

Internal distribution code:

- (A) [-] Publication in OJ
- (B) [-] To Chairmen and Members
- (C) [-] To Chairmen
- (D) [X] No distribution

**Datasheet for the decision
of 30 March 2022**

Case Number: T 2349/16 - 3.2.05

Application Number: 10839422.2

Publication Number: 2517852

IPC: B29B7/48, B29C47/00, B29C47/60,
B29C47/40

Language of the proceedings: EN

Title of invention:

Kneading segment, and kneading apparatus comprising such a segment

Patent Proprietor:

Kabushiki Kaisha Kobe Seiko Sho

Opponent:

Coperion GmbH

Relevant legal provisions:

EPC Art. 56, 111(1), 123(2)
EPC R. 84(1), 100(1)
RPBA Art. 12(2), 12(4)
RPBA 2020 Art. 11, 12(8)

Keyword:

Lapse of patent in all designated states - continuation of
appeal proceedings (yes)
Decision in written proceedings
Late-filed objection - admitted (no)
Amendments - added subject-matter (main request: yes)
Inventive step - (main request, first auxiliary request: no)
Remittal - (first auxiliary request: no, second auxiliary
request: yes)

Decisions cited:

T 0204/83, T 0451/88, T 0748/91, T 0749/01, T 1664/06,
T 1943/15



Beschwerdekammern

Boards of Appeal

Chambres de recours

Boards of Appeal of the
European Patent Office
Richard-Reitzner-Allee 8
85540 Haar
GERMANY
Tel. +49 (0)89 2399-0
Fax +49 (0)89 2399-4465

Case Number: T 2349/16 - 3.2.05

D E C I S I O N
of Technical Board of Appeal 3.2.05
of 30 March 2022

Appellant:

(Opponent)

Coperion GmbH
Theodorstrasse 10
70469 Stuttgart (DE)

Representative:

Rau, Schneck & Hübner
Patentanwälte Rechtsanwälte PartGmbH
Königstraße 2
90402 Nürnberg (DE)

Respondent:

(Patent Proprietor)

Kabushiki Kaisha Kobe Seiko Sho
10-26 Wakinohama-cho 2-chome
Chuo-ku
Kobe-shi
Hyogo 651-8585 (JP)

Representative:

TBK
Bavariaring 4-6
80336 München (DE)

Decision under appeal:

**Interlocutory decision of the Opposition
Division of the European Patent Office posted on
19 July 2016 concerning maintenance of the
European Patent No. 2517852 in amended form.**

Composition of the Board:

Chairman

P. Lanz

Members:

T. Vermeulen

C. Brandt

Summary of Facts and Submissions

I. The opponent lodged an appeal against the interlocutory decision of the opposition division finding that European patent No. 2 517 852 (hereinafter "the patent") as amended according to the auxiliary request 1 filed during oral proceedings met the requirements of the European Patent Convention.

II. The opposition was filed against the patent as a whole on the basis of the grounds for opposition under Article 100(a) together with Article 54(1) EPC (lack of novelty) and with Article 56 EPC (lack of inventive step).

III. In the decision under appeal, the opposition division mentioned the following documents:

- D1 WO 99/24236 A1;
- D2 EP 0 875 356 A2;
- D3 "Aufbereiten von Polymeren mit neuartigen Eigenschaften", VDI-Verlag GmbH, Düsseldorf 1995, pages 55 to 79;
- D4 JP S56-166927 A;
- D5 US 2001/0019729 A1,

and came to the conclusion that the subject-matter of claim 1 in its granted version did not involve an inventive step in view of documents D2 and D1.

IV. A summons to oral proceedings scheduled for 1 February 2022 was issued on 28 April 2021.

- V. In a communication pursuant to Article 15(1) of the Rules of Procedure of the Boards of Appeal in the 2020 version (RPBA 2020), issued on 7 October 2021, the parties were informed of the board's provisional opinion that the main request and the first auxiliary request did not seem allowable and that, with regard to the second and third auxiliary requests, a remittal to the opposition division for further prosecution could possibly be considered.
- VI. On 24 November 2021 a notification pursuant to Rule 84(1) EPC was issued, by which the parties were informed that the patent had been surrendered or had lapsed with effect for all the designated Contracting States.
- VII. With letter dated 7 January 2021 the appellant requested that the appeal proceedings be continued. At the same time, they withdrew their auxiliary request for oral proceedings and announced that they would not attend any oral proceedings that might be held.
- VIII. The respondent informed with letter dated 18 January 2022 that they would not participate at the oral proceedings scheduled to take place on 1 February 2022.
- IX. In a communication issued on 28 January 2022 the board informed the parties that the appeal proceedings were continued. Subsequently, the oral proceedings appointed for 1 February 2022 were cancelled.
- X. The appellant (opponent) requested that the decision under appeal be set aside and the patent be revoked.

The respondent (patent proprietor) requested that the appeal be dismissed (main request) or, alternatively,

that the decision under appeal be set aside and the patent be maintained in amended form on the basis of the claims of one of the first, second and third auxiliary requests filed (as auxiliary requests 2, 3 and 4) with letter dated 7 April 2017 in reply to the grounds of appeal, contingent on a remittal to the opposition division for further prosecution thereof.

XI. Claim 1 of the main request (corresponding to the auxiliary request 1 which the opposition division found to meet the requirements of the EPC) has the following wording (the feature numbering used by the board is introduced in brackets):

"A kneading segment (1)

(a) disposed on a kneading screw (4)

(b) which is housed in a rotatable manner in a barrel (3) having an inner cavity, and

(c) comprising a kneading flight (12) kneading materials supplied into the barrel (3) by rotating in accordance with rotation of the kneading screw (4),

(d) wherein a cutout section (13) which is formed into a concaved shape on a top surface (15) of said kneading flight (12) by cutting out radially inward a portion, along an axis, of the top surface (15) and

(e) which is surrounded by two side surfaces (20) facing each other in an axial direction and a bottom surface (14) provided between said side surfaces (20) is formed, and

(f) said cutout section (13) is formed in a manner that an opening (18) of the cutout section (13) facing one side of the rotational direction of the kneading screw (4) has a larger area than that of an opening (19) facing the other side,

- (g) by forming said bottom surface (14) of said cutout section (13) in a planar shape tilted in relation to the top surface (15),
- (h) wherein the shortest distance (L) from the bottom surface (14) to the top surface (15) is 3-14 % in relation to the maximum distance from the axial center of the kneading screw (4) to the top surface (15)."

XII. Claim 1 of the first auxiliary request corresponds to claim 1 of the main request except for the following amendment to feature (h):

"characterized in that ~~wherein~~ the shortest distance (L) from the bottom surface (14) to the top surface (15) is 5-10 % ~~3-14 %~~ in relation to the maximum distance from the axial center of the kneading screw (4) to the top surface (15)".

XIII. Claim 1 of the second auxiliary request corresponds to claim 1 of the first auxiliary request with the further limitation in the characterising part:

"and a tilt angle (θ) of the bottom surface (14) formed in relation to the top surface (15) is 10° to 25°".

XIV. Claim 1 of the third auxiliary request corresponds to claim 1 of the second auxiliary with the following amendment to features (d) and (e), respectively:

"(d) wherein said kneading flight (12) alternately includes, in the axial direction, a high-level chip portion (16) having a constant chip clearance in relation to an inner wall of the barrel (3), and a low-level chip portion (17) having a larger chip

clearance than that of said high-level chip portion (16), said low-level chip portion (17) is formed by a cutout section (13), said a cutout section (13) which is formed into a concaved shape on a top surface (15) of said kneading flight (12) by cutting out radially inward a portion, along an axis, of the top surface (15) and";

"(e) which is surrounded by two side surfaces (20) facing each other in an axial direction and a bottom surface (14) provided between said side surfaces (20) ~~is formed~~, and".

XV. The appellant's submissions may be summarised as follows:

Main request

(a) Amendments

Feature (h) of claim 1 had a basis in paragraph [0028] of the description as originally filed. However, the term "[m]oreover" linked the original passage to the specific tilt angle θ disclosed earlier in the paragraph. It was also linked to Figure 2(b). The opposition division erred in its finding that the shortest distance L and the tilt angle did not have a structural and functional connection. Increasing the tilt angle at a constant distance L, for example, would expand the inlet opening resulting in more material entering the cutout section. In view of the unchanged outlet opening, this would result in an increased load acting on the bottom surface of the cutout section.

As a consequence, feature (h) was an unallowable amendment contravening Article 123(2) EPC.

(b) Inventive step

- Starting from document D2

Document D2 disclosed a kneading segment with features (a) to (f) of claim 1. In addition, the bottom surface 38 of the cutout section was tilted in relation to the top surface. By measuring the ratios in Figure 7 of document D2, it could be derived that the shortest distance L was about 5 % in relation to the maximum distance from the axial center of the kneading screw to the top surface. In this context, reference was made to decision T 748/91. In view of the arrangement of the intermeshing kneading screws in separate borings with distance 'a' depicted between the screw axes, it must be possible to infer the size ratios from the figures of document D2. As a consequence, feature (h) was also disclosed.

The subject-matter of claim 1 only differed from document D2 in that the bottom surface of the cutout section was formed in a planar shape. Because of the decreasing area of the cutout section in document D2, a strong extension flow was imparted on the kneaded material so that the prior art kneading segment already solved the problem set by the patent. Feature (g) therefore had the technical effect to provide an alternative shape for the bottom surface of the cutout section.

According to column 5, lines 1 to 3 of document D2, the cutout section could be shaped differently in function of the process requirements. The alternative flat shape was known from document D1, which had the object to provide a screw extruder with improved dispersive and

distributive mixing. To that end, a groove 162 was disclosed with varying angle, see Figures 16A and 18A. The skilled person would thus have recognised from document D1 that the flat shape of the bottom surface was an obvious alternative.

Also documents D3 and D4 would have prompted the skilled person to opt for a tilted, planar bottom surface of the cutout section. Figure 15 on page 72 of document D3 implied that a superposed shear and extension flow allowed to break down polymers, especially at higher viscosities, into smaller particles. Extension flows were therefore advantageous, in particular when they were caused by a wedge flow in the area at the edges of the kneading blocks. Document D4, in turn, disclosed an extruder screw with a cutout section formed by side surfaces and a tilted, planar bottom surface.

Even if feature (h) were not considered as being disclosed by document D2, no inventive step was present. It followed from Figure 8 of document D2 that a shortest distance L was known which was larger than the one shown in Figure 7. Hence, these figures offered the skilled person a range for the shortest distance. Obviously, the shape of the cutout section influenced the mixing effect. But this problem was already solved by document D2. It would have been an obvious solution to an optimisation problem to select the shortest distance L through simple tests so that it lied within the range of feature (h).

In view thereof, the subject-matter of claim 1 according to the main request did not involve an inventive step when starting from document D2.

- *Starting from document D5*

Document D5 disclosed a kneading segment having features (a) to (e). In addition, the bottom surface of the cutout section was planar. In view of the dimensions given in paragraph [0087] of document D5, the shortest distance L corresponded to 8.4% of the maximum distance from the axial center to the top surface. Hence, also feature (h) was disclosed. The differing features (f) and (g) caused the materials to be surely kneaded without leaving gel.

Paragraph [0087] of document D5 already contained the hint that the arrangement of taller tip portions and lower tip portions improved the dispersion of gels. Figures 18A and 18B of document D1 showed a groove 162 formed by radially cutting out a portion of the tip 164. The bottom surface of that cutout section was planar and tilted in relation to the top surface. According to page 18, lines 9 and 10 of document D1, the cutout section could be angled differently to improve material dispersion. This was particularly efficient when the passage was progressively narrowing. The skilled person would have applied this teaching onto the lower tip portions 15c of document D5. According to paragraphs [0055] and [0078] of document D5, the taller tip portions 15b already presented good kneading properties and had to fulfill the task of scraping off material from the inner wall surface of the housing. In doing so, the skilled person would have tilted the bottom surface of document D5 in such a way that the inlet opening had a larger area than the outlet opening.

In consequence, the subject-matter of claim 1 according to the main request did not involve an inventive step when starting from document D5.

First auxiliary request

The submissions in respect of the main request also applied to the first auxiliary request.

XVI. The respondent's submissions were essentially as follows:

Admittance of inventive step objections

During the oral proceedings before the opposition division, the inventive step objections starting from either document D2 or document D5 in combination with document D3 or document D4 were not discussed with respect to the main request. Hence, these attacks were new and should not be admitted into the appeal proceedings.

Main request

(a) Amendments

Feature (h) was added so as to more clearly distinguish the subject-matter of granted claim 1 from the closest prior art according to document D2. The opposition division was correct in its assessment that the effect of the shortest distance L was not related or inextricably linked to the parameter range of the tilt angle. In paragraph [0040] of the patent, the resulting effect of the range of feature (h) was explained: if the distance was too short, the end of the bottom surface might be chipped, and if it was too long, the

amount of material passing through the cutout section became too large to impart a sufficient force in the extension direction to the materials. In contrast, paragraphs [0037] and [0039] of the patent disclosed that the tilt angle imparted a strong extension flow to the materials; they could be kneaded with a proper distributivity. Moreover, according to paragraphs [0032] to [0037] of the patent, tilting the bottom surface was a general measure which was not limited to a specific parameter range. This allowed to conclude that the generalising isolation of the parameter range of feature (h) was justified. The parameter range of the tilt angle did not have any influence on the shortest distance L. Even if the load on the bottom surface changed with the tilt angle, the effect on the force was negligible and did not justify to also include the parameter range of the tilt angle.

The requirements of Article 123(2) EPC were therefore met.

(b) Inventive step

- Starting from document D2

Feature (h) was not disclosed by document D2. Decision T 748/91 did not apply to the present case: directly comparing one dimension to another was not the same as accurately measuring the drawings to derive a ratio between two dimensions. In this respect, reference was made to decisions T 1664/06 and T 451/88. Figures 7 and 8 of document D2 related to two different embodiments; they did not disclose any intermediate shapes. Hence, document D2 did not disclose any range for the shortest distance L.

Consequently, the subject-matter of claim 1 differed from document D2 by the planar shape of feature (g) and by feature (h). The technical effect of feature (h) lied therein that a sufficient force was imparted in the extension direction while preventing that the force became so large that an end of the bottom surface was chipped. The mixing effect mentioned in document D2 related to the unsatisfying scraping results associated with the prior art cited therein. In the present case, the objective technical problem was to provide an improved kneading segment that could surely knead materials without leaving gel and without the risk of having the end of the bottom surface chipped.

Document D2 itself did not mention with a single word that the structure of the prior art cutout section would generate any extensional flow resulting in a proper distributivity and therefore in kneading without leaving gel. The shapes disclosed in document D2 did not have an outlet with an area larger than at the inlet. Further, there was no document in the proceedings which taught that extensional flow of kneaded materials was obtained by a cutout section with the features (g) and (h). Document D3 was absolutely silent about a cutout portion in the sense of claim 1. The wedge flow referred to the flow in the gap between the top surface of the kneading flight and the barrel. It did not give any information regarding the shape of the surfaces contributing to the wedge flow and must instead be formed by curved surfaces. In document D4 an extension flow related to a cutout section was not mentioned. It failed to provide the teaching that the groove 37 of document D2 could be used for providing such an extension flow and that the extension flow was even improved when making the bottom surface of the groove planar.

In conclusion, the subject-matter of claim 1 involved an inventive step when starting from document D2.

- *Starting from document D5*

The subject-matter of claim 1 according to the main request differed from the kneaded segment of document D5 by the features (f) and (g). The objective technical problem lay in providing a kneading segment which could surely knead materials without leaving gel, see paragraph [0010] of the patent.

The appellant's entire submission with respect to document D1 exclusively referred to dispersive mixing, which was obtained in the gap between the tip of the kneading flight and the inner wall of the housing. In contrast, the gist of the invention concerned distributive mixing obtained by imparting an extending flow to the materials. In document D1, it was absolutely necessary that the groove 162 terminated substantially in the middle of the tip 164 and did not extend over the entire tip. Otherwise, dispersion would not be possible. Had the skilled person considered the teaching of document D1, they would have provided a groove in the high-level portion 15b' of document D5, similarly to document D1. This would have still allowed scraping off the material from the inner surface of the housing. Document D1 did not give any motivation to tilt the surface of the low-level portion 15c' for the purpose of improving the extension flow. Paragraph [0078] of document D5 was absolutely silent about distributive mixing.

Hence, the subject-matter of claim 1 of the main request also involved an inventive step when starting from document D5.

Request for remittal

As regards the first, second and third auxiliary requests, it was requested to remit the case to the first instance, because these requests were not discussed before the opposition division.

First auxiliary request

Claim 1 of the first auxiliary request defined an even further narrowed parameter range in which the effect of the invention was even more suitably obtained. None of the cited references disclosed or taught this parameter range. The arguments put forward in respect of the main request applied analogously.

Reasons for the Decision

Procedural aspects

1. If a European patent has lapsed in all of the designated Contracting States, the opposition proceedings may be continued at the request of the opponent, filed within two months of a communication of the European Patent Office informing them of the lapse (Rule 84(1) EPC). The EPC contains no specific provision concerning continuation of appeal proceedings in case a European patent has been surrendered or has lapsed. Hence, based on Rule 100(1) EPC, Rule 84(1) EPC applies *mutatis mutandis* to appeal proceedings

following opposition proceedings (cf. T 749/01, reasons 3).

In the present case, the appellant (opponent) replied within two months of the notification pursuant to Rule 84(1) EPC with the request that the appeal proceedings be continued. Hence, the appeal proceedings were continued. With communication dated 28 January 2022, the parties were informed accordingly.

2. The present decision is handed down without holding oral proceedings.

In reply to the summons to oral proceedings and the board's subsequent communication according to Article 15(1) RPBA 2020, the appellant withdrew their auxiliary request for oral proceedings and announced that they would not attend any oral proceedings that might be held. The respondent then declared that they would not participate at the scheduled oral proceedings. This is considered equivalent to a withdrawal of the respondent's original request for oral proceedings under Article 116(1) EPC (cf. "Case Law of the Boards of Appeal of the European Patent Office", 9th edition 2019, III.C.4.3.2). In view of the above declarations, both parties expressed the clear intention only to rely on their written case. The oral proceedings were therefore cancelled.

As the case is ready for decision on the basis of the documents mentioned in Article 12(1) RPBA 2020, and the requirements of Articles 113(1) and 116(1) EPC are complied with, the board issues the decision in written proceedings pursuant to Article 12(8) RPBA 2020.

Admittance of inventive step objections

3. The admittance of submissions filed for the first time in the statement of grounds of appeal or in the written reply thereto is governed by Article 12(4) of the Rules of Procedure of the Boards of Appeal in its version of 2007 (RPBA 2007), which applies in the present case according to Articles 24 and 25(2) RPBA 2020. Following this provision, everything presented by the parties under Article 12(1) RPBA 2007 shall be taken into account by the board if and to the extent it relates to the case under appeal and meets the requirements in Article 12(2) RPBA 2007. However, the board has the discretionary power to hold inadmissible facts, evidence or requests which could have been presented or were not admitted in the first-instance proceedings.
4. In point II.6 of the statement of grounds of appeal, the appellant argued that the subject-matter of claim 1 according to the main request did not involve an inventive step when starting from either document D2 or document D5 in combination with document D3 or document D4. In the respondent's view, these objections were new and should therefore not be admitted into the appeal proceedings.
5. The board notes that the appellant's submissions in regard of documents D3 and D4 correspond almost literally to those subsumed under points III.4 and IV.4 of the notice of opposition in the context of inventive step attacks starting from document D2 against the subject-matter of claim 1 as granted. Further arguments in support of these attacks were brought before the opposition division in point I.4 of the appellant's letter of 4 May 2016.

Consequently, the inventive step objections starting from document D2 in point II.6 of the statement of grounds of appeal are only new insofar as they are directed against claim 1 according to the main request (corresponding to auxiliary request 1 filed during oral proceedings before the opposition division), which includes the additional feature (h).

The appellant is, however, of the view that feature (h) is already disclosed by document D2 (see point XV. above). As with granted claim 1 in the proceedings before the opposition division, they have adduced documents D3 and D4 in the appeal proceedings with the aim to establish the obviousness of the sole distinguishing feature (g) ("in a planar shape") vis-à-vis document D2 when faced with the technical problem of providing an alternative shape for the bottom surface. The board is therefore convinced that the submissions made in the statement of grounds of appeal in regard of the inventive step objections starting from document D2 in combination with document D3 or document D4 do not amount to an entirely new case based on facts and arguments not presented before.

Taking this into account, the board concludes that it lies outside its discretion to hold the inventive step objections starting from document D2 in combination with document D3 or document D4 inadmissible pursuant to Article 12(4) RPBA 2007.

6. This is different for the inventive step objections starting from document D5 in combination with document D3 or document D4. As noted above, the arguments provided in point II.6 of the statement of grounds of appeal are virtually identical to the submissions made in regard of documents D3 and D4 in points III.4 and

IV.4 of the notice of opposition in the context of the inventive step attacks starting from document D2. They do, however, not clearly address the question why the skilled person would have adapted the kneading segment of starting document D5 in view of the teachings of document D3 or document D4 by implementing the distinguishing features (f) and (g) ("tilted in relation to the top surface"). Nor does the statement of grounds of appeal contain a reference to the arguments provided in point V of the notice of opposition in support of the inventive step attacks starting from document D5 in combination with document D3 or document D4. The objections of lack of inventive step starting from document D5 in combination with document D3 or document D4 are therefore not substantiated in the statement of grounds of appeal, contrary to the requirements of Article 12(2) RPBA 2007, so that they cannot be taken into account by the board under the provision of Article 12(4) RPBA 2007.

Main request

(a) Amendments - Article 123(2) EPC

7. During opposition proceedings, feature (h) was added to claim 1 as granted. It establishes a value for the shortest distance L from the bottom surface to the top surface of the cutout section in terms of a percentage of the maximum distance from the axial center of the kneading screw to the top surface. The appellant disputes the opposition division's finding that the overall disclosure of the application as filed justifies the generalising isolation of the feature and its introduction into the claim (cf. point 3.2 of the reasons for the decision under appeal).

8. The board is particularly mindful of the fact that paragraph [0028] is the only passage in the description as filed that reflects the wording of feature (h). The first full sentence at the top of page 16 of the description as filed, about halfway through paragraph [0028], reads as follows:

"Moreover, a distance from the bottom surface 14 to the top surface 15 (shortest distance) L is preferably 3-14%, and more preferably 5-10% in relation to the maximum distance from the axial center of the kneading screw 4 to the top surface 15."

This sentence is an excerpt from the detailed description of an embodiment of the kneading segment, which explicitly refers to the cross-sectional view of Figure 2(b). It is immediately preceded by two sentences at the bottom of page 15, the first of which reads as follows:

"The tilt angle θ of the bottom surface 14 formed in relation to the top surface 15 is 10-25°, preferably 15-20° as shown in FIG. 2(b)".

In Figure 2(b) (or 'FIG. 2B', as the drawing is labelled), the reference signs 'L' and ' θ ' appear together, albeit without any numeric ranges.

The only other mention of the "distance L" in the application as filed is in the last sentence of paragraph [0030], about halfway through the description of the only example disclosed:

"In terms of the tilt angle θ and the distance L, which are described before, the bottom surface 14

of the example is formed at the tilt angle $\theta=20^\circ$ in relation to the top surface 15, and the distance L is 8% of the maximum distance from the top surface 15 to the axial center of the kneading screw 4".

9. The board shares the appellant's view that both the structure of the text in paragraph [0028] of the description as originally filed ("Moreover") and the respective effects presented therein convey a functional and structural relationship between feature (h), on the one hand, and the magnitude of the tilt angle θ , on the other hand. The board cannot follow the respondent's argument that the effect of a particular tilt angle on the extension flow of the kneaded materials (cf. the last sentence on page 15) is unrelated to the relative size of the shortest distance L. Both parameters will undoubtedly have an influence on the flow through the cutout section. By the same token, it cannot be denied that the force applied by the kneaded materials on the kneading segment depends not only on the shortest distance L between the bottom surface and the top surface (cf. second and third full sentences on page 16), but also on the magnitude of the tilt angle θ . Furthermore, it makes little technical sense to attribute the risk of chipping off the end of the bottom surface on a force build-up caused by a decrease in distance L, without also considering the thickness of that end, which in turn depends on the tilt angle of the bottom surface.

10. In view of the foregoing, the board is not persuaded that feature (h) *as such* is directly and unambiguously derivable, using common general knowledge, and seen objectively and relative to the date of filing, from the whole of the application as filed. Therefore, the amendment to claim 1 of the main request extends beyond

the content of the application as originally filed (Article 123(2) EPC).

(b) Inventive step - Article 56 EPC

11. The appellant contested the opposition division's finding that the subject-matter of claim 1 according to the main request involved an inventive step. Several attacks were brought forward; they either start from document D2 or document D5.

- Starting from document D2

12. It is common ground between the parties that document D2 discloses a kneading segment with features (a) to (f). With regard to feature (g), they agree that the bottom surface 38 of the cutout section 37 represented in Figure 7 of document D2 is tilted in relation to the top surface of the kneading flight, but not in a planar shape. The crucial point of dispute is whether feature (h) is disclosed by document D2.

13. The appellant relies on measurements carried out on Figure 7 of document D2 (reproduced below) to derive the ratio between the shortest distance from the bottom surface to the top surface and the maximum distance from the axial center of the kneading screw to the top surface. In order to justify that size ratios can be inferred even from a schematic drawing, they invoke decision T 748/91.



The board sees no merit in the appellant's argument. It is established case law that the dimensions obtained

solely by carrying out measurements on the schematic drawings of a document do not form part of the disclosure of that document (T 204/83, reasons 7). This also applies to patent drawings which often go beyond a mere schematic representation of the essential features (T 1943/15, reasons 4.3). The fact that Figure 2 of document D2 illustrates two kneading screws arranged side by side inside separate barrels 42, 43 of an extruder housing 2 and, at the same time, represents the distance 'a' between the respective screw axes does not mean that Figure 7 of document D2 shows the dimensions and proportions of the different elements to scale. This is all the less so since Figure 2 is explicitly labelled as schematic in the description (cf. column 2, line 36 of document D2: "einen schematischen Schnitt").

Furthermore, the respondent has convincingly argued that the present case is different from the case in T 748/91. The board in T 748/91 decided on an objection of added subject-matter against an amendment requiring the size of a first dimension ("Profiltiefe") to be smaller than the size of a second dimension ("geringste Schichtdicke der unverschlissenen Laufschrift"). In contrast, the issue under dispute in the present case is whether a feature can be derived from the drawings of a prior art document. Moreover, that feature amounts to comparing a first dimension with a *multiple* of a second dimension ($0.03 \leq x/y \leq 0.14 \rightarrow 0.03y \leq x \leq 0.14y$ or $7.14x \leq y \leq 33.33x$). Deducing how often the shortest distance L fits into the maximum distance from the axial center of the kneading screw to the top surface from merely looking at Figure 7 of document D2 is not straightforward and arguably involves the mental step of apportioning said maximum distance in predetermined

quantities, which can be considered as a way of measuring that distance (T 1943/15, reasons 4.5).

In view thereof, the board concurs with the respondent that feature (h) is not disclosed by document D2.

14. Hence, the opposition division was correct in its finding that the subject-matter of claim 1 according to the main request differs from the kneading segment of document D2 by feature (g) ("in a planar shape") and feature (h).

15. As the shape of the bottom surface of the cutout section does not necessarily affect the shortest distance between the bottom surface and the top surface, the relationship between the distinguishing features is not one of functional reciprocity. When assessing inventive step, each difference may therefore be considered separately and gives way to a separate objective technical problem.

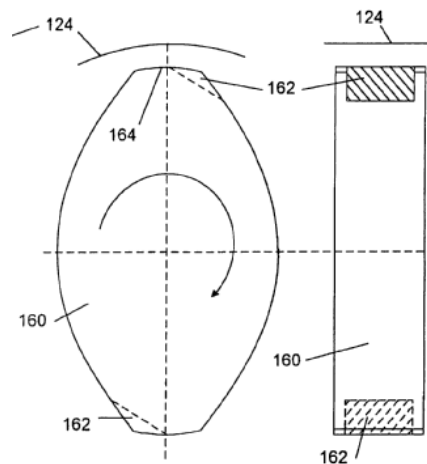
The technical effect of the planar shape is not explained in the patent. The board is in agreement with the opposition division that the effects mentioned in paragraphs [0035] to [0037] of the patent description only relate to the tilting arrangement of the bottom surface and not to its planar extension, which merely is an alternative shape of the bottom surface (see point 2.2.3.2 of the reasons for the decision under appeal).

Regarding feature (h), paragraph [0040] of the patent seems to imply that the claimed range is a trade-off between a smaller distance required for imparting a sufficiently high force on the materials in the extension direction and a larger distance necessary for

restricting the load imposed on the bottom surface. Yet, in reality, these forces would very much depend on further parameters, such as the (axial) width of the cutout section, the magnitude of the tilt angle, the chip clearance, the helix angle and the rotational speed of the kneading screw. Moreover, the board is unable to derive from the patent or from the respondent's submissions why a shortest distance L of, for example, 3% or 14% in relation to the maximum distance from the axial center of the kneading screw to the top surface would provide acceptable forces whereas a ratio of, for example, 2% or 15%, would not. Hence, rather than assuring a good mixing and kneading without leaving gel, the technical effect of selecting the shortest distance ratio from within the range of feature (h) comes down to optimising the cutout section.

16. Thus, the objective technical problems are to provide an alternative shape to the bottom surface and to optimise the cutout section.

17. In view of column 5, lines 1 to 3 of document D2, the skilled person would have been encouraged to form the the cutout section 37 in a different manner in function of the process requirements. The embodiment shown in Figures 18A and 18B of document D1, reproduced alongside, contains a pointer that a cutout section 162 of a kneading segment 160 formed by two opposed side surfaces can have a planar bottom surface tilted in relation to the top surface.



For those reasons, the board follows the appellant's view that the skilled person would have adapted the curved bottom surface 38 shown in Figure 7 of document D2 accordingly.

18. A similar reasoning applies in respect to document D4. The board is satisfied that the geometry of the cutout section illustrated in Figure 2 of document D4 would have prompted the skilled person to solve the first objective technical problem by forming the tilted bottom surface in a planar shape.
19. The appellant's arguments in support of the objection combining documents D2 and D3 are, however, not found convincing. The mention of "Keilströmung im Flankenbereich von Knetblöcken oder Knetschaufeln" on page 73 of document D3 is so general that it appears questionable whether this passage would have encouraged the skilled person to modify the shape of the bottom surface illustrated in Figure 7 of document D2.
20. With regard to the second objective technical problem, the question really is whether the skilled person would have arrived at a value of the distance L that lies within the range claimed in feature (h) as a result of a mere routine optimisation. The opposition division took the view that this question is to be answered in the negative, since "neither document D2 nor document D1 advise the skilled person to optimize the shortest distance L in any way" (cf. point 3.5.3.5 of the reasons for the decision under appeal). The respondent agrees and argues that none of the documents provides the teaching that the feature (h) has to be applied to solve the technical problem.

It is not unimportant to bear in mind that the inability to derive a dimension from the schematic drawing of a patent document does not preclude a finding of obviousness in regard of that dimension.

In practice, the skilled person starting from the kneading segment of document D2 would have had to select the dimensions of the different components in function of the barrel size and the operational requirements of the kneading process. Determining the shortest distance L of the bottom surface of the cutout section may very well be a trade-off between imparting a sufficiently high force on the kneaded materials and avoiding damage to the kneading segment. But that force will also depend on various other parameters, such as the exact geometry of the cutout section, the material of the kneading segment and the rotational speed of the screw, none of which are specified by claim 1. In addition, the range of 3-14% cannot be regarded as particularly narrow. For example, the value of the diameter given in paragraph [0043] of the patent yields a shortest distance within the range of 0.9-4.2 mm. In view thereof, the board is unable to see why the skilled person would not have optimised the cutout section by picking a value for the shortest distance L that relates to the maximum distance between the axial center and the top surface in a ratio of between 3% and 14%.

21. Having regard to the above considerations, the subject-matter of claim 1 according to the main request does not involve an inventive step with respect to documents D2 and D1 or documents D2 and D4 in combination with common general knowledge (Article 56 EPC).

- Starting from document D5

22. There is no dispute between the parties that the subject-matter of claim 1 according to the main request differs from the kneaded segment of document D5 by the features (f) and (g), except for the planar shape. The cutout section shown in Figure 8 of document D5 neither has an opening facing one side of the rotational direction with a larger area than that of an opening facing the other side, nor is its bottom surface 15c' tilted in relation to the top surface 15b'. With regard to feature (h), the board concurs with the appellant that the dimensions given in paragraph [0087] of document D5 yield a value of about 8.4%, i.e. in the middle of the claimed range.

23. The parties agree that the objective technical problem lies in providing a kneading segment which can surely knead materials without leaving gel (cf. paragraph [0010] of the patent). The board sees no reason to deviate from this formulation.

24. The board follows the respondent's line of argument that the improvement of material dispersion in document D1 is closely linked to the position of the groove 162 at the upstream side in the rotational direction of the kneading segment (cf. Figures 18A and 18B reproduced in point 17. above). By terminating in the middle of the tip 164, the tilted bottom surface of the groove 162 channels the material into the region between the tip and the barrel wall 124 (cf. page 18, lines 7 and 8 of document D1). In the board's view, this teaching cannot be ignored when modifying the segment of document D5 with the goal to surely knead materials without leaving gel. As a consequence, the respondent's argument is

followed that document D1 would not have given the skilled person any motivation to just tilt the surface of the low-level portion 15c' of document D5 for the purpose of improving the extension flow.

Even if the appellant were correct in arguing that the skilled person would have tilted the bottom surface 15c' of document D5 in view of document D1, this would not be without a substantial impact on the shortest distance L between the bottom surface and the top surface. In such a case, the ratio of feature (h) would no longer follow from the dimensions disclosed in paragraph [0087] of document D5 (see point 22. above).

25. Hence, the subject-matter of claim 1 according to the main request is not obvious having regard to documents D5 and D1 (Article 56 EPC).

Request for remittal - first auxiliary request

26. The respondent requested to remit the case to the opposition division for further prosecution of the auxiliary requests, arguing that these requests were not discussed before the opposition division.
27. Under Article 111(1) EPC the board may either decide on appeal or remit the case to the department which was responsible for the decision appealed. The appropriateness of remittal to the department of first instance is a matter for decision by the board, which assesses each case on its merits. Article 11 RPBA 2020, which applies in the present case according to Articles 24 and 25(1) RPBA 2020, stipulates that the board shall not remit a case to the department whose decision was appealed for further prosecution, unless special reasons present themselves for doing so. Whether

"special reasons" present themselves is to be decided on a case-by-case basis. If all issues can be decided without an undue burden, a board should normally not remit the case.

28. The opposition division did not present its position on the subject-matter of claim 1 according to the first auxiliary request, which corresponds to the auxiliary request 2 filed by the respondent in reply to the notice of opposition. It is noted, however, that claim 1 of the first auxiliary request largely corresponds to claim 1 of the main request, the only difference being that the range 3-14% in feature (h) has been replaced by the range 5-10%. Neither the appellant nor the respondent presented any specific arguments with regard to the first auxiliary request. Instead both relied on the submissions provided in the context of the main request.
29. Having regard to the finding in point 10. above with respect to the main request and taking into account that no specific arguments directed to the first auxiliary request were submitted, it would serve little purpose in the board's view to remit the case to the opposition division without a decision on the merits in respect of the first auxiliary request. Furthermore, no special reasons in the sense Article 11 RPBA 2020 can be identified. Hence, the respondent's conditional request to remit the case for further prosecution of the first auxiliary request is denied (Article 111(1) EPC).

First auxiliary request

30. The respondent has not presented any arguments explaining why the narrower range 5-10% in the amended

feature (h) would overcome any of the objections raised in respect of the main request. In particular in view of the inventive step objections starting from document D2 in combination with document D1 or document D4 (see points 12. to 21. above), it is not apparent why the skilled person would have been dissuaded to select a ratio for the shortest distance L in relation to the maximum distance from the axial center of the kneading screw to the top surface within the range of 5-10% when attempting to optimise the cutout section, taken into consideration the particular geometry of the cutout section, the material of the kneading segment and the rotational speed of the screw (see point 20. above).

31. Thus, the conclusion of point 21. above also applies to the first auxiliary request. The subject-matter of claim 1 according to the first auxiliary request does not involve an inventive step having regard to documents D2 and D1 or documents D2 and D4 in combination with common general knowledge (Article 56 EPC).

Request for remittal - second auxiliary request

32. Claim 1 of the second auxiliary request has an additional amendment taken from the description (see point XIII. above). As a consequence of adding the very feature that was found to have a close functional and structural relationship with feature (h), the objection under Article 123(2) EPC raised against the main request becomes groundless (see point 9. above).
33. However, the opposition division has not expressed their view on the inventive step of the subject-matter claimed in the second auxiliary request, which correspond to the auxiliary request 3 as filed in reply

to the notice of opposition. Instead, they held that the higher-ranking auxiliary request 1 (corresponding to the present main request) met the requirements of the EPC. Therefore, essential questions regarding the patentability of the claimed subject-matter have not yet been examined and decided on by the opposition division.

34. The appellant has not objected to a possible remittal.
35. In the light of these considerations, the board is satisfied that special reasons speak in favour of remitting the case to the opposition division for further prosecution (Article 111(1) EPC; Article 11 RPBA 2020).

Conclusion

36. To summarise, the board holds that:
- the inventive step objection starting from document D5 in combination with document D3 or document D4 is not admitted;
 - the requirements of Article 123(2) EPC are not met for the main request, because feature (h) *as such* is without basis in the application as filed;
 - the subject-matter of claim 1 according to the main request and the first auxiliary request does not involve an inventive step having regard to documents D2 and D1 or documents D2 and D4 in combination with common general knowledge;
 - the subject-matter of claim 1 according to the main request involves an inventive step in view of document D2 in combination with document D3 and in view of document D5 in combination with document D1;

- the case must be remitted to the opposition division for further prosecution.

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 for further prosecution.

The Registrar:

The Chairman:



N. Schneider

P. Lanz

Decision electronically authenticated