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**Datasheet for the decision  
of 20 October 2016**

**Case Number:** T 1820/12 - 3.2.08

**Application Number:** 08168321.1

**Publication Number:** 2062681

**IPC:** B23Q5/10

**Language of the proceedings:** EN

**Title of invention:**

Spindle device for machine tool

**Patent Proprietor:**

Mori Seiki Co., Ltd.  
Intelligent Manufacturing Systems International

**Opponent:**

Chiron-Werke GmbH & Co. KG

**Headword:**

**Relevant legal provisions:**

EPC Art. 56

**Keyword:**

Inventive step - (yes)

**Decisions cited:**

**Catchword:**



**Beschwerdekammern**  
**Boards of Appeal**  
**Chambres de recours**

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Case Number: T 1820/12 - 3.2.08

**D E C I S I O N**  
**of Technical Board of Appeal 3.2.08**  
**of 20 October 2016**

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**Decision under appeal:** **Decision of the Opposition Division of the  
European Patent Office posted on 6 June 2012  
rejecting the opposition filed against European  
patent No. 2062681 pursuant to Article 101(2)  
EPC.**

**Composition of the Board:**

**Chairwoman**            P. Acton  
**Members:**             M. Foulger  
                              D. T. Keeling

## Summary of Facts and Submissions

- I. With the decision dated 6 June 2012, the opposition division rejected the opposition against the European patent no. 2 062 681. The opposition division came to the conclusion that the subject-matter of claim 1 was new and involved an inventive step.
- II. The appellant (opponent) filed an appeal against this decision in the correct form and within the given time limits.
- III. Oral proceedings took place before the Board of Appeal on 20 October 2016.
- IV. The appellant requested that the decision under appeal be set aside and the patent revoked.

The respondent (patent proprietor) requested that the appeal be dismissed, or in the alternative, that the patent be maintained in modified form based on the claims filed with the letter dated 15 September 2016.

- V. The following documents are relevant for this decision:
  - D1 - JP H1-81245 U
  - D2 - EP 0 491 894 B1
  - D3 - GB 1 266 132 A
  - D4 - JP 11099433 A
- VI. Claim 1 of the patent as granted reads:

"**[1]** A spindle device (1) for a machine tool, comprising:

**[1.1]** a spindle (12) having an attaching hole (12a) penetrating in an axial direction, the attaching hole (12a) being attached with a tool;

**[1.2]** a first housing (11), having a retaining hole (11a), for supporting within the retaining hole (11a) the spindle (12) rotatably about its axis;

**[1.3]** a first drive motor (13) for rotating the spindle (12);

**[1.4]** clamping means (20) for clamping the tool attached into the attaching hole (12a) of the spindle (12); the first drive motor (13) being configured by: a first rotor (13a) installed securely on an outer circumferential surface of the spindle (12); and a first stator (13b) installed securely on an inner circumferential surface of the retaining hole (11a) of the first housing (11) in a manner to be kept apart radially outwardly from the first rotor (13a); and the clamping means (20) being including: a drawing member (21, 22), disposed within the attaching hole (12a) of the spindle (12) movably in a direction of an axis thereof, for drawing the tool into the attaching hole (12a); and a drive mechanism (24), placed on a rear end side of the spindle (12), for unclamping the clamped tool drawn into the attaching hole (12a) by the drawing member (21, 22),

**[1.5]** a second housing (14), which is formed to have a hollow portion therein. (*sic*) and which is so arranged at a rear of the first housing (11) that a rear end of the spindle (12) is positioned within the hollow portion;

**[1.6]** a second drive motor (15) for rotating the spindle (12), the second drive motor (15) including:

**[1.6.1]** an annular second rotor (15a) which is disposed so as to be coaxially to the spindle (12) at the rear end side of the spindle (12) and which is supported within the hollow portion by the second housing (14) in a manner to rotate freely about the axis; and a second stator (15b) installed securely on an inner circumferential surface of the hollow portion of the

second housing (14) in a manner to be kept apart by a distance radially outwardly from the second rotor (15a); and

**characterized in that** the spindle device (1) further comprises:

**[1.7]** control means for controlling an action of the first drive motor (13) and an action of the second drive motor (15);

**[1.8]** connecting means (30) which is disposed within the second housing (14) and which carries out a connecting operation for connecting the rear end of the spindle and the second rotor (15a) and a releasing operation for releasing the connection between the rear end of the spindle and the second rotor (15a), an action of the connecting means (30) being controlled by the control means;

**[1.9.1]** wherein the drive mechanism (24) is placed on a rear end side of the spindle and

**[1.9.2]** is contained in the second rotor (15a)."

Feature references in square brackets added by the board.

The auxiliary request is not relevant for this decision.

VII. The appellant argued essentially the following:

The subject-matter of claim 1 did not involve an inventive step in view of the teaching of D1 and the knowledge of the skilled person, as illustrated by D1 itself or by D3 or D4, or in view of a combination of the teachings of D1 and D2.

a) Considering D1 as closest prior art:

Features [1] to [1.5], [1.6], [1.6.2], [1.7], [1.8], [1.9.1] of claim 1 were clearly known from D1, see Fig.

1. D1 also disclosed a second drive unit 9 which was disposed so as to be coaxial to the spindle at the rear end side of the spindle.

The subject-matter of claim 1 differed from the spindle known from D1 in that the second drive unit included an annular second rotor, which together with a second stator formed a second drive motor, wherein the second stator was installed securely on an inner circumferential surface of the hollow portion of the second housing in a manner to be kept apart by a distance radially outwardly from the second rotor (part of feature [1.6.1]) and in that the drive mechanism was contained in the second rotor (feature [1.9.2]).

The objective problem to be solved was therefore to provide a more compact spindle device than that known from D1.

i) D1 combined with the common general knowledge of the skilled person:

The motor (3, 4) shown in Fig. 1 of D1 did not have a gearbox. Consequently the skilled person was taught that such motors did not need gearboxes. Moreover the motor (3, 4) of D1 was mounted directly on the spindle which was clearly more space efficient than the external motor (11) of D1 which was connected via a gear train to the spindle. Thus D1 already provided the skilled person with the teaching to use a coaxial motor. The skilled person would therefore, without the exercise of inventive activity, apply this teaching to further develop the spindle of D1 and would arrive at the subject-matter of claim 1 without the exercise of inventive activity. Furthermore D3 and D4 showed spindle arrangements with two coaxial motors hence



giving the skilled person a further hint to adopt this arrangement.

ii) D1 combined with the teaching of D2:

D2 taught that the non-coaxial second motor with associated gearbox could be replaced by a coaxial second motor. This provided a more compact arrangement so that the skilled person would apply the teaching of D2 to the spindle known from D1 in order to solve the problem posed and thereby arrive at the subject-matter of claim 1 without the exercise of inventive activity.

b) Considering D2 as closest prior art:

The subject-matter of claim 1 differed from the spindle disclosed in D2 merely in that connecting means were provided for releasing the connection between the rear end of the spindle and the second rotor (feature [1.8]). This measure was a normal design feature, see D1, Fig. 1, which the skilled person would apply without the exercise of inventive activity.

Hence, the subject-matter of claim 1 did not involve an inventive step.

VIII. The respondent argued essentially the following:

a) Considering D1 as closest prior art:

Contrary to the appellant's submissions, feature [1.6] of claim 1 referred to a "drive motor" and not to a "drive unit". Since the second motor of D1 (11) was positioned outside the housing and displaced from the spindle axis, D1 did not disclose features [1.6.1] and [1.9.2] of claim 1.

The problem to be solved was to provide a more compact spindle device.

i) Considering D1 in combination with the common general knowledge of the skilled person:

If the spindle arrangement of D1 were to be modified to have two coaxial motors, it would additionally be necessary to provide for the actuating mechanism of the connecting means (7, 8) for connecting the rear end of the spindle and the second rotor. The actuating means known from the prior art could not simply be taken without further modification. There was, furthermore, no hint in either D1, D3 or D4 for the skilled person to make such an attempt which would inevitably involve considerable structural modifications. Consequently this was not obvious for the skilled person.

ii) Considering D1 in combination with the teaching of D2:

D2 did indeed disclose two coaxial motors. These were however rigidly coupled - see claim 1 of D2 - and therefore had no provision for connecting means for connecting the rear end of the spindle and the second rotor. The application of the teaching of D2 to the spindle of D1 would mean that the actuation for the connecting means of D1 would need to be completely redesigned. There was no hint in the prior art as to how this could be achieved. This modification was therefore not obvious for the skilled person.

b) Considering D2 as closest prior art:

D2 disclosed a spindle with two coaxial motors which were rigidly connected (see D2, claim 1). The subject-

matter of claim 1 therefore differed from the spindle of D2 in that connecting means were provided for connecting the rear end of the spindle and the second rotor (feature [1.8] of claim 1). Since the stator of the second motor was rigidly connected to the rotor (see D2, Fig. 1) there was no space for connecting means. The connecting means known from D1 were clearly not suitable to be applied to the spindle arrangement known from D2. The skilled person would therefore have to have demonstrated inventive activity in order to have arrived at the subject-matter of claim 1.

Hence, the subject-matter of claim 1 involved an inventive step.

## Reasons for the Decision

1. Considering D1 as closest prior art:

1.1 It has not been disputed that D1 discloses features [1] - [1.5] of claim 1 and, moreover, that a second motor is provided (feature [1.6]). Also features [1.7],[1.8] and [1.9.1] are known from this document.

It is true - as argued by the appellant - that D1 discloses a second drive unit which is coaxial to the spindle in the form of a spur gear - see Fig. 1, item no. 9. However, the claimed feature [1.6.1] requires a second motor with a rotor which is coaxial to, and at the rear side of, the spindle. Since the second motor (11) is positioned displaced from the spindle axis this document does not disclose feature [1.6.1]. Moreover it is common ground that the location of the drive mechanism in the second rotor as per feature [1.9.2] is not disclosed in D1.

1.2 The problem to be solved may be regarded as being to provide a more compact arrangement, see patent, paragraph [0010].

1.3 Considering D1 in combination with the knowledge of the skilled person:

The skilled person using their common general knowledge would not arrive at the subject-matter of claim 1. It is true that the motor (3, 4) of D1 allows a more compact arrangement. Furthermore it is not disputed that coaxial second motors are known from D3 and D4. However, in the spindle of D1, the actuator for the connecting means (7, 8) is positioned at the rear end

of the spindle (see abstract). If a second coaxial motor were to be used in the spindle of D1 then this would require the actuator to be redesigned because the second coaxial motor would take the space currently used by the actuator. Such a modification of the actuator is not suggested by the cited prior art. Hence the skilled person would be deterred from making this modification and would not have done so without the use of inventive activity.

1.4 Considering D1 in combination with the teaching of D2:

It is undisputed that D2 discloses the feature [1.6.1] and that the arrangement is more compact. However D2 does not have connecting means as defined in feature [1.8] of claim 1 because the stator of the second motor is rigidly coupled to the rotor of the first motor, see D2, claim 1.

Hence applying the teaching of D2 to that of D1 would not result in the subject-matter of claim 1 because the two motors would be rigidly coupled i.e. without the connecting means defined in claim 1. If the skilled person were to consider retaining the connecting means of D1 then, for the reasons set out above, it would be necessary to redesign the actuation mechanism for the connecting means. Hence the skilled person would not combine the teachings D1 and D2 and arrive at the subject-matter of claim 1 without the exercise of inventive activity.

2. Considering D2 as closest prior art:

Contrary to the claimed spindle, the spindle according to D2 had two coaxial motors which were rigidly connected. Hence, the subject-matter of claim 1 differs

from the spindle known from D2 in the provision of the connecting means defined in feature [1.8].

The skilled person, considering D2 as closest prior art, would have to, firstly, separate the rigidly connected first and second motors and then, secondly, design a new connecting means and associated actuator in order to arrive at the subject-matter of claim 1. Such means are not shown in the cited documents and hence this would require the exercise of inventive activity.

3. The subject-matter of claim 1 therefore involves an inventive step.

## Order

### **For these reasons it is decided that:**

The appeal is dismissed.

The Registrar:

The Chairwoman:



C. Moser

P. Acton

Decision electronically authenticated