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**D E C I S I O N**  
**of 23 June 2004**

**Case Number:** T 0479/02 - 3.2.6

**Application Number:** 95118569.3

**Publication Number:** 0742072

**IPC:** B23Q 1/01

**Language of the proceedings:** EN

**Title of invention:**

Symmetrical multi-axis linear motor machine tool

**Patentee:**

THE INGERSOLL MILLING MACHINE COMPANY

**Opponents:**

Hüller Hille GmbH  
Ex-Cell-O GmbH

**Headword:**

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**Relevant legal provisions:**

EPC Art. 56, 123

**Keyword:**

"Late-filed request (no) - admitted"  
"Amendments - allowed"  
"Inventive step (yes)"

**Decisions cited:**

T 0056/87

**Catchword:**

-



Case Number: T 0479/02 - 3.2.6

**D E C I S I O N**  
**of the Technical Board of Appeal 3.2.6**  
**of 23 June 2004**

**Appellant:**  
(Opponent 01)

Hüller Hille GmbH  
Schwieberdinger Strasse 80  
D-71636 Ludwigsburg (DE)

**Representative:**

Rau, Manfred, Dr. Dipl.-Ing.  
Rau, Schneck & Hübner  
Patentanwälte  
Königstrasse 2  
D-90402 Nürnberg (DE)

**Party as of right:**  
(Opponent 02)

Ex-Cell-O GmbH  
Salacher Strasse 93  
D-73054 Eislingen/Fils (DE)

**Representative:**

HOEGER STELLRECHT & PARTNER  
Patentanwälte  
Uhlandstrasse 14 c  
D-70182 Stuttgart (DE)

**Respondent:**  
(Proprietor of the patent)

THE INGERSOLL MILLING MACHINE COMPANY  
707 Fulton Avenue  
Rockford,  
Illinois 61103-4199 (US)

**Representative:**

Manitz, Finsterwald & Partner  
Martin-Greif-Strasse 1  
D-80336 München (DE)

**Decision under appeal:**

**Interlocutory decision of the Opposition  
Division of the European Patent Office posted  
8 April 2002 concerning maintenance of European  
patent No. 0742072 in amended form.**

**Composition of the Board:**

**Chairman:** P. Alting van Geusau  
**Members:** H. Meinders  
M. J. Vogel

## Summary of Facts and Submissions

- I. By decision dated 8 April 2002 the Opposition Division maintained European Patent 0 742 072 in amended form.

The Opposition Division considered that the amendments carried out in the patent as granted complied with Article 123(2) and (3) EPC and that the subject-matter of claim 1 as amended was considered novel and inventive in particular over the prior art disclosed in:

D1: EP-A-0 583 585

and

D2: EP-A-0 614 724.

- II. Against this decision the Appellant (Opponent 01) filed an appeal on 15 May 2002, paying the appeal fee on that same date. The statement of grounds of appeal was filed by the Appellant on 13 August 2002.

- III. The Board issued a communication dated 17 May 2004, raising the question whether D1 or D2 should be considered the closest prior art, as starting from one or the other would lead to a different problem to be solved by the subject-matter claimed. Filing of any further submissions by the parties should be done within a time limit of two weeks.

- IV. Oral proceedings were held on 16 October 2003, in the absence of the party as of right (Opponent 02), who had notified the Board with letter of 11 June 2004 that it would not attend.

The Appellant requested setting aside of the decision under appeal and revocation of the patent.

The Respondent (patentee) requested maintenance of the patent on the basis of the following documents:

Claims 1 to 18 as filed in the oral proceedings,

Description,

pages 2 and 4 to 10 as granted,

pages 3 and 3a as filed in the oral proceedings,

Drawings, figures 1 to 13 as granted.

V. The wording of independent claim 1 according to the Appellant's request is as follows:

"A machine tool comprising:

a rotary spindle (78) having a cutting tool (11) mounted thereon;

a frame (12) having side frame members (16, 18) defining a central opening;

a vertical gantry (38) extending parallel to the side frame members (16, 18) and mounted for slidable movement along a first axis on the frame (12);

a saddle (56) mounted on the gantry (38) and carried therewith and mounted for slidable movement along a second axis along the gantry (38);

a ram (68, 68a) carried by the saddle (56) and mounted for slidable movement through the central opening and along a third axis normal to the first and the second axes and carrying the spindle (78) and rotary cutting tool (11) through the opening;

a first linear drive having one or more pairs of linear motors (108a, 108b) each having a stator coil section (110a) and permanent magnet section (112a) extending in the direction of the first axis and mounted proximate opposite ends of the gantry (38) for moving the gantry with magnetic force attractions being in opposite directions to provide symmetry;

a second linear drive having linear motors (108c, 108d) mounted on opposite sides of the gantry (38) and extending in the direction of the second axis; and

a third linear drive (108e) having one or more motors (108e) extending in the direction of the third axis and having a stator coil section (110e) and permanent magnet section for moving the ram (68, 68a) and spindle (78);

characterized in that:

the second linear drive has at least one pair of said linear motors (108c, 108d) each having a stator coil section (110c, 110d) and permanent magnet section (112c, 112d) mounted on opposite sides on the gantry (38) for moving the saddle (56) with magnetic force attractions being in opposite directions to provide symmetry,

that the frame (12) has a box-shape which defines the central opening,

the frame includes parallel top and bottom frame members (20, 22) and said side frame members (16, 18) being parallel and connected to the top and bottom frame members (20, 22);

that the vertical gantry (38) has a top member (44) adjacent to and below the frame top member (20) and a bottom member (46) adjacent to and above the frame bottom member (22) and side members (40, 42)

interconnecting the top and bottom members (44, 46) to define a box-like configuration within the box-shaped

frame (12) each of said side members (40, 42) carrying vertically-disposed portions of linear motors (108c, 108d) of said second linear drive, the saddle (56) being mounted for vertical sliding movement in the gantry (38) between said side members (40, 42); that the saddle (56) has side members (58, 60) fitting between the gantry side members (40, 42) so that the saddle is nested within the gantry (38) which is encompassed within the box frame (12) to minimize cantilevers therefrom and that the ram (68) and spindle (78) travel between the sides of the saddle (56), the ram (68, 68a) being nested within the gantry (38); that the first linear drive has said linear motors (108a, 108b) between the gantry top members (44) and the frame top member (20) and between the gantry bottom member (46) and the frame bottom member (22) with magnetic force attractions being in opposite directions to provide symmetry; and that the second linear drive has said linear motors (108c, 108d) between the gantry side members (40, 42) and corresponding saddle side members (58, 60) with magnetic force attractions being in opposite direction to provide symmetry."

VI. The arguments of the Appellant can be summarised as follows:

In its reply of 8 June 2004 to the communication of the Board dated 17 May 2004 the Respondent had indicated that it maintained in appeal its four auxiliary requests as filed in the opposition proceedings. In these requests extensive modifications to claim 1 had been carried out, which concerned subject-matter which had not been comprised in the dependent claims as

granted and therefore had not been the subject of any examination. The present set of claims based on these earlier requests should therefore not be admitted as it was late-filed.

Claim 1 as maintained by the Opposition Division contained an amendment contrary to Article 123(2) EPC: "the linear motors (108c, 108d) of the second linear drive being disposed on opposite sides of the ram (68, 68a) and spindle (78)". There was no original disclosure of that feature being essential to the invention, nor did the decision under appeal explain why this was so.

The machine tool claimed in claim 1 lacked inventive step over D2 in combination with the teaching of D1. D2 already suggested that the working on the workpiece could be performed by using a relative movement between the toolholder and the workpiece, thus instead of the workpiece the **toolholder** would be moved in the Z-direction. D1 provided the skilled person with the indication to nest the gantry in the frame, thereby giving an indication how the cantilever-effect could be reduced.

VII. The Respondent argued as follows:

Present claim 1 was based on claim 1 of the fourth auxiliary request presented in the opposition proceedings. The Respondent had stipulated within the time limit set by the Board that this request was one of its auxiliary requests for the coming oral proceedings. The further amendments, carried out in the oral proceedings, were to be considered a reply to the

opinion expressed by the Board as well as the arguments presented by the Appellant, in these oral proceedings. They were therefore not late-filed and should be admitted.

The amendments to granted claim 1 in the opposition proceedings were derivable from the original application documents, see the patent in suit, column 4, lines 24 to 30, 34 to 44 and 49 to 58; column 8, lines 39 to 42; column 10, lines 34 onwards; column 15, lines 22 to 36 and figures 1, 2, 10 and 13.

The general remark in D2 that the movement between toolholder and workpiece was a relative movement could not be interpreted in the specific sense as done by the Appellant, in that it meant a movement of the toolholder in the Z-direction. The whole teaching of D2 was to a machine tool for line production purposes, where the workpiece was taken off the line by a separate linear motor which provided the (relative) movement in the Z-direction to the **workpiece**, not to the toolholder.

D1 could not give the skilled person any indication to a saddle nested in and moving between side members of the gantry, nor to a ram nested in the gantry as well, as it provided for a single beam gantry. Therefore the Appellant's submissions were based on hindsight rather than on an objective analysis of the prior art teachings.



## Reasons for the Decision

1. The appeal is admissible.
  
2. *Admissibility of the request of the Respondent*

Present claim 1 consists of claim 1 according to the fourth auxiliary request as filed in the opposition proceedings (and maintained as an auxiliary request with the Respondent's letter of 8 June 2004) with further amendments carried out in the oral proceedings before the Board.

The Board, in its communication dated 17 May 2004, had set the latest date for filing submissions at two weeks before the oral proceedings set for 23 June 2004, i.e. 9 June 2004. The Respondent's letter of 8 June 2004 was sent by fax on 9 June 2004 and received on that same day, thus the fourth auxiliary request has been indicated as such in time in respect of the ultimate date indicated by the Board for filing further submissions.

The further amendments to claim 1 carried out in the oral proceedings are considered by the Board to have been in reply to the objections raised by the Board and the Appellant, in these oral proceedings.

Therefore there is no valid reason to not admit this request is admitted into the proceedings.

3. *Amendments (Articles 84 and 123(2) and (3) EPC)*

3.1 Claim 1 has been amended in respect of claim 1 as granted by the inclusion of (in brackets the disclosure in the original application documents):

- the three directions of possible movement of the gantry, saddle and ram (page 1, first paragraph)
- the linear motors extending in these directions (page 21 to 24 and figures 3, 8, 10, 11, 13)
- that the frame (12) has a box-shape which defines the central opening (page 11, figure 12)
- the frame includes parallel top and bottom frame members (20, 22) and said side frame members (16, 18) being parallel and connected to the top and bottom frame members (20, 22) (paragraph bridging pages 19 and 20)
- that the vertical gantry (38) has a top member (44) adjacent to and below the frame top member (20) and a bottom member (46) adjacent to and above the frame bottom member (22) and side members (40, 42) interconnecting the top and bottom members (44, 46) to define a box-like configuration within the box-shaped frame (12) each of said side members (40, 42) carrying vertically-disposed portions of linear motors (108c, 108d) of said second linear drive, the saddle (56) being mounted for vertical sliding movement in the gantry (38) between said side members (49, 42); that the saddle (56) has side members (58, 60) fitting between the gantry

side members (40, 42) so that the saddle is nested within the gantry (38) which is encompassed within the box frame (12) to minimize cantilevers therefrom and that the ram (68) and spindle (78) travel between the sides of the saddle (56), the ram (68, 68a) being nested within the gantry (38) (page 15; page 18, second paragraph; page 21, last paragraph; page 22, first paragraph; figures 10, 11, 13; claim 6)

- that the first linear drive has said linear motors (108a, 108b) between the gantry top members (44) and the frame top member (20) and between the gantry bottom member (46) and the frame bottom member (22) with magnetic force attractions being in opposite directions to provide symmetry (page 21, last paragraph; page 22, first paragraph; figure 13)
  
- that the second linear drive has said linear motors (108c, 108d) between the gantry side members (40, 42) and corresponding saddle side members (58, 60) with magnetic force attractions being in opposite direction to provide symmetry (page 23, second paragraph).

These features result in a further limitation of the subject-matter of claim 1 as granted.

The dependent claims have been amended so as to be consistent with present claim 1. The description has been amended to include a reference to D2, necessary for the purposes of Rule 27(1)(b) EPC.

The amendments thus do not give rise to objections under Article 123(2) and (3) EPC.

- 3.2 The Appellant had objected in its appeal to the passage "the linear motors (108c, 108d) of the second linear drive being disposed on opposite sides of the ram (68, 68a) and spindle (78)" which was added in the opposition proceedings to claim 1 as granted. This feature had not been disclosed in the original application as essential to the invention (Article 123(2) EPC).

The Board wishes to note that the EPC does not require a feature by which a claim has been amended to have been originally described as "essential" to the invention or to be "essential" in solving the problem. What is required is that the amendment is directly and unambiguously derivable for the skilled person from the original application documents and that it should not result in the patent not complying with the other requirements of the EPC.

- 3.3 In any case, this feature objected to no longer figures in present claim 1 but has been replaced by the feature that the ram (68) and spindle (78) travel between the sides of the saddle (56), that the saddle is nested within the gantry (38), that the saddle has side members (58, 60) fitting between the gantry side members (40, 42) and that the linear motors (108c, 108d) of the second linear drive are arranged between the gantry side members (40, 42) and the corresponding saddle side members (58, 60). This combination of features is derivable from the application documents as originally filed (see point 3.1 above).

The above features give a clearer description of where the linear motors are located than was the case with claim 1 as maintained in the opposition proceedings and objected to by the Appellant, the wording of which might give the impression that the linear motors were mounted directly onto the ram and spindle themselves. The requirements of Article 84 EPC are thus met as well.

3.4 Considering a possible *reformatio in peius* situation resulting from the replacement of the feature in claim 1 as upheld by the Opposition Division by an other feature it is noted that the subject-matter of present claim 1 has been amended by incorporating a number of further limiting features within the context of the feature allowed by the Opposition Division (see above), thereby limiting the subject-matter of claim 1 as maintained by the Opposition Division further. Present claim 1 therefore does not give rise to objections based on the case law in respect of *reformatio in peius*.

4. *Novelty (Article 54 EPC)*

The novelty of the subject-matter of present claim 1 was not questioned by the Appellant. The Board has verified that none of the documents available in this file discloses all features of present claim 1.

5. *Inventive step (Article 56 EPC)*

5.1 The Board considers that closest prior art for the discussion of inventive step is D2 as supported by the parties. The multi-axis machine tool discussed in this

document has the drawback that the spindle is cantilevered with respect to the gantry carrying it and that the gantry is cantilevered with respect to the machine frame. Increased bending forces on the saddle and the frame are the result, which - in order to meet the required accuracy - necessitate an increased stiffness (with a resulting increased weight) of these constructional parts. For a general discussion of these drawbacks see the patent in suit, columns 1 to 3).

5.2 These problems in the prior art machine tools are overcome by the features through which the machine tool of present claim 1 distinguishes itself from the tool disclosed in D2, being:

- the saddle has side members fitting between the gantry side members so that it is nested within the gantry and is mounted for sliding movement therein,
- the gantry defines a box-like configuration encompassed within the box-shaped frame, and
- the ram is nested within the gantry,
- a third linear drive having one or more motors extending in the Z-direction enabling the ram and spindle to travel between the sides of the saddle in that direction through the central opening of the frame,

thereby providing an arrangement with an improved stability for a given weight of the machine.

5.3 The Appellant argued that D1 provided the indication to a gantry nested in the frame (see figure 8 and column 7, lines 12 to 34 of D1). The top member of that gantry was mounted below the top member of the frame, the bottom member of the gantry was mounted above the bottom member of the frame, as claimed in claim 1.

The Board cannot see how the application of this teaching of D1 to the machine tool known from D2 could lead to the machine tool of present claim 1, as the gantry disclosed in D1 does not define a box-like configuration within which the saddle is nested, with the saddle side members fitting between the gantry side members, nor that the ram is nested within the gantry as well.

5.4 To arrive at the machine tool presently claimed in claim 1 the skilled person would firstly have to isolate from the gantry as disclosed in D1 the feature of the top and bottom members of the gantry being mounted respectively below and above the top and bottom members of the frame and apply it to the gantry of the machine tool disclosed in D2, which has two parallel side members.

It is, however, established case law of the Boards of Appeal that the technical disclosure in a prior art document should be considered in its entirety, as it would be done by a person skilled in the art. It is not justified arbitrarily to isolate parts of such a document from their context in order to derive from them technical information which would be distinct from or even in contradiction with the integral teaching of

the document (see T 56/87, OJ EPO 1990, 188, Reasons point 3.1).

Secondly he would have to extensively redesign the saddle known from D2 so as to have it nested within the gantry. For this measure there are, however, no indications to be found in the prior art available in the file.

- 5.5 The Appellant argued in this respect that D2 provided the skilled person with the additional indication that the movement in the Z-direction could just as well be provided by the toolholder ("Werkzeugträger") in the ram and spindle instead of the workpiece holder ("Werkstückträger"), as column 1, lines 1 to 9 and claim 1 of D2 only mentioned the necessity to have a "relative movement" between toolholder and workpiece, not that the workpiece holder **should always** provide the movement in the Z-direction.

The Board does not share this opinion; in essence D2 relates to a machine tool for working on workpieces provided in line, where a movement in the Z-direction takes the workpiece off the line so as to be worked on. The necessary further movements in the Z-direction during the work on the workpiece are performed by the workpiece, not the toolholder. This arrangement is also described as advantageous for the stability of the machine and the distribution of the masses (column 6, lines 10 to 17).

In the absence of any further information in D2 as to how a movement in the Z-direction of the toolholder instead of the workpiece is to be achieved with the



machine tool disclosed, the Board considers that the general statement in D2 regarding the "relative movement" between workpiece and toolholder cannot be interpreted as meaning a movement of the toolholder in the Z-direction as intended by the Appellant.

Even if it would, it would not directly lead to a saddle nested in the gantry having side members fitting between the gantry side members, as claimed in present claim 1.

5.6 Hence, the Board comes to the conclusion that the subject-matter of claim 1 cannot be derived in an obvious manner from the prior art and accordingly involves an inventive step (Article 56 EPC).

The subject-matter of claims 2 to 18 relate to preferred embodiments of the machine tool of claim 1, thus their subject-matter also is novel and involves inventive step.

The patent can therefore be maintained according to the request of the Respondent.

## Order

### For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the first instance with the order to maintain the patent on the basis of the following documents:

Claims 1 to 18 as filed in the oral proceedings,

Description,

pages 2 and 4 to 10 as granted,

pages 3 and 3a as filed in the oral proceedings

Drawings, figures 1 to 13 as granted.

The Registrar:

The Chairman:

A. Wallrodt

P. Alting van Geusau