles were used in flat bath operation.

The only requirement for an electric arc furnace to operate in flat bath mode was that material had to be charged continuously or in small batches (see paragraph

[0002] of the contested patent). Nothing in D2 prevented this.

Even if charging had to be done without opening the roof part, a roof part being implicit in an electric arc furnace configured for flat bath operation, the skilled person knew from their common general knowledge how to introduce scrap into a furnace without opening it.

Use of the electric arc furnace of D2 for flat bath operation was therefore obvious when it came to increasing the efficiency of melting, and the skilled person was not obliged to change any furnace features of D2 since the particulars of the furnace were not disclosed in this document, the necessary modifications being thus limited to adding what was necessary for flat bath operation.

Furthermore, with respect to the technical problem brought forward by the respondent, the quality of the final metal was not credibly improved by flat bath operation. Other factors such as scrap quality were far more important for such improvement.

The only distinguishing feature was therefore feature 1g (off-centre metal-charging region), and the related objective technical problem was where to arrange the metal-charging region in the furnace of D2. The skilled person would obviously consider an off-centre location since the centre point of the bottom of an electric arc furnace was the least suitable location for charging due to the presence of the electrodes.

Reasons for the Decision

1. Main request, novelty, D1 - Article 54 EPC

1.1 Feature 1a (an electric arc furnace configured for flat bath operation)

1.1.1 Document D1 discloses a furnace assembly (see figure 1) for a metal-making process (see paragraph [0001] of D1a; all references made below to text passages in D1 will actually refer to D1a).

1.1.2 During the written proceedings, the patent proprietor contested the disclosure of feature 1a in document D1 and argued that the furnace disclosed therein was not configured for flat bath operation since it only disclosed melting scrap deposited in amounts of a size which implied use under non-flat bath conditions at least during the charging phase. The only mention of "flat" was in paragraph [0019] in the context of a situation where the electric arc is not deflected, the melt thus not being moved.

1.1.3 This is not persuasive since feature 1a only defines that the electric arc furnace is **configured** for flat bath operation, i.e. the electric arc furnace must comprise all necessary features which render it suitable for flat bath operation. This does not require a disclosure of the flat bath operation itself in D1 as long as all the features enabling this mode of operation are disclosed in the document. The patent proprietor has not cited any specific feature missing in D1 which would prevent the disclosed device from working in flat bath operating mode. The Board agrees

with the opponent and the opposition division that D1 discloses a device suitable to be used for flat bath operation in view of the presence, *inter alia*, of an off-centre scrap input port (14) through which scrap material can be fed during operation of the electric arc without opening the furnace lid (4).

1.2 Features 1b to 1h and 1j to 1n

It is not disputed that the furnace assembly of D1 discloses:

a bottom (see figures 1 and 3) (feature 1b),

and an electromagnetic stirrer (31, 41) (see paragraphs [0010] and [0016]; the molten steel is driven in a direction dependent on the electromagnetic field created by the electromagnets (31) and (41)) (feature 1c)

configured to be arranged underneath the bottom of the electric arc furnace (see figures 1 and 3) (feature 1d)

to enable stirring of molten metal in the electric arc furnace (see paragraph [0016]) (feature 1e),

wherein a metal-charging region (14) (feature 1f)

is located off-centre with respect to a centre point of the bottom of the electric arc furnace (see figures 1 to 3) (feature 1g),

and wherein the electromagnetic stirrer (31, 41) comprises coils (33, 43) (feature 1h)

configured to generate an electromagnetic field resulting in a stirring direction defining an axis (see paragraphs [0016] to [0020] and figure 2)

wherein the electromagnetic stirrer (31, 41) is configured to be arranged so relative to a central plane (see figures 1 to 3, the plane projecting on a line between steel outlet 2 and the centre at reference number 6, see also central plane 7 in figure 1 of the patent) (feature 1j)

extending through the centre of the electric arc furnace (see D1, figure 2) (feature 1k)

and through a tapping hole or spout (2) of the electric arc furnace (see D1, figure 2) (feature 1l)

that the stirring direction axis is at an angle relative to the central plane (see figure 2, direction of the combined electromagnetic force F resulting from F0 and F3) (feature 1m),

wherein the stirring direction axis intersects the central plane (see figure 2) (feature 1n).

1.3 Feature 1i (electromagnetic stirrer configured to generate a travelling magnetic wave)

1.3.1 The opposition division considered that D1 anticipated feature 1i since the coils (33, 43) "*participate to the movement of the molten metal*".

1.3.2 This is not persuasive since the fact that a movement is induced in the molten metal by an electromagnetic field (in D1: indirectly via deflection of the electric arc) does not imply that a **travelling magnetic wave** is

generated by the electromagnetic stirrer. Document D1 discloses two electromagnets (31, 41) comprising coils (33, 43) connected to **DC** power supplies (34, 44) (see paragraph [0010], second sentence). Although the polarity and the amount of supply current are variable (see paragraph [0010], third sentence) such that the direction and magnitude of the combined electromagnetic force can be changed (see paragraph [0018]), as argued by the opposition division in point II.1.1 of the decision, this would not generate a travelling magnetic wave within the meaning of claim 1. The skilled person understands that the adjustment disclosed in D1 consists of occasional variations in polarity and/or current flow which would not generate what is commonly understood as a travelling wave or field but would simply change a static magnetic field into a different, again static, field better suited to the working conditions at that specific point of time.

1.3.3 The opponent argued that the magnetic field generated by the DC electromagnets (31, 41) generated a force which was suitable for moving the molten metal in a given direction as in the contested patent, feature 1i thus being disclosed in D1 since the claim had to be interpreted in the broadest possible manner and the movement of the molten metal could be interpreted as a "traveling magnetic wave".

1.3.4 This is not persuasive since the term "traveling magnetic wave" has a well-defined meaning for the skilled person. A prerequisite for the generation of a travelling magnetic wave is that the electromagnetic field varies over time in a regular manner in order to generate such a wave. This is not the case for static electromagnetic fields and also not the case for a "wave" of moving molten metal.

1.3.5 Concerning the arguments of the opponent relating to the presence of a switch in D1, the only capability described in paragraph [0010] is that of varying "*the polarity (positive / negative) and the amount of supply current*". This is described within the context of the discussion of the DC power supply devices (34, 44) for the DC electromagnets (31, 41). Paragraph [0018] explains that "[b]*y adjusting the polarity and amount of direct current supplied to the DC electromagnets 31 and 41 in this way, the direction and magnitude of the combined electromagnetic force F can be freely changed, and the arc 51 can be moved in a desired direction in a desired amount. The scrap S can be efficiently melted in a short time with no unmelted residue by deflecting only the amount*".

1.3.6 The skilled person would understand from this information that the switch is configured to be actuated occasionally in order to steer the electric arc in a desired direction which is to be maintained for some time in order to ensure the success of the melting process. The variation in the magnetic field created by such occasional actuation of the switch may generate a short spike in a magnetic field, but does not represent a travelling magnetic field or wave within the meaning of claim 1 (see point 1.3.4 above). In other words, D1 does not clearly and unambiguously disclose a switch suitable to be actuated in a manner which would result in the generation of a travelling magnetic wave (i.e. configured for this purpose).

1.4 Conclusion

The subject-matter of claim 1 differs from D1 in feature 1i (travelling magnetic wave).

2. Main request, inventive step - Article 56 EPC

2.1 Admittance of D10 and D11

2.1.1 The opposition division applied the *prima facie* relevance criterion when deciding on the admittance of D10 and D11 (see point II.2 of the contested decision), which is an appropriate criterion in the case of late-filed documents according to well-established case law.

2.1.2 The patent proprietor has not suggested that the opposition division exercised its discretion in accordance with the wrong principles, without taking the right principles into account or in an arbitrary or unreasonable way, thereby exceeding the proper limits of its discretion, these being the criteria which could justify a board overruling the way in which the opposition division exercised its discretion (see Case Law of the Boards of Appeal, 11th edition, V.A. 3.4.1.b), in particular G 7/93, r. 2.6).

2.1.3 In the absence of any apparent error in the exercise of discretion, documents D10 and D11 - admitted by the opposition division - were part of the opposition proceedings, and are thus not an amendment within the meaning of Article 12(4) RPBA. They thus form part of the appeal proceedings.

2.2 Starting from D1

2.2.1 The opponent argued as a first line of attack that no objective technical problem could be identified with respect to D1, in particular since claim 1 did not define stirring when the electric arc was off or any correlation between the position of the metal charging

position and the stirring direction axis. According to the opponent, the objective technical problem suggested by the opposition division in the contested decision and argued by the patent proprietor (in the appellant's words, "how to find a more flexible process when the arc is not energized") was not derivable from the patent application, such that a technical problem could not be said to be solved by the distinguishing feature. The distinguishing feature could therefore not justify the inventive character of the claim.

2.2.2 This is not persuasive since the generation of a travelling magnetic wave as defined in feature 1i is a technical feature which implies a technical effect, namely the generation of forces in the molten metal inducing movements of the molten metal in the furnace. As acknowledged by the opponent in the context of the magnetic stirrer disclosed in D10, see the three paragraphs directly below the figure on page 7 in its reply dated 19 June 2024, the skilled person is familiar with this technical effect since it is due to the generation of eddy currents in the molten metal which create electromagnetic forces setting the molten metal in motion (see e.g. paragraph [0011] of D10a). As a technical effect is factually present, it cannot be considered that no objective technical problem at all can be taken into consideration to such an extent as to render the distinguishing features obvious for this reason alone.

2.2.3 Since this attack is not persuasive, there is no need to discuss its admittance as requested by the patent proprietor.

2.2.4 Alternatively, the opponent has considered two possible objective technical problems in relation to the

distinguishing feature 1i ("[coils] *configured to generate a traveling magnetic wave in a first direction along a stirring direction axis*"). These are discussed in points 2.2.5 to 2.2.8 and 2.2.9 to 2.2.10 below.

However, even if these problems are taken into consideration and the person skilled in the art takes account of the teaching of documents D10 and D11, the raised objections will not be persuasive for the following reasons.

2.2.5 The opponent suggested that if the posed problem was the provision of an alternative to the stirring means of D1, the skilled person would find a solution to it in either of D10 or D11, and would consequently replace the DC electromagnets (31, 41) of D1 with the AC stirrer of D10 or D11 in an obvious manner, such an AC stirrer generating a travelling magnetic wave as defined in feature 1i.

2.2.6 This is not persuasive for two reasons.

2.2.7 Firstly, as argued by the patent proprietor, the skilled person would note that the bottom electrode (5) of D1 would interfere with the magnetic field generated by an AC stirrer as disclosed in D10 or D11, thus casting doubt on the efficiency of the stirring.

2.2.8 Secondly, D1 discloses a solution focusing on deflecting the electric arc (51) in a desired direction in order to set the molten metal in desired motion, **all this** by means of the application of a static magnetic field created by the DC electromagnets (31, 41) (see paragraphs [0016] and [0017]). The skilled person would not replace the DC electromagnets (31, 41) (see paragraph [0010]) providing the necessary static

magnetic field which allows the desired deflection of the electric arc (51) in a controlled manner with AC electromagnets generating a travelling magnetic wave, since the latter would result in a variable magnetic field which is at odds with the essential concept of D1 of accurately controlling the position of the electric arc (51). Thus, although the solution to the posed problem based on providing AC stirrers generating a travelling magnetic wave may be known from D10 or D11, the application of this teaching is incompatible with the technical function explicitly disclosed in D1.

2.2.9 The opponent further argued that if the posed problem were to increase the flexibility of stirring, D10 or D11 would prompt the skilled person to modify the device of D1 in the direction of feature 1i by adding an AC stirrer. The skilled person would have no difficulty doing so since D10 in particular teaches that the hinges of the AC stirrer allow an adaptation to the space available for its installation (see paragraph [0007] of D10a).

2.2.10 This is not persuasive since major modifications would be necessary in order to arrange an AC stirrer as disclosed in D10 or D11 in the furnace of D1. Both D10 (see figures 1 and 2) and D11 (see page 1967, first paragraph and figure 1) disclose that the electromagnetic stirrer has to be installed under the bottom of the furnace, precisely where the DC electromagnets (31, 41) and the bottom electrode (5) system is installed in D1 (see figure 1). Since the skilled person knows that the effect of the electromagnetic field decreases when the distance to the molten metal is increased, they would not contemplate adding a further electromagnetic stirrer according to D10 or D11 below the DC electromagnets of

D1 (31, 41). Furthermore, as argued by the patent proprietor, the skilled person would note that the ferromagnetic core of the DC electromagnets of D1 (31, 41) would interfere with the electromagnetic field generated by an AC stirrer arranged below, such that the control of the AC stirrer would need to be considerably adapted. Finally, the hinges (7) of D10 are simply shown as suitable for ensuring that the shape of the AC stirrer follows the external contour of the furnace shell (see figures 1 and 2). This is different from using these hinges for adaptation of the AC stirrer to an undefined "available space" for it under the furnace of D1. Contrary to the opponent's arguments in this respect, the skilled person would find no teaching in D10 as to how to perform such an adaptation.

2.3 Starting from D2

2.3.1 Undisputed features

The patent proprietor does not dispute that D2 discloses an electric arc furnace (see paragraph [0037], second sentence) comprising the following features:

a bottom (13) (feature 1b),

and an electromagnetic stirrer (5) (feature 1c)

configured to be arranged underneath the bottom (13) of the electric arc furnace (see figures 1 and 3) (feature 1d)

to enable stirring of molten metal in the electric arc furnace (during tapping or meltdown, see figure 3 and paragraph [0049]) (feature 1e),

wherein a metal-charging region is present (implicit, since the furnace must be charged with scrap material) (feature 1f)

and wherein the electromagnetic stirrer (5) comprises coils (6) (feature 1h)

configured to generate a travelling magnetic wave (see paragraph [0047], "time-varying electromagnetic field") in a first direction along a stirring direction axis (feature 1i),

wherein the electromagnetic stirrer (5) is configured to be arranged relative to a central plane (i.e. any plane passing through the centre point (C)) (feature 1j)

extending through the centre of the electric arc furnace (C) (feature 1k)

and through a tapping hole (17) of the electric arc furnace (see figures 1 to 3) (feature 1l).

2.3.2 Features 1a (electric arc furnace configured for flat bath operation) and 1g (metal-charging region located off-centre with respect to a centre point of the bottom of the electric arc furnace)

The opponent argued that nothing in D2 prevented the electric arc furnace described in paragraph [0037] from being configured for flat bath operation. The fact that the furnace shown in D2 comprised a tapping hole and

was tilted did not prevent flat bath operation, since the contested patent itself confirmed that tap-to-tap cycles were present in furnaces configured for such operation.

The Board acknowledges that the contested patent itself discloses that a furnace working in flat bath operating mode is tilted and tapped (at least down to a remaining hot heel; concerning tapping, see e.g. paragraph [0015]; concerning tilting, see sentence bridging columns 4 and 5). Therefore, these capabilities of the D2 device would be no obstacle to flat bath operation nor a clear hint not to operate in flat bath mode.

However, the fact that the electric arc furnace shown in D2 does not comprise features incompatible with flat bath operation does not mean that this document shows an electric arc furnace configured for flat bath operation. Direct and unambiguous disclosure of an electric arc furnace comprising all the necessary features for flat bath operation is required if feature 1a is to be considered to be anticipated. This is not true of the electric arc furnace shown in D2.

Even though it can be accepted that an electric arc furnace typically comprises a roof part closing the furnace during operation, D2 shows no details relating to this roof part or to how material is charged into such an undefined electric arc furnace, i.e. whether or not the furnace is opened (with the electrodes removed) for charging, whether the metal-charging means are configured for supplying metal continuously or in small buckets or how large is the furnace's volume, these being decisive features when it comes to whether or not the furnace is suitable for flat bath operation.

Thus, the subject-matter of claim 1 differs from D2 at least in that the electric arc furnace is configured for flat bath operation (feature 1a) and, as the opponent does not dispute, in that the metal-charging region is located off-centre with respect to a centre point of the bottom of the electric arc furnace (feature 1g).

2.3.3 Features 1m and 1n ("*the stirring direction axis is at an angle relative to the central plane, wherein the stirring direction axis intersects the central plane*")

The Board will preliminarily assume for the sake of discussion that D2 does reveal features 1m and 1n, since this cannot change the fate of the objection as explained below.

2.3.4 Requested oral submissions by Mr Patrizio - G 4/95

The opponent announced by letter dated 7 October 2025 that "*in addition to the authorized representatives of the Opponent* [..] *Mr. Damiano Patrizio from the Opponent's Company will also attend to provide technical support.*"

During oral proceedings, the attorney requested that Mr Patrizio be allowed to make oral submissions. The proprietor requested that he not be allowed to speak, as the established requirements for submissions by accompanying persons were not fulfilled.

The Enlarged Board of Appeal decided in G 4/95 the conditions under which a person accompanying the professional representative of a party may be allowed to make oral submissions on specific legal or technical issues on behalf of that party. Such oral submissions

cannot be made as a matter of right, but only with the permission of and at the discretion of the EPO (see G 4/95, Headnote, II.(a)).

According to G 4/95, the following main criteria should be considered by the EPO when exercising its discretion to allow the making of oral submissions by an accompanying person in opposition or opposition appeal proceedings (see G 4 /95, Headnote II.(b)).

- The professional representative should request permission for such oral submissions to be made.

- The request should state the name and qualifications of the accompanying person, and should specify the subject-matter of the proposed oral submissions.

- The request should be made sufficiently in advance of the oral proceedings so that all opposing parties are able properly to prepare themselves in relation to the proposed oral submissions.

- A request which is made shortly before or at the oral proceedings should in the absence of exceptional circumstances be refused, unless each opposing party agrees to the making of the oral submissions requested.

It is uncontested that the letter dated 7 October 2025 did not request permission for Mr Patrizio to make any oral submissions, did not include the qualifications of Mr Patrizio and did not specify the subject-matter of any proposed oral submissions.

The requirements as set out in decision G 4/95 serve to protect the legitimate interest of one party in preparing for oral submissions from a person accompanying the other party who is proposed for the purpose of providing specific expertise, so as to be able to respond to and counter the orally presented arguments of such a technical expert adequately and possibly to bring its own technical expert for support. Moreover, direct representation by a professional representative also serves to permit efficient and effective conduct of the proceedings (see G 4/95, reasons 6) even if the Board offers to allow the representative to consult the accompanying person.

Furthermore, the Board notes that the alleged technical effect of obtaining a cleaner metal, i.e. the subject on which Mr Patrizio was supposed to make submissions, had already been argued by the patent proprietor in its reply to the opponent's statement of grounds of appeal (see point 3.2 of the reply, second paragraph). This argument thus did not come as a surprise to the opponent only during the oral proceedings before the Board. Hence, the opponent could already have presented the relevant arguments in this respect in writing.

Since the patent proprietor explicitly disagreed with Mr Patrizio making oral submissions, in the absence of exceptional circumstances, the Board exercised its discretion to refuse the request for Mr Patrizio to make oral submissions during the oral proceedings in accordance with G 4/95, HN II, (iii). As a side note, the Board notes that the opponent's representative was able to consult its technical expert Mr Patrizio because the Chairman interrupted the oral proceedings to allow such communication. After the break, the representative himself brought forward the technical

arguments gathered in the consultation with Mr Patrizio. Hence, the opponent did not suffer any disadvantage from the Board's decision.

2.3.5 Technical effect of distinguishing features 1a, 1g

For the sake of discussion, the Board will take account of the objective technical problem suggested by the opponent, namely that of increasing the efficiency of melting, in order to show that the objection cannot succeed even if this were accepted to be the objective technical problem.

The further technical problem brought forward by the opponent, namely "where to put the metal charging region", is not convincing because it takes no account of distinguishing feature 1a.

2.3.6 Obviousness of distinguishing features 1a, 1g

The opponent argued that using/adapting the electric arc furnace of D2 for flat bath operation was an obvious way to solve the problem of increasing the efficiency of melting, in particular since the skilled person did not have to change any furnace features, the necessary modifications being limited to adding what was necessary for flat bath operation.

This is not persuasive since it ignores the fact that the features (of which there are several) which would have to be provided or modified in the undefined electric arc furnace of D2 actually constitute major modifications to an electric arc furnace, details of which are only revealed in a vague manner.

Indeed, although "being configured for flat bath operation" appears to be only a single feature of the claim (namely feature 1a), it actually involves, as discussed in point 2.3.2 above, a particular furnace roof design, an off-centre (see feature 1g) charging system with suitable control means and associated ladle requirements. All this would need to be provided, starting from D2, simply from the alleged, abstract common general knowledge of the skilled person.

Firstly, such modifications exceed what can be expected of a skilled person as a routine modification based on common general knowledge alone.

Secondly, such an approach ignores the fact that the choice of closest prior art defines the framework for further development, i.e. the development is bound by the particular type of starting point chosen. If a conventional electric arc furnace is chosen as the starting point (i.e. one not configured for flat bath operation, which has to be assumed here, as flat bath operation is not directly and unambiguously disclosed in paragraph [0037] of D2), the further development is within the bounds of such a conventional furnace. A change of furnace type during the further development of a consciously chosen type to another type (such as from a conventionally operated electric arc furnace to a flat bath operated electric arc furnace), which other type was previously known but had not been chosen as the starting point, and which further development requires major modifications, can then only be seen as the result of an *ex post facto* analysis (Case law of the Boards of Appeal, 11th edition, I.D.3.9).

Thirdly, the combination with such abstract undefined common general knowledge ("flat bath operation of

electric arc furnaces being known to the person skilled in the art") does not allow a judgement to be made as to whether the necessary modifications of the D2 device would encounter technical obstacles, such as e.g. identified by the opposition division with respect to the integration of features from D1 into D2 (see penultimate paragraph on page 5 of the impugned decision, see also point 2.2.6-2.2.8 and 2.2.10 above). It thus cannot be assumed that the person skilled in the art not only could but would have made the alleged modifications.

2.3.7 Consequently, even if the suggested objection combining D2 alone with the common general knowledge of the skilled person is taken into account, the subject-matter of claim 1 still involves an inventive step. There is thus no need to take a decision about the admittance of this objection as requested by the patent proprietor.

2.4 Conclusion

None of the objections raised by the appellant cast doubt on the inventive step of the subject-matter of claim 1 of the main request (Article 56 EPC).

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the opposition division with the order to maintain the patent in amended form based on the following documents:

   - claims 1 to 11 of the main request, filed on 18 May 2022
   - description and figures as granted

The Registrar: The Chairman:

C. Spira C. Herberhold

Decision electronically authenticated