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Datasheet for the decision of 3 September 2019

Case Number: T 0471/16 - 3.2.03

Application Number: 10728679.1

Publication Number: 2452022

IPC: E02F3/92, E02F9/28

Language of the proceedings: EN

Title of invention:
CUTTER HEAD FOR DREDGING GROUND, CUTTER SUCTION DREDGER PROVIDED WITH SUCH A CUTTER HEAD AND USE OF THE CUTTER HEAD FOR DREDGING GROUND

Patent Proprietor:
Dredging International N.V.

Opponent:
IHC Holland B.V.

Headword:

Relevant legal provisions:
EPC Art. 100(a), 54(2), 56

Keyword:
Novelty - main request (yes)
Inventive step - main request (yes)

Decisions cited:

Catchword:

Europäisches Patentamt
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Beschwerdekammern

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Case Number: T 0471/16 - 3.2.03

D E C I S I O N
of Technical Board of Appeal 3.2.03
of 3 September 2019

Appellant: (Opponent)	IHC Holland B.V. Smitweg 6 2961 AW Kinderdijk (NL)
Representative:	Nederlandsch Octrooibureau P.O. Box 29720 2502 LS The Hague (NL)
Respondent: (Patent Proprietor)	Dredging International N.V. Scheldedijk 30 2070 Zwijndrecht (BE)
Representative:	Brouwer, Hendrik Rogier Arnold & Siedsma Bezuidenhoutseweg 57 2594 AC Den Haag (NL)
Decision under appeal:	**Interlocutory decision of the Opposition Division of the European Patent Office posted on 22 December 2015 concerning maintenance of the European Patent No. 2452022 in amended form.**

Composition of the Board:

Chairman	G. Ashley
Members:	V. Bouyssy
	G. Weiss

Summary of Facts and Submissions

I. European patent No 2 452 022 (in the following: "the patent") concerns a cutter head for dredging ground under the water surface.

II. The patent as a whole was opposed on the grounds of insufficient disclosure (Article 100(b) EPC), lack of novelty and lack of inventive step (Article 100(a) EPC).

III. The opposition division held that the patent as amended on the basis of the main request before it met the requirements of the EPC.

IV. This intermediate decision was appealed by the opponent (in the following: the appellant).

V. With summons to oral proceedings, the Board sent a communication pursuant to Article 15(1) of the Rules of Procedure of the Boards of Appeal (RPBA) indicating its preliminary opinion of the case.

VI. Oral proceedings before the Board were held on 3 September 2019.

VII. Final requests

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

The patent proprietor (in the following: the respondent) requested that the appeal be dismissed, alternatively that the decision under appeal be set aside and the patent be maintained in amended form on the basis of one of the sets of claims filed as first,

second and third auxiliary requests with letter dated 3 June 2019.

VIII. Claims of the appellant's main request

Independent apparatus claim 1 as amended reads as follows (the feature numbering is introduced by the Board for ease of reference; compared with claim 1 as granted, added passages are indicated in bold, deleted passages in strike-through):

(a) Cutter head (10) for dredging ground under the water surface, comprising
(b) a revolving body (11) which is rotatable around a central axis and
(c) which is formed by a base ring (13) and a hub (14) placed at a distance therefrom,
(d) between which extend a number of support arms (15) provided with cutting tools (20),
(e) between which support arms (15) passage openings (16) are present for discharge of the dredged ground,

characterised in that

(f) the cutter head comprises at least ~~50~~ **100** cutting tools,
(g) which cutting tools (20) are axisymmetrical at least at their free outer end.

IX. Cited evidence

(a) In the statement setting out the grounds of appeal, and in the reply to it, the parties referred among others to the following documents which were filed in the opposition proceedings and are cited in the decision under appeal:

D1: US 4,319,415 A;
D2: WO 2005/035884 A1;
D3: GB 2 032 492 A;
D8: DE 10 2005 051 450 B4;
N1: Product information on "bosta - Cutter systems for soft and hard soils", Stapel shipyard, Spaarndam (NL), 6 pages, with imprint "86-01";
N2: WO 2007/100250 A1;
N3: Roxborough, F.F. and Sen, G.C., "Breaking coal and rock", chapter 9 of "Australian coal mining practice", 1986, pages 30 to 147;
N4: NL 8000 840 A;
N5: US 4,736,533 A;
N9: Product information on "Dura-Point® Tooth" from the journal "International dredging and port construction", Vol. IV, No 6, April 1977, pages 1 and 12.

(b) With letter dated 1 September 2016, the appellant filed the following document:

N10: Expert opinion by Prof. C. van Rhee

In addition, the appellant offered the expert testimony of Prof. C. van Rhee.

(c) With letter dated 27 October 2016, the respondent filed the following document:

N12: Product information on "ESCO® Dredge Products- Spherilok® and Helilok® Cutterheads", ESCO, 2003, 8 pages

(d) In addition, with letter dated 3 June 2019, the respondent filed the following document:

N13: Written statement by Mr. K.G. Wijma

X. The arguments of the parties, insofar as relevant for the present decision, can be summarised as follows:

(a) Admission of N10 and N13 in the appeal proceedings

The respondent requested the Board not to admit document N10 into the proceedings because it was filed at a late stage.

The appellant requested the Board not to admit document N13 into the proceedings because it was filed at a very late stage.

(b) Main request - Novelty

Appellant's case:

D3 discloses a cutter head including a base ring 14, a hub 23 and four pairs of helical webs 13 extending between them and carrying cutter bits 19. The opposition division erred in deciding that this head does not comprise features (d), (f) and (g) of claim 1.

Each web pair forms a support arm as required by feature (d). They fulfill the function of support arms because they support the cutter bits. The claim wording does not exclude that the support arms are as flange-like as webs 13. In practice there is no clear distinction between flangy and army type supports. As shown in figure 1 of D1, the support arms can be relatively flange-like.

With respect to feature (g) it is apparent in figures 1 to 3 of D3 that the cutter bits 19 are conical rock

bits. This is confirmed by the teaching on page 1, lines 16 to 25 that the cutter head is adapted for dredging hard rock with an Unconfined Compressive Strength (UCS) of about 48 MPa.

With respect to feature (f) figures 1 to 3 clearly show that each pair of webs 13 has 26 cut-outs 16 for mounting cutter bits 19, making a total of 104 bits. In fact, according to an expert in the art (document N10), the cutter head is equipped with 120 bits.

Respondent's case:

D3 fails to disclose features (d), (f) and (g) for the reasons set out by the opposition division in the decision under appeal.

The term "support arm" in feature (d) must be construed to have its normal meaning in the art of dredging. It is generally known that, in a conventional rotatable cutter head for a cutter suction dredger, several arms (sometimes also referred as blades due their cutting function) protrude from a base ring to support a hub, whereby ground material cut loose passes through the openings between the support arms (see D1; D2; D3, column 1, lines 4 to 10; N1; N2; N12). The pairs of webs 13 disclosed in D3 do not anticipate such support arms.

With respect to feature (g), D3 is silent about the number of cutter bits. Since 17 cutter bits (reference numeral 19) are shown in figure 1, which is a side view of the head, there are probably only 34 bits in total (17 per side). Contrary to the appellant's assertion, it cannot be derived from D3 that bits 19 are positioned in all cut-outs 16. Even if they were, it

cannot be derived from D3 that the cutter head would comprise at least 100 bits. Contrary to the appellant's view, figures 1 to 3 do not show that each web pair has 26 cut-outs. In fact, figure 3 shows a web pair with only 16 cut-outs. The expert alleges that 60 cut-outs are shown in figure 1 and that their total amount is 120 (N10). However, less than 50 cut-outs are shown in figure 1. Moreover, the cut-outs at the edge of the head in figure 1 are located either on the other non-visible side or at the exact middle plane, and hence they must be counted only once. Finally, there is no reason to assume that the number of cut-outs on the non-visible side is the same as on the visible side.

With respect to feature (g), it cannot be derived from D3 that the cutter bits 19 are conical teeth. In fact, the shape of the bits is not clear from D3.

(c) Main request - Inventive step

Appellant's case:

The subject-matter of claim 1 does not involve an inventive step in view of the following documents:
a) N2 alone or in combination with N1;
b) N1 ("Bosta SC") in combination with N9, N4 or D3;
c) N1 ("Bosta D") in combination with N9 or D3;
d) D3 alone or in combination with N1; or
e) D1 in combination with N3 and possibly N1.

Attack a):
N2 discloses a cutter head with cutting tools in the form of conical teeth for cutting hard ground (page 1, line 17 and page 2, line 25; figures 1 to 5, teeth 12), contrary to the opposition division's view. The cutter head comprises six support arms carrying 60 teeth in

total. Thus, the cutter head defined in claim 1 differs from that disclosed in N2 only by feature (f). The technical problem objectively solved by this feature is how to increase efficiency when dredging hard ground (see paragraph 11 of the patent specification). The skilled person faced with this problem, and assisted by their common general knowledge, would inevitably increase the size of the head and/or reduce the size of the teeth, and thus use at least 100 teeth. This is confirmed by the opinion of an expert in the art of dredging (document N10). In addition, N1 suggests using so many teeth because it discloses a similar cutter head with six support arms carrying 120 teeth (see head "Bosta SC" on front page). The mere fact that this head is used for dredging clay or peat would not hinder the skilled person from providing the cutter head of N2 with 100 teeth or more.

Attack b):
The subject-matter of claim 1 differs from the cutter head "Bosta SC" disclosed in N1 by feature (g). As with N2, this distinguishing feature solves the objective problem of how to increase efficiency when dredging hard ground. The claimed solution to this problem is rendered obvious by N9 which discloses conical pencil-point picks for efficiently dredging hard rock. The mere fact that Bosta SC comprises cutting tools in the form of flared points would not hinder the skilled person from replacing these cutting tools with conical picks as shown in N9.

Attack c):
In addition to Bosta SC, N1 discloses a cutter head with 60 cutting tools for dredging rock with a UCS of up to 250 MPa (head "Bosta D"). The subject-matter of claim 1 differs from it by features (f) and (g). Since

these distinguishing features do not interact to achieve a synergistic effect, they can be treated independently when assessing their obviousness. For the reasons set out above with regard to Bosta SC, the provision of feature (g) is rendered obvious by the teaching of N9. Alternatively, the skilled person would look for suggestions in the neighbouring field of trenching and N4 would motivate them to replace the flared points of Bosta D with conical points. For the reasons set out above with regard to N2, the provision of feature (f) is rendered obvious by common general knowledge and/or N1. In addition, features (f) and (g) are rendered obvious by the teaching of D3.

Attack d):
Should the Board decide that D3 fails to disclose features (d) and (f), these features could not lead to an inventive step. With respect to feature (d), the skilled person starting from D3 and looking to make the support structure for the cutting tools more robust, or simply to provide an alternative support structure, would consider replacing the pairs of webs 13 by support arms extending from the base ring to the hub, because this is the conventional support structure in the art, as documented in N1 or N12. Alternatively, if the skilled person were to beef up the webs 13, they would arrive at the flange-like arms in an obvious manner. With respect to feature (f), this modification would be obvious, for the reasons set out above with regard to N2. In fact, D3 dates from 1980 and the skilled person seeking to use the cutter head of D3 in a modern large-sized cutter suction dredger would inevitably scale up the head and thus use at least 100 cutter bits.

Attack e):

The cutter head defined in claim 1 differs from that disclosed in D1 only by features (f) and (g). For the skilled person looking to increase efficiency when dredging hard ground, the provision of conical teeth is rendered obvious by the teaching of N3 (feature (g)). Once the desired tooth spacing has been established, it is only a matter of size of the head and of the driving power to end up with at least 100 teeth (feature (f)). Alternatively, this latter feature is rendered obvious by N1, for the reasons set out above with regard to N2.

Respondent's case:

The claimed subject-matter involves an inventive step when starting from N2, N1, D3 or D1 as closest prior art.

Attack a):
In addition to feature (f), N2 fails to disclose feature (g). In the drawings of N2, items 12 are not teeth but adapters to which teeth may be removably fitted, as stated on page 6, line 33. Even if items 12 are considered to be teeth, it cannot be derived from N2 that they would be axisymmetrical at their free outer end (feature (g)). N2 is concerned with the provision of non-return means in the form of valves/ flaps 13 to prevent spillage of cut ground material (page 3, lines 8 to 15), not with the provision of specific teeth for cutting ground material. Therefore a skilled reader would not attach any significance to the teeth shown in the drawings, in particular because the illustrations are highly schematic. In practice, the teeth were intended to be asymmetrical pick points, as explained by the inventor of N2 (see document N13).

The technical problem objectively solved by features (f) and (g) is that of how to provide a cutter head for a suction dredger that is more efficient in hard ground (see paragraphs 11 and 25 of the patent specification). The skilled person facing this problem would have no motivation to modify the shape and number of the cutting teeth in the claimed manner.

Contrary to what is stated in the expert opinion N10, this modification is not rendered obvious by common general knowledge before the priority date (6 July 2009). When dredging hard ground, it was conventional practice to strike large fragments out of the ground with great force, not to break off small pieces of ground, as with the invention. In view of the fact that teeth are prone to wear or damage, the skilled person seeking to increase dredging efficiency would tend not increase the number of teeth. Instead, they would replace the conical teeth of N2 by bigger asymmetrical teeth (see Bosta D in N1).

Whilst N1 teaches that a cutter head with 120 cutting teeth in the form of flared points prevents clogging when dredging clay ("Bosta SC"), this specific teaching is not compatible with that of N2. Clay is a soft pudding-like material which can be dredged with cutting tools in the form of flared points, acting like spoons shovelling the pudding. Pick points or conical pencil-point picks are only suitable for dredging much harder ground, such as rock. N1 also discloses the cutter head Bosta D having 60 cutting teeth in the form of asymmetrical pick points for efficiently dredging hard rock with a UCS of up to 250 MPa ("Bosta D"). This teaching is compatible with that of N2 and would lead the skilled person away from features (f) and (g).

Attack b):
The subject-matter of claim 1 differs from the cutter head Bosta SC disclosed in N1 by feature (g). For the skilled person seeking to increase efficiency when dredging hard ground, this distinguishing feature is not rendered obvious by N9, N4 or D3. Contrary to Bosta SC, which is used for dredging soft ground such as clay and peat, N9, N4 and D3 relate to heads for cutting much harder ground such as rock. Thus, the skilled person would not consider their teachings. Even if they were to consider any of these teachings, they would recognise that conical pencil-point picks as disclosed therein would not be adequate for dredging clay or peat. Thus, the skilled person would not replace the flared points of Bosta SC with conical picks, as this would run counter to the function of Bosta SC.

Attack c):
The subject-matter of claim 1 differs from the cutter head "Bosta D" by features (f) and (g). For the skilled person seeking to increase efficiency when dredging hard ground, none of these modifications would be obvious. In fact, the skilled person would rather use bigger and heavier asymmetrical teeth, as suggested by D2 (figure 8) and N12, rather than axisymmetrical ones. Even if they were to replace the asymmetrical pick points of Bosta D by conical teeth as disclosed in N9, they would not arrive at feature (f). This feature is not rendered obvious by common general knowledge, let alone N1, for the reasons set out above with respect to N2.

Attack d):
Should the Board decide that the subject-matter of claim 1 differs from D3 by features (d) and (f), the provision of these distinguishing features involves an

inventive step. With regard to feature (d) the skilled person seeking to reinforce the structure supporting the cutting bits is not provided with a clear motivation to modify the pairs of webs in the claimed manner. Instead, using the common general knowledge in the art, they would rather consider improving the webs' stability by increasing the webs' thickness or arranging stiffeners on them. With regard to feature (f) the appellant's assertion that it results automatically from a scaling-up of the cutter head of D3 is mere speculation. Furthermore, the skilled person has no clear motivation to scale up this head.

Attack e):
D1 fails to disclose features (f) and (g). The objective problem is how to provide a cutter head for a suction dredger that is more efficient in hard ground. N3 documents general knowledge about breaking coal and rock in underground mining, as opposed to D1 which relates to dredging underwater. Therefore, when addressing the objective technical problem, the skilled person would not consider the teachings of N3. Even if they did, D1 and N3 would not motivate them to increase the number of cutting tools to at least 100.

Reasons for the Decision

1. Admission of N10, N12 and N13 in the appeal proceedings

1.1 Whilst documents N10, N12 and N13 could arguably have been filed in the opposition proceedings, the Board decided to admit these documents into the appeal proceedings, irrespective of their relevance, for the following reasons (Articles 12(4) and 13(1) RPBA).

1.2 The appellant filed document N10 in reaction to the evaluation of novelty and inventive step in the decision under appeal, to provide further evidence of the general knowledge of the skilled person and how they would read prior art documents D3, N1, N2, N3 and N9. Even though N10 was late-filed, at least from a formal point of view, its content was already announced in the statement of grounds of appeal (see pages 4, 6, 10 and 12).

1.3 The respondent filed document N12 in reaction to the content of late-filed document N10.

1.4 The respondent filed document N13 allegedly in reaction to the Board's communication under Article 15(1) RPBA in preparation of the oral proceedings, and this document did not give rise to any new or complex issue.

2. Hearing of technical expert

2.1 The appellant requested that a technical expert, Prof. C. van Rhee, be allowed to provide an expert testimony during the oral proceedings.

2.2 However, the Board considers itself to be sufficiently competent to decide the merits of the case without use of the technical assistance of experts, either provided by the parties or appointed independently by the Board. The Board therefore did not proceed to the hearing of the expert.

3. Main request - Novelty

3.1 D3 discloses, in the terms of claim 1, a cutter head for dredging ground under the water surface (figures 1 to 3), comprising a revolving body which is rotatable

around a central axis and which is formed by a base ring (ring 14) and a hub (central boss 11) placed at a distance therefrom, between which extend four pairs of spiral-helical webs 13 provided with cutting tools (cutter bits 19).

3.2 The parties dispute whether D3 discloses the following features of claim 1:

(d) that support arms extend between the base ring and hub and are provided with cutting tools, and

(f) that the cutter head comprises at least 100 cutting tools

(g) which are axisymmetrical at their free outer end.

3.3 The Board is persuaded by the appellant's argument that feature (g) is disclosed in D3. It is apparent from the side and perspective views of the cutting tools 19 in figures 1 to 3 of D3 that they are conical teeth. This understanding is in conformity with the teaching of D3. Indeed, this document is concerned with the provision of a cutter head for dredging hard rock (page 1, lines 16 to 25), and it is generally known that conical teeth are used for cutting hard ground, such as rock (see e.g. D8, figure 4; N3, pages 133 and 137 and figures 12, 17 and 18; N4, figure 5; N5, figure 1; N9, page 2).

3.4 However, the Board shares the view of the respondent that D3 fails to disclose features (d) and (f), as assessed by the opposition division.

3.4.1 With respect to feature (d), each pair of webs 13 does not constitute a "support arm" in the sense of claim 1, even though it serves the function of carrying the cutting tools 19. In the context of claim 1, the term "support arm" is clear and it can only be given its normal meaning of an arm-shaped part which protrudes

from the base ring to support the hub, when the cutter head rests on its base ring (see N1, drawing on page 2 and photographs on pages 4 and 6; N2, figure 3; N12, front page; D1, figure 2, arm-shaped blades 2; D2, figure 9, arms). This understanding accords with the teaching in the patent (see support arms 15 in figure 2). The spiral-helical webs 13 do not fulfill this requirement. The appellant alleges that the term "support arm" could be construed in a broader manner to cover flanges or webs, and refers to paragraph 23 of the patent specification to support this allegation. However, the Board considers that the language of this term imparts a clear teaching to the skilled person reading claim 1 and thus there is no reason for them to use the description to interpret this term in a different manner.

3.4.2 With respect to feature (f), the Board is not persuaded by the appellant's argument that it can be derived from figures 1 to 3 of D3 that the cutter head comprises 104 cutting tools, let alone 120 cutting tools, for the reasons given by the respondent (see point X-b) above).

3.5 Thus, the Board shares the view of the opposition division that the subject-matter of claim 1 as amended is novel in light of D3 (Articles 52(1) and 54 EPC).

4. Main request - Inventive step

4.1 The parties agree that N2 forms a realistic starting point for the assessment of inventive step. The Board shares this view.

4.2 N2 discloses, in figures 1 to 5, a cutter head 3 for dredging ground under the water surface, comprising a revolving body which is rotatable around a central axis

and which is formed by a base ring 7 and a hub 8 placed at a distance therefrom, between which extend support arms 9 provided with cutting tools.

4.3 The parties agree that N2 fails to disclose feature (f) of claim 1 but they dispute whether it discloses feature (g).

4.4 The Board shares the view of the appellant that this feature can indeed be derived from N2. Whilst reference sign 12 is used on page 6, lines 30 and 33 of N2 to denote "adapters" for connecting teeth to the arms 9, figures 1 to 5 clearly show that each arm 9 carries a series of cutting tools in the form of teeth 12. This is confirmed by the language of claims 1, 4 and 12 in N2. Further, from the side and perspective views of the teeth in figures 2 to 5 of N2, it is apparent that they have a conical shape. Thus, a skilled reader of N2 would immediately recognise that the arms 9 carry conical teeth 12, even though the text of N2 does not focus on the actual shape of the teeth, but rather on the prevention of spillage by providing non-return means between the arms 9, such as valves/flaps 13. The respondent refers to a written statement of the inventor of N2 (document N13), in which it is explained that the drawings of N2 are based on a small scale model wherein the teeth were asymmetrical pick points, and not intended to represent any particular shape. However, in light of the clear teaching of figures 2 to 5 of N2, the Board does not assign too much weight to this submission.

4.5 Hence, the subject-matter of claim 1 differs from N2 by feature (f).

4.6 The parties agree that the problem objectively solved by this distinguishing feature can be seen as how to increase efficiency when dredging hard ground (see paragraphs 11 an 25 of the patent specification).

4.7 The Board is not persuaded that the skilled person starting from N2, in the expectation of solving this problem, could and indeed would increase the number of teeth to 100 or more so as to arrive at the claimed invention.

4.8 Common general knowledge alone does not give a clear motivation to modify the head of N2 in the claimed manner. Using common general knowledge, the skilled person seeking to improve dredging efficiency would not increase the number of teeth because they are prone to wear or damage, but rather use larger teeth.

4.9 No evidence has been provided to support the appellant's assertion that, on the basis of common general knowledge alone, the skilled person looking to improve dredging efficiency would consider increasing the size of the head, alternatively reducing the size of the teeth whilst increasing the number to above 100. The Board is also not convinced that a larger cutter head would increase efficiency as it would require more driving power. The appellant further alleges that the skilled person wanting to dredge harder ground than in N2, would automatically use a larger number of smaller teeth, and refers to an expert opinion (document N10) to support this allegation. However, this allegation and opinion appear to have an element of hindsight because they are contradicted by the teaching of N1 that a cutter head with 60 large teeth can be successfully used in dredging rock with a UCS of 50 to 250 MPa (see cutter head "Bosta D" in N1).

4.10 The appellant argues that the claimed solution to the objective problem is rendered obvious by N1 which discloses a cutter head provided with 120 teeth (see cutter head "Bosta SC"). The Board is not persuaded by this argument, for the reasons submitted by the respondent. N1 teaches that the cutter head "Bosta SC" is adapted for cutting clay and peat, whereby it comprises a large number of small teeth in the form of flared points in order to prevent clogging (page 4, right column; page 6, bottom table). However, this teaching is not compatible with N2 which concerns a cutter head for cutting hard ground (page 1, line 17; page 2, line 25), for which clogging of the cutter head is not a issue. If the skilled person were to consider N1, they would rather consider the rock cutter head disclosed therein ("Bosta D"), which is provided with 60 teeth in the form of asymmetrical pick points and thus would be lead away from features (f) and (g) of claim 1. It is stated in N1 that the cutter head Bosta D has been developed for driving powers ranging from 500 to 5000 kW (page 4, left column). No evidence has been provided to support the appellant's allegation that in practice the number of teeth of a cutter head is inevitably increased as a function of the driving power.

4.11 In conclusion, the Board is not convinced by the appellant's argument that the subject-matter of claim 1 lacks an inventive step when starting from N2 (Articles 52(1) and 56 EPC).

4.12 The appellant also disputes whether the subject-matter of claim 1 involves an inventive step when taking the cutter head Bosta SC or Bosta D disclosed in D1, or the cutter head disclosed in D3 as starting point, even

though these cutter heads are less promising starting points than that disclosed in N2. For the sake of completeness, this issue is discussed hereafter:

4.13 Inventive step with respect to Bosta SC

The claimed subject-matter differs from Bosta SC as disclosed in N1 by feature (g). Bosta SC is adapted for cutting clay and peat and thus is equipped with teeth in the form of flared points. The skilled person would not replace the flared points by conical pencil-point picks as disclosed in N9 because this would most likely jeopardise dredging of clay or peat and thus run counter to the aim of Bosta SC. Clay is a soft material which can be dredged with flared points, as used in Bosta SC. Conical pencil-point picks as disclosed in N9 are not suitable for dredging clay; they are designed for breaking off much harder ground, such as rock.

The Board thus shares the respondent's view that, starting from Bosta SC, which is designed for dredging clay or peat, the skilled person could further develop that cutter head but at the end of that development the result would be a cutter head that is still suitable for this purpose. It is unrealistic to suggest that, starting from Bosta SC, the skilled person would develop a cutter head that is no longer suitable for dredging clay or peat. In general, although the skilled person is essentially free in choosing a (realistic) starting point for a development towards the claimed invention, that choice defines the framework for further development (see e.g. Case Law of the Boards of Appeal, 9th edition, 2019, Chapter I.D.3.6).

Thus, the claimed invention involves an inventive step over Bosta SC.

4.14 Inventive step with respect to Bosta D

The claimed subject-matter differs from Bosta D as disclosed in N1 by features (f) and (g). Bosta D is adapted for cutting rock and thus is equipped with 60 teeth in the form of asymmetrical pick points. Whilst the skilled person looking to improve efficiency when dredging harder ground would gain motivation from N9 to replace the asymmetrical pick points by conical pencil-point picks (feature (g)), they would have no motivation to increase the number of cutting tools to 100 or more (feature (f)), for the reasons already given above when starting from N2. D3 fails to disclose feature (f) (see point 3.4.2 above) and thus could not lead the skilled person to the claimed solution.

Thus, the claimed invention involves an inventive step over Bosta D.

4.15 Inventive step with respect to D3

As reasoned above, the subject-matter of claim 1 differs from the cutter head disclosed in D3 by features (d) and (f).

The appellant argues that the skilled person seeking to make the construction of the cutter head more robust or to provide an alternative solution for mounting the hub onto the base ring, would replace the pairs of spiral-helical webs 13 by support arms as disclosed in N1 and thus arrive at feature (d). The Board is not convinced. Whilst basket cutters with support arms as shown in N1 are generally known in the art of dredging, there is no evidence indicating that feature (d) would be the inevitable result of a standard modification of the

cutter head of D3. Should the skilled person decide to strengthen the webs 13, they would arrive at thicker helical webs but not support arms (see point 3.4.1 above). Moreover, even if the pairs of webs 13 were replaced by support arms, no evidence has been provided to support the appellant's assertion that the cutter head would be scaled up to be equipped with at least 100 cutting tools.

Thus, the claimed invention involves an inventive step over D3.

4.16 In its written submissions, the appellant also argued that the claimed subject-matter lacked an inventive step when starting from D1 as closest prior art. In its communication pursuant to Article 15(1) RPBA the Board addressed this objection and expressed its intention to limit the discussion only to the objections of lack of inventive step starting from either N2 or Bosta SC, in particular because D1 appears to be a less promising starting point than either N2 or Bosta SC and because it fails to disclose features (f) and (g) (see point 9.10 of the communication). In response, the appellant neither commented upon nor disputed this opinion and in particular did not refer to it in the oral proceedings, and the Board sees no reason to depart from its preliminary opinion. Hence, there is no need to address the objection based on D1 any further.

5. The above reasoning applies *mutatis mutandis* to the subject-matter of independent claim 12 as well as that of independent claim 13. Claim 12 concerns a use of the cutter head as defined in claim 1, while claim 13 concerns a cutter suction dredger provided with this cutter head.

6. For the reasons set out above, the grounds for opposition raised by the appellant do not prejudice the maintenance of the patent as amended according to the main request.

7. In light of this conclusion there is no need to consider the auxiliary requests of the respondent.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

C. Spira G. Ashley

Decision electronically authenticated