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**Datasheet for the decision
of 28 November 2024**

Case Number: T 0136/22 - 3.2.03

Application Number: 09823927.0

Publication Number: 2361135

IPC: F23C10/28, F23J7/00, F23C10/18,
C01B33/40

Language of the proceedings: EN

Title of invention:
METHODS FOR OPERATING A FURNACE

Patent Proprietor:
Kentucky-Tennessee Clay Co.

Opponent:
Sumitomo SHI FW Energia Oy

Headword:

Relevant legal provisions:
EPC Art. 100(c), 54, 56
RPBA 2020 Art. 12(4), 12(6)

Keyword:

Novelty - (yes)

Inventive step - (yes)

Amendment to appeal case - taken into account (no)

Late-filed facts - admitted in first-instance proceedings (no)

Late-filed objection - admitted in first-instance proceedings
(no)

Decisions cited:

T 0928/20, G 0002/10

Catchword:



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Case Number: T 0136/22 - 3.2.03

D E C I S I O N
of Technical Board of Appeal 3.2.03
of 28 November 2024

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Decision under appeal: **Decision of the Opposition Division of the
European Patent Office posted on 18 November
2021 rejecting the opposition filed against
European patent No. 2361135 pursuant to Article
101(2) EPC.**

Composition of the Board:

Chairman B. Miller
Members: B. Goers
N. Obrovski

Summary of Facts and Submissions

- I. European patent No. 2 361 135 relates to a method for combusting fuel in the presence of calcium carbonate.
- II. The opposition division decided to reject the opposition against the patent.

This decision was appealed by the opponent ("appellant").

- III. During oral proceedings before the Board, the parties' final requests were as follows.

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

The patent proprietor ("respondent") requested that the appeal be dismissed (main request), or, as an auxiliary measure, that the patent be maintained as amended according to one of auxiliary requests 1 and 2 filed with the reply to the statement of grounds of appeal.

- IV. The following documents are referred to in this decision.

A1 WO 2010/051018 A1 (publication of the patent's application as filed)

D3: Encyclopedia Britannica, Inc., "Fuller's earth" 19.09.2016, [cited 22.11.2019] Available from: [https://britannica.com/science/fullers- earth]

D5: "Mineralogical, geochemical and physico-chemical characterisation of compact clays", Internal Report IR/04/155, British Geological Survey,

Keyworth Nottingham, published 2004

- D6: US 4,387,653
- D7: "Attagel Rheology modifiers", BASF Corporation, 2007
- D8: Öhman et al., "Effect of Kaolin and Limestone Addition on Slag Formation during Combustion of Wood Fuels" Energy & Fuels 18, 2004, 1370-1376
- D9: "Steam, its generation and use", 41st edition, The Babcock & Wilcox Company, 2005
- D11: Davidsson et al., "Kaolin Addition during Biomass Combustion in a 35 MW Circulating Fluidized-Bed Boiler" Energy & Fuels 21, June 2007, 1959-1966
- D12: Intrafill C, Imerys Minerals Ltd., Product Bulletin PB 157, April 2000
- D19: DD 250 568 A1
- D21: EP 0 338 103 B1
- D27: Encyclopedia Britannica, "Encyclopedia Britannica Article history entries of the Fuller's earth page and web.archive.org record of "<https://www.britannica.com/science/fullers-earth>" as of 12 July 2015
- D32: Respondent's letter dated 27 August 2013 relating to the examination procedure
- D33: Respondent's letter dated 11 August 2016 relating to the examination procedure
- D34: Intrafill C Powder, Imerys Minerals Ltd., Product specification PS157(p), April 2000
- D36: WO 2006/037213 A1

V. Claim 1 of the main request - the patent as granted - reads as follows (with feature labelling added in "[]", amendments compared with claim 1 as originally filed marked in bold and strike-through):

"A method for combusting fuel in the presence of ~~an alkali-containing material~~ **calcium carbonate**, the method comprising:

[a] introducing fuel and calcium carbonate into a furnace configured to combust the fuel;

[b] introducing hydrous clay having a moisture content of at least 5% by weight **to 15% by weight** into the furnace and

[c] **wherein the hydrous clay comprises kaolinite;**

[d] and heating at least a portion of the fuel, calcium carbonate, and hydrous clay, such that at least a portion of the hydrous clay is at least partially calcined and the at least partially calcined clay adsorbs at least a portion of alkali present in the furnace;

[e] **wherein said portion of alkali is released as a result of heating the portion of fuel and/or calcium carbonate."**

VI. The appellant's arguments, where relevant to the present decision, can be summarised as follows.

(a) Main request - Article 100(c) EPC

The subject-matter of granted claims 1, 9 to 11 and 14 and the description, paragraphs [0016] and [0023], extended beyond the content of the application as filed. The combination of the kaolinite and the moisture content range of the hydrous clay was an undisclosed combination resulting from a selection from two lists. Furthermore, as a result of specifying kaolinite as a compulsory component in the description, kaolinite was disclaimed from further hydrous clays listed here, contrary to the original disclosure.

(b) Main request - novelty

The subject-matter of claim 1 was not novel in view of the disclosure of D6 or D11. D6 disclosed the use of hydrous clay in the form of agglomerates and in the claimed moisture content range. D11 disclosed a powder kaolin additive having the same particle size distribution as the commercial product described in D12, which falls within the claimed range. D34 related to a kaolin having a different particle size distribution. Calcium carbonate was implicitly present in the process of D11 in the fuel feedstock as well as in the fly ash recirculated back into the furnace.

(c) Main request - admittance of objections

The objections relating to a lack of inventive step based on D6 and D36 should be admitted into the appeal proceedings since they were *prima facie* relevant. The opposition division erred when exercising its discretion not to admit D36.

(d) Main request - inventive step

The subject-matter of claim 1 did not involve an inventive step starting from D11. The selection of the moisture content range had no proven effect, in particular as D11 already taught that the efficiency of the boiler could be improved by adding kaolinite. The example in the patent did not show the effect of selecting the claimed moisture content range. Moreover, the example was not in line with claim 1 as calcium carbonate was not used as feedstock. D35 was not relevant as it did not disclose a hydrous clay comprising kaolinite. Furthermore, it was obvious to the skilled person that the residence time of the

hydrous clay in the furnace could be increased by providing it in an agglomerated form. This was evident from common general knowledge as well as from the teachings of D6, D8, D9, D12, D21, D19 and D34, for example.

VII. The respondent's arguments, where relevant to the present decision, can be summarised as follows.

(a) Main request - Article 100 (c) EPC

The subject-matter of granted claims 1, 9 to 11 and 14 and of the description, paragraphs [0016] and [0023], did not extend beyond the content of the application as filed.

(b) Main request - novelty

The novelty objection based on D11 was an amendment and should not be admitted into the appeal proceedings. The subject-matter of claim 1 was also novel in view of the disclosure of D6 or D11. D6 did not disclose directly and unambiguously that the hydrous clay comprised kaolinite. The moisture content of the formed agglomerates when introduced into the furnace was not disclosed in D6 either. D11 disclosed a powder kaolin additive for which the moisture content was not disclosed; it was not even implicitly disclosed by referring to a fine powder under the product name Intrafill C. D11 did not provide any disclosure that the Intrafill C product was according to D12. Since in the process of D11 the kaolin was added as a fine powder it was more likely that a product such as that in D34 was used. Furthermore, D11 did not disclose calcium carbonate as a feedstock component in addition to the fuel.

(c) Main request - admittance of objections

The objections relating to a lack of inventive step based on D6 and D36 should not be admitted into the appeal proceedings since they were late filed and were not *prima facie* relevant. The opposition division correctly exercised its discretion not to admit D36.

(d) Main request - inventive step

The subject-matter of claim 1 involved an inventive step starting from D11. The objective technical problem was to increase the residence time of the hydrous clay in the furnace. However, the skilled person would not have an incentive to deviate from the powder form of the kaolin in D11 in favour of an agglomerated form as implied by the claimed moisture content range. In particular, the skilled person would chose the product of D34, which was also a powder form, thereby avoiding to introduce additional water to be evaporated into the furnace. There was no indication in the prior art of the effect of the claimed moisture content range with respect to residence times.

Reasons for the Decision

1. Article 100(c) EPC

The subject-matter of the main request does not extend beyond the content of the application as filed (in this regard reference is made to the application as published, document A1, in line with the submissions of the parties).

1.1 The following arguments with respect to the alleged unallowable extension were raised by the appellant:

- (a) Claim 1 was an undisclosed singled-out combination based on a selection from multiple lists.
- (b) The amendments to paragraph [0016] of the description constitute an extension of the subject-matter.
- (c) The amendments to paragraph [0023] of the description constitute an extension of the subject-matter.
- (d) Claims 9 to 11 and 14 were not originally disclosed in combination with the features of claim 1.

However, none of these arguments are considered persuasive for the following reasons.

1.2 Argument (a): subject-matter of claim 1

1.2.1 The originally filed claim 1 was amended with respect to features [b], [c] and [e]. The original claims do not comprise a combination of these features. However, this combination is directly and unambiguously derivable for a skilled person, using their common

general knowledge and seen objectively and relative to the date of filing, from the entirety of the application documents as filed ("gold standard"; see Case Law of the Boards of Appeal, 10th edition, 2022, II.E.1.3.1), as is explained in the following.

The conclusion in the appealed decision that "no new technical information [...] has been added to claim 1" does not - contrary to the appellant's view - contradict this approach (see also G 2/10, Reasons 4.5.1) as there is a uniform concept of disclosure with respect to Articles 54, 87 and 123 EPC (see G 2/10, Reasons 4.6).

Contrary to the appellant's view, the assessment of added subject-matter is only based on the content of the application documents and the common general knowledge at the date of filings. The respondent's interpretations in its letters, D32 and D33, are not binding for the understanding of the content of the application as filed.

1.2.2 Feature [e] does not constitute added subject-matter.

Feature [e] states that alkali is released when the fuel and/or the calcium carbonate are heated. In the combustion process, the fed calcium carbonate can be calcined to calcium oxide. In addition, further alkalines that have been part of the fuel feedstock are released or created during the combustion. The fact that feature [e] refers only to "heating" and not to "combustion" as in paragraph [0021] does not constitute an unallowable intermediate generalisation since claim 1 as such is directed to a combustion process.

Moreover, feature [e] is not inextricably linked to the type of adsorbent used for its removal. The presence of the alkaline is the technical reason to provide (in general) a calcined hydrous clay as an adsorbent for alkaline species. This is originally disclosed in paragraphs [0010] and [0021] and is not interrelated with the specification of the hydrous clay supplied to the furnace according to features [b] and [c].

- 1.2.3 The Board is of the opinion that the combination of features [b] and [c] does not constitute added subject-matter either.

Features [b] (moisture content of 5 to 15% by weight) and [c] (the hydrous clay comprising kaolinite) were disclosed in original claims 2 and 7, respectively. However, both claims refer back to original claim 1 only. Therefore, the combination of the features in current claim 1 can only have a basis in the originally filed description.

The argument of the appellant that features [b] and [c] relate to different alternatives selected from different lists is not convincing. The skilled person reading the originally filed application will not understand that there is one embodiment, in which the moisture content is 5 to 15% and another distinct embodiment in which the clay comprises kaolinite.

Paragraphs [0022] and [0036] of A1 disclose the claimed moisture content of hydrous clays to be used in the invention in general.

In the introductory part of the application as filed it is stated that combustion processes in the prior art use "highly processed fine powder kaolin" which has the

required alkaline adsorption properties, but involves a significant loss of the kaolin with the fly ash. Although the adsorbents to be used were originally more broadly defined, it is apparent from the application as filed that kaolin is a particularly useful hydrous clay.

Moreover, the sole example originally disclosed, on page 14, uses a hydrous clay containing kaolinite which has a moisture content of 8 to 12%.

To summarise, the skilled person will understand from the application as filed that hydrous clays with a certain moisture content are preferred, one embodiment of which being clays containing kaolinite, and that such a clay is disclosed as an embodiment of the general method defined in claim 1 as originally filed.

1.2.4 The appellant also argues that the combination of features of claim 1 "factually [...] have resulted in undisclosed disclaimers" (page 5, first paragraph of the statement of grounds of appeal). Since the claim wording does not contain a disclaimer and the appellant did not explain what was allegedly disclaimed, the Board is not convinced by this argument.

1.3 Argument (b): paragraph [0016] of the description

The amendment in paragraph [0016] of A1 reflects the amended wording of claim 1. Therefore, the previous conclusions with respect to claim 1 apply *mutatis mutandis*.

1.4 Argument (c): paragraph [0023] of the description

The original paragraph [0025] discloses a list of possible hydrous clays. This list comprises kaolinite as one possible hydrous clay. According to the statement in this paragraph, one or more hydrous clays from this list can be selected.

According to the patent as granted, kaolinite is a compulsory component, and the Board does not consider the reformulation of paragraph [0023] to result in an extension of the subject-matter. Contrary to the appellant's view, despite being defined as compulsory compound, kaolinite is not disclaimed as comprised by any of the optional further hydrous clays such as "lump clay", i.e. it is not the case that kaolinite is no longer included in the list of optional further hydrous clays.

1.5 Argument (d): claims 9 to 11 and 14

Claims 9 to 11 and 14 relate to general aspects of the operation of the furnace (combining of feedstock components, furnace type) or of the hydrous clay feedstock (agglomerate size). These aspects are originally not disclosed as being interrelated with the selection of kaolinite. The skilled person will understand from the application as filed that the pre-mixing step (claim 13 of A1), the type of combustion system (claims 14 and 15 of A1), and the size of the agglomerates (claim 18 of A1) apply to each type of hydrous clay disclosed, in particular a hydrous clay with the moisture content range according to claim 1 (see also A1, paragraphs [022] and [024]).

2. Main request - novelty

The subject-matter of claim 1 is novel.

In its statement setting out the grounds of appeal, the appellant raised novelty objections based on D6 and D11.

2.1 Novelty objection based on D11

In the opposition proceedings, D11 was used by the appellant only as a starting point for an inventive-step objection.

As explained below in the context of the Board's assessment of this inventive-step objection (see point 3.3), the subject-matter of claim 1 has distinguishing features over the disclosure of D11 and is therefore novel.

The respondent's request that the novelty objection based on D11 not be admitted into the appeal proceedings can thus be left undecided.

2.2 Novelty over the disclosure of D6

A combination of features [b] (moisture content between 5 and 15%) and [c] (the hydrous clay comprises kaolinite) is not disclosed in D6, neither explicitly nor implicitly.

2.2.1 D6 discloses a list of possible cementitious binders to form limestone agglomerates (see column 5, lines 18 to 29: "gel-forming grades of sepiolite and smectite clays, e.g. bentonite, montmorillonite, hectorite and the like"), which can comprise kaolinite (such as the

bentonite, for example). In this general context, the moisture content of the clay is not disclosed.

- 2.2.2 In D6, the main embodiment of a cementitious binder is the product "Attagel", which is derived from Georgia-Florida fuller's earth (D6, column 5, lines 18 to 22), which is an attapulgite clay.

While a moisture content is mentioned in D6 for attapulgite (14 to 16%, see column 7, lines 5 to 16), this disclosure does not anticipate feature [c], which defines the moisture content of the clay fed to the furnace. In D6, the moisture content of 14 to 16% of the attapulgite clay was determined before the agglomerates were wetted with water and optionally dried (column 5, line 44, to column 6, line 19) before being fed to the furnace. The moisture content of the hydrous clay in accordance with feature [c] is thus not disclosed in D6.

- 2.2.3 Furthermore, it has not been established that the product Attagel used in D6 comprises kaolinite. As explained in D7, the product Attagel is "made from specially processed attapulgite, a hydrated magnesium aluminosilicate and a principal member of the fuller's earth family of clay minerals", i.e. Attagel is not simply unprocessed fuller's earth. According to D3 or D27, fuller's earth is a natural product which can comprise, besides montmorillonite as the main component, various other hydrous clay species (kaolinite, attapulgite, palygorskite). However, as also concluded in the appealed decision, not every sample of the natural product fuller's earth necessarily comprises kaolinite (see, for example, D5, Table 2). Therefore, the reference to Attagel or

fuller's earth in D6 does not implicitly disclose feature [b], let alone [b] and [c] in combination.

3. Main request - inventive step

The appellant raised inventive-step objections starting from each of D11, D6 and D36.

The subject-matter of claim 1 involves an inventive step over the disclosure of D11 as the starting point.

Neither document D36 (or the objection based thereon) nor the inventive-step objection starting from D6 were admitted into the appeal proceedings.

3.1 Admittance of document D36

D36 was submitted after the expiry of the period defined in Article 99(1) EPC. Therefore, the opposition division had discretion not to admit D36 even though it was submitted before the final date defined in Rule 116(1) EPC. In exercising its discretion, the opposition division decided not to admit D36 or the inventive-step objection based thereon. The criterion applied by the opposition division was a *prima facie* lack of relevance, *inter alia* because D36 was focused on the removal of heavy metals and thus was not considered to be a promising starting point for a process for alkaline removal.

The opposition division did not exercise its discretion in an unreasonable or erroneous way. The appellant's argument that some of the conclusions of the opposition division on the content of D36 were wrong, such as its conclusion that there was no disclosure of kaolinite in

combination with the moisture content range of below 10%, does not outweigh the *prima facie* consideration set out above, and in any case does not demonstrate that the opposition division erred when exercising its discretion.

The Board does not consider there to be any circumstances justifying the admittance of D36 into the appeal proceedings (Article 12(6), first sentence, RPBA).

3.2 Admittance of the inventive-step objection based on D6 as the starting point

The inventive-step objection starting from D6 was first raised with the statement setting out the grounds of appeal and constitutes an amendment under Article 12(4) RPBA.

The main embodiment of D6 is an attapulgite clay. A number of further clays are also mentioned as being suitable. As explained above (see point 2.2) and contrary to the appellant's view, it is not directly and unambiguously disclosed in D6 that some of these species comprise kaolinite. Therefore, this objection is *prima facie* not relevant.

In exercising its discretion under Article 12(4) RPBA the Board thus decided not to admit the objection into the appeal proceedings.

3.3 D11 as the starting point

D11 discloses a process for combusting fuel by introducing fuel (forest residues) and a hydrous clay into a furnace, see page 1960, left hand column, second

last sentence and right column, first paragraph. The hydrous clay used in D11 is a "fine powder" kaolin with the product name "Intrafill C", see page 1960, right column, last complete paragraph.

The only disputed features of claim 1 with respect to the disclosure of D11 were:

- calcium carbonate is introduced into the furnace in D11 (see feature [a])
- the kaolin has a moisture content of 5 to 15% by weight (feature [c])

Neither of these features are disclosed in D11, as explained in the following paragraphs.

3.3.1 Feature relating to "introducing [...] calcium carbonate"

Feature [a] defines a step of "introducing fuel and calcium carbonate into a furnace configured to combust the fuel". The appellant is of the opinion that this feature is anticipated in D11 by both:

- the fuel used in D11 (forestry residues) which in its view inherently contained calcium carbonate
- the recirculated fly ash which contained calcium carbonate (see D11, Table 5)

However, the calcium carbonate as defined in feature [a] is not understood to encompass calcium carbonate comprised by the fuel, i.e. calcium carbonate that is part of the fuel. It is not understood to encompass calcium carbonate which originates from internal recirculated matter into the furnace, such as from the cyclone, either.

When applying a normal linguistic understanding, the wording of feature [a] refers to a component fed from the outside into the furnace as does the fuel defined in the same context. This understanding is also in line with claim 9, according to which the calcium carbonate is, *inter alia*, combined with at least a part of the fuel "before introducing" it "into the furnace".

It is also not persuasive that the calcium carbonate of feature [a] can refer to the calcium carbonate that is part of the fuel. The fuel can indeed contain alkali components (see the patent, paragraph [0024]). However, the fuel and calcium carbonate are defined in feature [a] as distinct components. Furthermore, calcium carbonate is only disclosed as an additional compound (see paragraph [0025]) derived for example "from the sea") and is optionally to be mixed with the fuel (see paragraph [0026]), regardless of what (additional) alkali components the fuel as such may contain. According to paragraphs [0047] and [0050] of the patent, the calcium carbonate is added to serve as SO_x- and NO_x-getter, for example.

It was undisputed that D11 does not disclose the separate introduction of calcium carbonate into the furnace according to the above understanding of feature [a]. Although D11 mentions that calcium carbonate is found in the fly ash (see page 1962, left-hand column, penultimate paragraph, Figure 3, and Table 5), this does not imply that calcium carbonate had been added as separate feedstock to the furnace, since calcium carbonate can be formed as a side product of the combustion of the fuel.

3.3.2 Feature relating to the "moisture content"

D11 does not disclose the moisture content of "Intrafill C". It is merely mentioned that it is a "fine powder kaolin" with a particle size distribution of smaller than 1 μm : 36% and smaller than 2 μm : 55%, and was purchased from Imerys Minerals Ltd. (see page 1960, right-hand column).

D12 and D34 are two product data sheets relating to "Intrafill C", which differ at least with respect to the moisture content thereof (D12: 10%; D34: 1.5%). However, it is not sufficiently established that the Intrafill C used in D11 is either of the products disclosed in D12 or D34. It is true that D12 discloses exactly the same information as D11 with respect to the particle size distribution. However, contrary to the appellant's view, the particle size disclosed in D12 is not an indication that the product is a fine powder. The kaolin particle size distribution is determined in dispersion (equivalent spherical diameter, see patent, paragraph [0038]) and therefore independent of the particles' agglomerate state and size in the product. The size of agglomerates formed from the kaolin particles depends, *inter alia*, on the moisture content (see the patent, paragraph [0021], for example) and is not to be confused with the particle size. Therefore, D12 neither clearly excludes nor directly and unambiguously discloses a kaolin having a "powder" form.

In D34, only the information "smaller 2 μm %: 55" is found for the particle size distribution (which merely indicates that the particle size is in a range similar to that of D11). The data sheet D34, however, explicitly refers to Intrafill C as a "powder".

In view of the above it has not been established and it cannot be ascertained whether the product according to D12 or D34 or a third, unknown Intrafill C product has been referred to in D11. Indeed, further variants of Intrafill C may have existed at the time of the publication of D11.

To conclude, based on the information at hand, the moisture content of the Intrafill C product used in D11 is unknown. Therefore, D11 does not disclose **any** moisture content of the hydrous clay kaolin, and in particular not in the range disclosed in feature [c].

3.3.3 The distinguishing features are different from the situation in decision T 928/20, which deals with a patent based on a divisional application. Therefore, contrary to the respondent's view, the conclusions made therein with respect to inventive step cannot be applied to the present case.

3.3.4 It was common ground that the distinguishing feature "moisture content according to feature [c]" is not interrelated with the distinguishing feature "introduction of calcium carbonate into the furnace", the latter being disclosed as being effective at reducing the SO_x and NO_x content of the flue gas (see the patent, paragraphs [0047] and [0050]).

3.3.5 Obviousness of the introduction of calcium carbonate into the furnace

Since calcium carbonate is present in the fly ash in D11 and is also present - at least according to the appellant - in the fuel feedstock, it is not apparent what would motivate the skilled person to add further

calcium carbonate to the furnace, in particular as sulphur compounds are already captured in the bed and fly ash in D11. The appellant did not provide any arguments in this respect.

Already for this reason the subject-matter of claim 1 is not obvious when starting from D11.

3.3.6 Objective technical problem related to the moisture content

Contrary to the conclusion in the appealed decision, it has not been convincingly shown that the selected moisture content of the hydrous clay improves boiler efficiency. Such an effect is not supported by the example in the patent.

The patent's example does not include the addition of calcium carbonate into the furnace. Moreover, it also does not provide a comparison between the addition of a dry hydrous clay and a hydrous clay having a moisture content in the claimed range. Instead, the example compares the latter with effect achieved when using no hydrous clay at all.

Boiler efficiency is expressed in the patent in terms of steam temperature and not in terms of an overall boiler efficiency calculated on the basis of an energy balance (see the patent, paragraph [0052]). The teaching is very similar to that of D11, i.e. the addition of kaolin can prevent fouling of the heat exchangers, due to its capability of capturing alkaline species. This reduces the tendency of ash particles to stick (see D11, page 1966: "Conclusions") and also reduces costs evolving from the fouling of the tubes (see page 1959, right column: "[...] the tubes have to

be replaced at high costs"). Therefore, the example in the patent merely confirms an effect shown for kaolin in D11 is qualitatively also achieved for a hydrous clay containing kaolinite with a moisture content in the claimed range.

D11 discloses introducing a "fine" kaolinite powder into the furnace (page 1960, right-hand column). This powder has very low residence times in the furnace and is "immediately carried away" by the flue gas. However, this short residence time is nevertheless successful in removing the alkaline components. According to the process of D11, the alkaline species and the kaolin are predominantly found in the fly ash and not in the bed ash of the furnace (D11, page 1964: "Discussion"). This results in permanent loss of the hydrous clay with the fly ash.

The respondent argued that hydrous clay comprising kaolin with a moisture content in the claimed range is not in fine powder form but in agglomerate form and that it was shown in D35 that the residence time in the furnace can be increased at higher moisture contents since the hydrous clay and the absorbed alkali species remain in the bed ash.

However, D35 is not relevant for the support of the respondent's position as it does not mention that the hydrous clay used comprises kaolinite. Having said this, it is nevertheless persuasive that kaolin in the claimed moisture content range has an agglomerated form and is not "immediately carried away" with the fly ash as in D11 (page 1964, right-hand column) and has longer residence time in the furnace. The appellant has not presented any evidence to the contrary, in particular with respect to the product described in D12.

The objective technical problem is therefore to increase the residence time of the kaolin in the furnace while maintaining the effect of reduced fouling of the heat exchangers (and thus improved boiler efficiency), see also the patent, paragraph [0012].

3.3.7 Obviousness of the claimed moisture content range

Contrary to the appellant's view there is no pointer in any of the documents cited by the appellant that would lead the skilled person to the selection of a hydrous clay with the claimed moisture content in order to solve the objective technical problem. On the contrary, the skilled person would assume that the moisture in the hydrous clay could negatively affect boiler efficiency as the moisture has to be evaporated at the cost of energy gain. As a dry product in powder form is available (see D34) there would be no reason to select a hydrous clay with the higher moisture content.

D6 teaches using limestone agglomerates as bed particles for the removal of sulphur components wherein the hydrous clay is solely used as a binder. D6 contains no information regarding the moisture content at the time of introducing the agglomerated bed particles into the furnace and it is also not established that these agglomerates comprise kaolinite (see point 2.2 above). The other documents cursorily cited documents by the appellant in this context (D7 to D9, D12, D19 and D21) have no such teaching either.

It has not been convincingly shown by the appellant that it is within the common general knowledge that the selection of kaolin with an increased moisture content

and a respective agglomerated form ("lump") reduces kaolin loss in the fly ash.

The skilled person carrying out the method described in D11 would have no incentive to deviate from the "fine [kaolin] powder" as suggested in D11, in favour of a kaolin with the claimed moisture content such as according to D12 and hence in a more agglomerated form.

Therefore, the subject-matter of claim 1 involves an inventive step.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:



C. Spira

B. Miller

Decision electronically authenticated