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**Datasheet for the decision
of 16 April 2018**

Case Number: T 1534/16 - 3.2.07

Application Number: 11700196.6

Publication Number: 2523761

IPC: B08B3/02, B23D79/02

Language of the proceedings: EN

Title of invention:

METHOD FOR HIGH-PRESSURE LIQUID JET DEBURRING AND
CORRESPONDING INDUSTRIAL INSTALLATION

Patent Proprietor:

Elwema Automotive GmbH

Opponents:

Ecoclean GmbH
Förster, Michael

Headword:

Relevant legal provisions:

EPC Art. 56, 123(2)
EPC R. 144(d)

Keyword:

Inventive step - (yes)

Amendments - added subject-matter (no)

Inspection of files - Exclusion of documents from file
inspection (yes)

Decisions cited:

Catchword:



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Case Number: T 1534/16 - 3.2.07

D E C I S I O N
of Technical Board of Appeal 3.2.07
of 16 April 2018

Appellant:
(Patent Proprietor)

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Representative:

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Decision under appeal:

Interlocutory decision of the Opposition
Division of the European Patent Office posted on
6 May 2016 concerning maintenance of European
patent No. 2523761 in amended form

Composition of the Board:

Chairman G. Pricolo
Members: V. Bevilacqua
 G. Weiss

Summary of Facts and Submissions

I. European patent No. 2 523 761 was maintained in amended form by the Opposition Division's decision of 6 May 2016. Notice of appeal against this decision was filed by the opponent on 5 July 2016 and by the patentee (appellant) on 4 July 2016.

Notice of intervention was submitted on 28 February 2017.

In a letter dated 10 July 2017 the appellant requested accelerated proceedings.

The opposition and the intervention were withdrawn with letters dated 7 March 2018.

II. Oral proceedings were held on 16 April 2018. At the end of them the appellant withdrew all its previous requests and requested that the decision under appeal be set aside and that a patent be maintained in amended form on the basis of a new main request submitted at the oral proceedings. It also requested that some of the documents submitted by the opponent during written proceedings be excluded from file inspection.

III. The present decision is based on the following documents:

E14: The IP com Journal: Evidence of Innovation Thinking, volume 8/2008, number 11a, with email from Ms Olga Harder, TIB;

E15: FR 2810267 A1;

E18: Sale presentation of ABB Robotics.

IV. Claim 1 of the main request reads as follows:

"Installation (10) for high-pressure liquid jet deburring of a machined portion of a workpiece (44), said installation comprising:

at least one deburring receptacle (16) for containing a bath (46) of cleaning liquid during operation and for receiving at least part of said workpiece; and a high-pressure jet nozzle (30) connected to a high-pressure liquid circuit (32) for creating a high-pressure/high-speed liquid jet and arranged in said receptacle for deburring said machined portion of said workpiece, from which burr is to be removed;

a positioning device (12), which is a 6-degree-of-freedom articulated industrial robot, for positioning said workpiece relative to said high-pressure jet nozzle;

wherein

said deburring receptacle (16) has a flooding inlet (48) connected to a cleaning liquid supply circuit and suitable for flooding said deburring receptacle (16) with a cleaning liquid;

said high-pressure jet nozzle (30) is configured for creating a high pressure/high-speed liquid jet without gas sheath and immersed in said bath (46) of cleaning liquid so as to deburr said machined portion of said workpiece and further comprising

a pre-washing receptacle (14), said at least one deburring receptacle (16) and a drying receptacle (20), each of said receptacles being arranged within the reachable workspace of said articulated industrial robot (12)."

Claim 7 of the main request reads as follows:

"Installation (10) for high-pressure liquid jet deburring of a machined portion of a workpiece (44), said installation comprising:
at least one deburring receptacle (16) for containing a bath (46) of cleaning liquid during operation and for receiving at least part of said workpiece; and a high-pressure jet nozzle (30) connected to a high-pressure liquid circuit (32) with a high-pressure pump (34) for providing high-pressure liquid and for creating a high-pressure/high-speed liquid jet and arranged in said receptacle for deburring said machined portion of said workpiece, from which burr is to be removed;
a positioning device (12), in particular a 6-degree-of-freedom articulated industrial robot, for positioning said workpiece relative to said high-pressure jet nozzle;
characterized in that
said deburring receptacle (16) has a flooding inlet (48) connected to a cleaning liquid supply circuit and suitable for flooding said deburring receptacle (16) with a cleaning liquid and a flood washing inlet for creating turbulence in said bath (46) of cleaning liquid; in that
said high-pressure jet nozzle (30) is configured for creating a high pressure/high-speed liquid jet without gas sheath and immersed in said bath (46) of cleaning liquid so as to deburr said machined portion of said workpiece;
and in that said high-pressure liquid circuit (32) comprises a valve (52, 54) arrangement connecting said high-pressure pump (34) as a single pressurization source to said high-pressure jet nozzle (30) and to said flood washing inlet in order to supply said high-

pressure jet nozzle (30) and said flood washing inlet with high-pressure liquid for flood washing said workpiece (44) inside said deburring receptacle (16)."

- V. The arguments submitted by the appellant in support of its main request may be summarised as follows:

On the basis of the available written evidence there were doubts as to the public availability of all the prior uses submitted during written proceedings.

The closest prior art was disclosed by E15. The installations disclosed in E14 and E18 were not suitable starting points for discussing inventive step because both these documents failed to disclose that the high-pressure/high-speed liquid jet was without a gas sheath, and E18 additionally failed to disclose that the jet was immersed in a bath of cleaning liquid.

The subject-matter of claim 1 of the main request was based on an inventive step because the teachings of E14 and E18, relating to installations using water, were not directly applicable to the installation disclosed in E17, as the latter used cutting oil and would thus require extensive modifications in order to use water.

A skilled reader would have considered that the feature that the liquid in the high-pressure liquid circuit was devoid of abrasive additives was inherently present in the installation according to claim 7 of the main request. Therefore the subject-matter of claim 7 of the main request did not extend beyond the content of the application as filed.

The subject-matter of claim 7 of the main request also involved an inventive step, in particular because none

of the available documents taught the feature that a valve arrangement connected a high-pressure pump to both the high-pressure jet nozzle and the flood washing inlet.

As regards the request for exclusion from file inspection, it was justified because the documents concerned reflected proprietary know-how, and their publication would have been prejudicial to legitimate economic interests of the appellant.

Reasons for the Decision

1. *Prior uses*

The opponent and the intervener submitted a plurality of allegations of prior use before their respective oppositions were withdrawn.

The appellant replied by raising doubts concerning the public availability of the installations in accordance with the alleged prior uses, in particular by referring to the presence of an obligation to maintain secrecy.

The Board, regarding the appellant's doubts as justified and considering that further investigations would require the co-operation of the opponent and/or intervener, who have withdrawn their oppositions and their intervention (see Case Law of the Boards of Appeal, 8th edition 2016, IV.D.2.2.9 (c)), concludes that the allegations of prior use are to be disregarded.

2. *Exclusion from file inspection*

During the written proceedings before the Board, documents E48, E48a, E49, E51, E52, E53 and E54 filed by the appellant before it withdrew its opposition were provisionally excluded from file inspection (see communication dated 28 February 2018) at the request of the appellant (patentee). The Board, considering that the opponent and intervener had explicitly agreed by letters of 6 March 2018 to the appellant's request and being satisfied that the documents in question do not serve the purpose of informing the public about the patent in suit, concludes that the above-mentioned documents should remain excluded from file inspection pursuant to Rule 144(d) EPC.

3. *Claim 1 - inventive step*

3.1 E15 as a starting point

E15 discloses an installation (see the figure and page 1, line 25) for high-pressure liquid jet deburring (page 1, lines 14-18) of a machined portion of a workpiece (see page 1, line 22: "bavures d'usinage"), said installation comprising:

at least one deburring receptacle (2) for containing a bath (page 3, line 7) of cleaning liquid (cutting oil) during operation and for receiving at least part of said workpiece; and a high-pressure jet nozzle (4, see figure 1) connected to a high-pressure liquid circuit (page 5, lines 6-8) for creating a high-pressure/high-speed liquid jet for deburring said machined portion of said workpiece, from which burr is to be removed.

Appellant I argues that oil cannot be considered a cleaning liquid.

The Board disagrees, because in E15 the bath of cutting oil also has a cleaning function, as it also contributes to removing dirt and chips from the workpiece.

E15 discloses a positioning device (5), which is a 6-degree-of-freedom articulated industrial robot, for positioning said workpiece relative to said high-pressure jet nozzle.

E15 discloses that the deburring receptacle (2) necessarily has a "filling inlet" (page 3, line 7) connected to a cleaning liquid supply circuit and suitable for flooding said deburring receptacle (16) with a cleaning liquid.

In the absence of any specific limitation in the claim, the term "flooding" must be given its broad, normal meaning, implying that the receptacle is filled with liquid. In particular, contrary to the appellant's view, it cannot be read as implying filling in a "short time" or "at a very high rate". Thus the filling inlet of E15 clearly corresponds to the claimed "flooding inlet".

E15 also discloses that the high-pressure jet nozzle (4) is configured to create a high-pressure/high-speed liquid jet without gas sheath and immersed in the bath of cleaning liquid so as to deburr said machined portion of said workpiece.

The skilled person reading E15 would consider that the jet disclosed therein is without gas sheath because, as the nozzles are positioned outside the receptacle, the jet impacts the surface of the bath. In such a

situation the skilled person would exclude the presence of a gas sheath, because such a gas sheath would only be able to follow the jet in the atmosphere, but would not be able to penetrate into the bath together with the high-pressure jet.

On the basis of the above analysis the Board considers that the installation disclosed in E15 represents a suitable starting point for discussing inventive step.

3.2 E14 as a starting point

E14 fails to disclose that the high-pressure jet is without gas sheath because, due to its schematic nature, silence on the presence of a specific feature (gas sheath) does not per se imply that there is a clear and unambiguous teaching as to its absence.

For this reason, E14 is considered to be a less suitable starting point for discussing inventive step.

3.3 E18 as a starting point

The Board also considers E18 to be a less suitable starting point for discussing inventive step.

The absence of a gas sheath is not disclosed in E18. This document being a marketing presentation, it cannot be assumed that all the technical details of the described method and installation are described in full.

As for E14 (see above), the fact that this document is silent about a gas sheath does not per se imply that there is a clear and unambiguous teaching as to its absence.

E18 also fails to disclose that the machined portion is dipped in liquid.

3.4 Discussion of inventive step starting from E15

3.4.1 E15 fails to disclose that the high-pressure jet nozzle is arranged in the deburring receptacle.

When the nozzle is arranged in the filled receptacle, the jet is completely submerged.

The effect of this that the jet does not impact on the surface of the liquid, and therefore that no splashing occurs.

E14 teaches that deburring with a submerged nozzle reduces the noise level and the creation of mist (see the paragraph "Advantages of the proposed solution").

3.4.2 E15 also fails to disclose a pre-washing receptacle and a drying receptacle, each of the receptacles being arranged together with the deburring receptacle within the reachable workspace of the articulated industrial robot.

This feature allows a single robot to be used to hold the workpiece not only during deburring, as disclosed in E15, but also during a pre-washing step and a drying step after deburring. The effect of this feature is that the same robot can also be used to move the workpiece from pre-washing to deburring to drying.

On the basis of this distinguishing feature, the effect of which is independent of the effect of the previously mentioned distinguishing feature, the problem to be

solved is how to modify the known installation such as to arrive at a modular installation for integrated washing and deburring which can be manufactured at comparatively low cost.

E18 (see slide 17) discloses a configuration where a single robot that holds and moves a workpiece from a pre-washing receptacle to a deburring receptacle and then to a drying receptacle is described as being particularly cost-effective (see slides 2 and 3).

The Board however considers that the skilled person would not regard the application of the teaching of this document to the installation of E15 as being straightforward.

The installation of E15 working with oil as a cutting fluid and the direct and straightforward application of the teaching of E18 would result in a workpiece which is blown off (step 3, slide 17) and dried (step 4) whilst still having cutting oil on its surface. However, steps 3 and 4 are described in E18 in connection with water being the working liquid, not oil. Since there is no indication in the prior art that these steps would be equally effective with cutting oil, the Board concludes that there is no motivation for the skilled person to directly implement the teaching of E18 in the installation according to E15.

4. *Claim 7 - amendments*

The disclosure of a circuit equipped with a single pressurisation source as claimed in claim 7 of the main request is found in paragraph [38] of the original description. Such a circuit is designed for, and carries, a purely liquid phase which is devoid of

abrasive additives (see the last four lines of paragraph [38]).

This last feature is not explicitly mentioned in claim 7 of the main request.

However, the Board concurs with the position of the appellant that it is inherently present in the installation according to claim 7 of the main request.

This is because the use of abrasive additives would be immediately excluded by a skilled person, as they would inevitably damage the high-pressure pump mentioned in the claim.

As a consequence, the subject-matter of claim 7 of the main request complies with the requirements of Article 123(2) EPC.

5. *Claim 7 - inventive step*

5.1 E15 as a starting point, differences

For the reasons already discussed in relation to claim 1 (see point 3.1 above), E15 is considered to be the closest prior art.

Starting from E15 (see also point 3.1 above), the following distinguishing features are identified:

- (a) the high-pressure jet nozzle is arranged in the deburring receptacle;
- (b) the deburring receptacle has a flood washing inlet for creating turbulence in said bath of cleaning liquid;

(c) the high-pressure liquid circuit comprises a valve arrangement connecting the high-pressure pump as a single pressurisation source to the high-pressure jet nozzle and to the flood washing inlet in order to supply said high-pressure jet nozzle and said flood washing inlet with high-pressure liquid for flood washing said workpiece inside said deburring receptacle.

5.2 Discussion of inventive step

5.2.1 Concerning feature (a), as already discussed in relation to claim 1 (see point 3.4.1 above), its effect is to reduce the noise level and the creation of mist.

5.2.2 Concerning features (b) and (c), the Board concurs with the appellant that the use of a single pressurisation source contributes to a reduction of the complexity and also of the cost of the known installation. The problem solved by these features is therefore, as for claim 1, how to modify the known installation such as to arrive at a modular installation for integrated washing and deburring which can be manufactured at comparatively low cost.

Inventive step is to be acknowledged because none of the available documents teaches or discloses the use of distinguishing features (b) and (c).

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the department of first instance with the order to maintain the patent in amended form on the basis of:
 - claims 1 to 12 submitted at the oral proceedings before the Board as new main request;
 - description: pages 2, 3, 3a and 4 submitted at the oral proceedings before the Board and pages 5, 6 and 7 of the patent specification;
 - drawings: figures 1, 2A, 2B, 2C, 2D and 3 of the patent specification.

The Registrar:

The Chairman:



T. Buschek

G. Pricolo

Decision electronically authenticated