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**Datasheet for the decision
of 5 November 2015**

Case Number: T 0228/11 - 3.2.06

Application Number: 05006779.2

Publication Number: 1600244

IPC: B23K26/10

Language of the proceedings: EN

Title of invention:

Method and device for robot-aided remote laser welding, with simplified control of focusing direction of laser beam

Patent Proprietor:

COMAU S.p.A.

Opponent:

KUKA Systems GmbH

Headword:

Relevant legal provisions:

EPC 1973 Art. 84
EPC Art. 123(2), 100(c)

Keyword:

Amendments - added subject-matter (no)
Remittal to the department of first instance - (yes)

Decisions cited:

Catchword:



**Beschwerdekammern
Boards of Appeal
Chambres de recours**

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Case Number: T 0228/11 - 3.2.06

D E C I S I O N
of Technical Board of Appeal 3.2.06
of 5 November 2015

Appellant:
(Patent Proprietor)

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Decision under appeal:

**Decision of the Opposition Division of the
European Patent Office posted on 23 December
2010 revoking European patent No. 1600244
pursuant to Article 101(3)(b) EPC.**

Composition of the Board:

Chairman W. Ungler
Members: M. Hannam
T. Rosenblatt

Summary of Facts and Submissions

- I. An appeal was filed by the proprietor against the decision of the opposition division revoking European Patent No. 1 600 244 in which it found that the ground for opposition under Article 100(c) EPC was prejudicial to the maintenance of the patent according to the main request and that the requirement of Article 123(2) EPC was not met by the first auxiliary request.
- II. With its grounds of appeal, the appellant (proprietor) requested that the decision under appeal be set aside and that the patent be maintained as granted. It also requested maintenance of the patent in an amended form according to an auxiliary request 1.
- III. The respondent (opponent) requested that the appeal be dismissed as inadmissible, auxiliarily that it be dismissed since the ground for opposition under Article 100(c) EPC was prejudicial to the maintenance of the patent according to the main request and that the requirement of Article 123(2) EPC was not met by the first auxiliary request.
- IV. The Board issued a summons to oral proceedings and a subsequent communication containing its provisional opinion, in which it indicated *inter alia* that the appeal appeared admissible and that the subject-matter of claim 1 of both the main request and auxiliary request 1 appeared to extend beyond the content of the application as originally filed.
- V. With letter of 30 September 2015 the appellant filed an auxiliary request 2.

- VI. With letter of 5 October 2015 the respondent withdrew its opposition and indicated that it would not attend the scheduled oral proceedings. Hereinafter, for avoidance of confusion, the use of the term 'respondent' is however continued.
- VII. Oral proceedings were held before the Board on 5 November 2015, during which the appellant withdrew both its main request and auxiliary request 1. It requested that the decision under appeal be set aside and the patent be maintained in amended form on the basis of the claims of auxiliary request 2, auxiliarily that the decision under appeal be set aside and the case be remitted to the department of first instance for further prosecution.
- VIII. Claim 1 of auxiliary request 2 reads as follows:
- "Method for laser welding of a structure consisting of metal sheet elements, in which:
- a multi-axis handling robot (1) is arranged, including a plurality of electric motors controlling the movement of elements of the robot around said axes, together with a programmable electronic control unit (2) for programming said electric motors in order to shift a terminal element of the robot in any position, with any orientation and on any trajectory inside a given three-dimensional spatial volume,
 - onto said terminal element of the handling robot (1) is mounted an accessory device (3) for focusing a laser beam coming from a laser source, said device being designed to orient the focused laser beam (F) by oscillating it around one oscillation axis (8),
 - said handling robot (1) is controlled so as to shift the aforesaid accessory device (3) along a given

trajectory (L) close to, though not adjacent to, various areas of the structure to be welded,

- while the aforesaid accessory device (3) is shifted along said given trajectory (L), the direction of the focused laser beam (F) is varied by means of said accessory device (3), in order to shift the area (W) of the structure to be welded that is lighted by the focused laser beam (B) along a trajectory and/or at a speed not depending directly on the shifting trajectory and speed of the aforesaid accessory device (3), characterized in that:

- said accessory device (3) is designed to orient the focused laser beam (F) by oscillating it around one single oscillation axis (8),

- said handling robot (1) is controlled so as to shift the aforesaid accessory device (3) along a rectilinear trajectory (L) parallel to a direction along which a number of welding beads (10) are to be obtained and orthogonally to said single oscillation axis (8),

- the aforesaid accessory device (3) is shifted along said rectilinear trajectory at a speed (V) which is higher than the speed at which each weld bead (10) is to be created,

- while the robot shifts the accessory device (3) along said rectilinear trajectory (L) at said speed (V), the direction of the focused beam (F) is oscillated around said single oscillation axis (8) so that the area (W) lighted by the beam (F) shifts along the structure to be welded at a speed (V_w) corresponding to the speed at which a weld bead is to be created,

- once a weld bead (10) has been completed, the device has already gone farther, to a position (B) between the completed weld bead and the new bead to be made, and the focused beam (F) is oscillated abruptly so as to be brought on the initial end of a new bead to be made, so that the area of the structure lighted by the beam (F)

shifts at a very high speed (V_v) from the final end of the previous bead (10AB) to the initial end of the new bead (10CD) to be made, while said device, shifting at said higher speed, has reached a position (C) which is still between the completed weld bead and the new bead to be made."

Claim 2 of auxiliary request 2 reads:

"Device for laser welding of a structure consisting of metal sheet elements, comprising:

- a multi-axis handling robot (1) including a plurality of electric motors controlling the movement of elements of the robot around said axes, and a programmable electronic control unit (2) for controlling said electric motors in order to shift a terminal element of the robot (1) in any position, with any orientation and on any trajectory inside a given three-dimensional spatial volume,
- in which onto said terminal element of the robot is mounted an accessory device (3) for focusing a laser beam (F) coming from a laser source, said device being designed to orient the focused laser beam (F) by rotating it around one oscillation axis (8), said accessory device (3) further comprising means for controlling said oscillation, which are controlled by electronic control means,
- in which said control unit is programmed so as to shift the aforesaid accessory device (3) along a given trajectory close to, though not adjacent to, various areas of the structure to be welded,
- said robot control unit and said electronic control means for directing the orientation of the focused laser beam (F) being programmed so as to vary the pointing direction of the focused beam (F), while the aforesaid accessory device (3) is shifted by the robot

along said given trajectory, in order to shift the area (W) of the structure to be welded that is lighted by the focused laser beam (B) with a speed and/or a trajectory not depending directly on the shifting speed and trajectory of the accessory device (3), characterized in that:

- said accessory device (3) is designed to orient the focused laser beam (F) by oscillating it around one single oscillation axis (8),
- said robot control unit is programmed so as to shift the aforesaid accessory device (3) along a rectilinear trajectory (L) parallel to a direction along which a number of welding beads (10) are to be obtained and orthogonally to said single oscillation axis (8),
- the robot control unit is programmed so as to shift the aforesaid accessory device (3) along said rectilinear trajectory at a speed (V) which is higher than the speed at which each weld bead (10) is to be created,
- said electronic control means are programmed so that while the robot shifts the accessory device (3) along said rectilinear trajectory (L) at said speed (V), the direction of the focused beam (F) is oscillated around said single oscillation axis (8) so that the area (W) lighted by the beam (F) shifts along the structure to be welded at a speed (V_w) corresponding to the speed at which a weld bead is to be created,
- said electronic control means are programmed so that once a weld bead (10) has been completed, the device has already gone farther, to a position (B) between the completed weld bead and the new bead to be made, and the focused beam (F) is oscillated abruptly so as to be brought on the initial end of a new bead to be made, so that the area of the structure lighted by the beam (F) shifts at a very high speed (V_v) from the final end of the previous bead (10AB) to the initial end of the new

bead (10CD) to be made, while said device, shifting at said higher speed, has reached a position (C) which is still between the completed weld bead and the new bead to be made."

IX. The respondent's arguments relevant to the present decision may be summarised as follows:

The appeal was inadmissible since the appellant had failed to provide reasons why the opposition division's decision was unsound. In particular the omission in claim 1 of the feature relating to the position of the device between the completed weld bead and the new weld bead (e.g. position C) at the time of the abrupt oscillation of the laser beam had not been addressed by the appellant. The lack of reasons in the appellant's statement of grounds of appeal why this omission did not present an unallowable intermediate generalisation led to the appeal being inadmissible.

As regards the main request and auxiliary request 1, the expression 'single oscillation axis' in the feature 'said accessory device is designed to orient the focused laser beam by oscillating it around one single oscillation axis' was not disclosed in the originally filed documents. Similarly, the expressions 'parallel' and 'orthogonal' in the feature 'said robot control unit is programmed so as to shift the aforesaid accessory device along a rectilinear trajectory parallel to a direction along which a number of welding beads are to be obtained and orthogonally to said single oscillation axis' also lacked a basis, contrary to Article 123(2) EPC.

Reasons for the Decision

1. *Admissibility of the appeal*

1.1 Rule 99(2) EPC requires that 'in the statement of grounds of appeal the appellant shall indicate the reasons for setting aside the decision impugned ... and the facts and evidence on which the appeal is based'. In the present case it is thus necessary to establish whether the appellant's statement of grounds of appeal meets this requirement.

1.2 In section 1.2 of its appeal grounds, the appellant clearly indicates that it disagrees with the opposition division's view regarding position C, and continues in the first four paragraphs on page 2 by providing specific reasons why it disagrees with the opposition division's finding. Finally, in paragraph 5 on page 2, it summarises by stating 'In view of the above, we believe that the man skilled in the art would consider the feature "while the device has reached position C" as neither essential nor indispensable for performing the invention.

1.3 Irrespective of whether these arguments are convincing or not, they clearly indicate, contrary to the opinion of the respondent, the reasons for setting aside the decision impugned, as required by Rule 99(2) EPC, i.e. that the location of the device at position C is not required in claim 1 for the requirement of Article 123(2) EPC to be met.

1.4 The Board thus finds that the appeal meets the requirements of Article 108 EPC in combination with Rule 99(2) EPC as required by Rule 101(1) EPC, such that the appeal is admissible.

2. *Auxiliary request 2*

2.1 Article 100(c) / 123(2) EPC

The subject-matter of claims 1 and 2 is found not to extend beyond the content of the application as filed.

2.1.1 Despite not raising any objections specifically to auxiliary request 2, certain of the respondent's objections raised against the main request and auxiliary request 1 also apply to claims 1 and 2 of auxiliary request 2. These objections are however not found convincing, as detailed below.

2.1.2 As also opined by the respondent, the Board finds that there is no explicit basis in the application as originally filed for the expressions 'orthogonal', 'parallel' and 'single oscillation axis' found in claims 1 and 2. Nonetheless these expressions are directly and unambiguously derivable from the originally filed documents.

2.1.3 As regards the expression 'single oscillation axis', it is noted that the preambles of both claims 1 and 2 indicate the presence of 'one' oscillation axis yet, from the application as a whole, particularly Fig. 2 and paragraphs [0024] to [0026] of the description of the originally filed application in its published version, it is apparent that just one single oscillation axis is disclosed. From Fig. 2 it is apparent that this single oscillation axis indeed moves with the device during its travel from position A to position G, yet the oscillation axis itself remains as a single axis despite this travel. Furthermore, the Board finds that there are no features with a clearly recognisable functional or structural relationship to

the single oscillation axis disclosed in the application as a whole which are not already included in claims 1 and 2. It is furthermore noted that there is no technically reasonable interpretation of the originally disclosed method or device allowing more than one single oscillation axis of the accessory device. It thus follows that the inclusion of the expression 'single oscillation axis' in claims 1 and 2 does not extend their subject-matter beyond the content of the application as filed.

2.1.4 Regarding the expression 'parallel' in relation to the shifting of the accessory device along a rectilinear trajectory parallel to a direction along which a number of welding beads are to be obtained, the embodiment of Fig. 2 to which claims 1 and 2 are now specifically restricted, clearly discloses such a parallel movement. Furthermore, there are no features with a clearly recognisable functional or structural relationship to the parallel movement disclosed in the application as a whole which are not already included in claims 1 and 2. The skilled person would also not consider this embodiment to disclose any technically reasonable movement of the accessory device other than one parallel to the direction of development of the weld beads. The feature 'parallel' is thus also found to be directly and unambiguously disclosed.

2.1.5 Regarding the expression 'orthogonal' in relation to the shifting of the accessory device along a rectilinear trajectory orthogonal to the single oscillation axis, this restricts the possible shifting of the accessory device to movement in the plane on which Fig. 2 is depicted (e.g. the plane of the paper on which Fig. 2 is printed). However, since the shifting is also parallel to a direction along which

the welding beads are obtained, the only technically possible interpretation of 'orthogonal to the single oscillation axis' is in the direction of the arrow V indicating the robot speed in Fig. 2. It is also held that there are no features with a clearly recognisable functional or structural relationship to the feature 'orthogonal' disclosed in the application as a whole which are not included in claims 1 and 2. It thus follows that the skilled person finds a direct and unambiguous basis for the feature 'orthogonal' in the application as originally filed.

2.1.6 No further objections under Article 100(c) / 123(2) EPC to the claims of auxiliary request 2 can be inferred from the objections raised by the respondent to the main request and auxiliary request 1. The Board also sees no further objections. The subject-matter of claims 1 and 2 is thus found not to extend beyond the content of the application as filed.

2.2 Article 84 EPC 1973

No objections to the clarity of any amended claims which could be inferred to apply also to the claims of auxiliary request 2 were made by the respondent. The Board also sees no objections as valid in this respect. The claims of auxiliary request 2 are thus found to meet the requirements of Article 84 EPC 1973.

3. *Remittal according to Article 111(1) EPC 1973*

3.1 The Board notes that the opposition division took its decision on the present case based solely on Article 100(c) EPC / Article 123(2) EPC. The presently claimed subject-matter, and indeed also that before the opposition division, was not subject to a decision

under the remaining requirements of the EPC, in particular those under Articles 54 and 56 EPC 1973.

3.2 According to Article 111(1) EPC 1973, when deciding on an appeal, the Board may either exercise any power within the competence of the department which was responsible for the decision appealed or remit the case to that department for further prosecution.

3.3 With remittal also having been requested by the appellant, the Board avails itself of its power under Article 111(1) EPC 1973 to refer the case back to the department of first instance 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 department of first instance for further prosecution.

The Registrar:

The Chairman:



S. Sánchez Chiquero

W. Ungler

Decision electronically authenticated