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D E C I S I O N
of 12 January 2000

Case Number: T 0020/98 - 3.2.6

Application Number: 88111377.3

Publication Number: 0300375

IPC: B23B 31/12

Language of the proceedings: EN

Title of invention:
Chuck for tools

Patentee:
YUKIWA SEIKO INC.

Opponent:
-

Headword:
-

Relevant legal provisions:
EPC Art. 56

Keyword:
"Inventive step (yes, after amendment)"

Decisions cited:
-

Catchword:
-

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Case Number: T 0020/98 - 3.2.6

D E C I S I O N
of the Technical Board of Appeal 3.2.6
of 12 January 2000

Appellant: (Proprietor of the patent)
YUKIWA SEIKO INC.
No. 2600-1, Oaza-Chiya-ko
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Niigate-ken (JP)

Representative:
Rapp-Bertram, Dr.
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Respondent: (Opponent)
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Representative:
-

Decision under appeal:
Decision of the Opposition Division of the European Patent Office posted 29 October 1997 revoking European patent No. 0 300 375 pursuant to Article 102(1) EPC.

Composition of the Board:

Chairman: P. Alting van Geusau
Members: M. Bidet
J.-C. De Preter

Summary of Facts and Submissions

I. The appellant is proprietor of European patent No. 0 300 375.

II. The patent was opposed on the grounds that the subject-matter of Claim 1 lacked an inventive step (Article 100(a) EPC). Shortly before holding second oral proceedings during the opposition proceedings, the opponent withdrew its opposition. At the oral proceedings held on 9 October 1997 the Opposition Division revoked the patent (written decision dated on 29 October 1997) on the ground that its subject-matter lacked an inventive step, essentially in view of the prior art disclosed in the documents:

D1: US-A-0 911 012

D9: US-A-1 784 002

D11: JP-U-36 22 31 (with a translation into English).

III. On 29 December 1997, the appellant filed an appeal and paid the appeal fee on the same day. The statement of grounds was filed on 24 February 1998.

IV. In a communication issued on 22 October 1999 with summons to oral proceedings, the Board informed the appellant that it was questionable whether the amended claim 1 filed with the grounds for appeal met the requirements of inventive step (Article 56 EPC) in view of the available prior art.

V. Oral proceedings took place on 12 January 2000 during

which the appellant filed a new set of claims together with an amended description.

Claim 1 reads as follows:

"1. A chuck for tools comprising:

- a main body (1) in which an axial center hole (4) and a plurality of slanting holes (5) extending radially from said center hole are formed,

- a plurality of jaws (2) each being slidably inserted in each slanting hole (5) and formed at its outer surface, with a male screw (7);

- an annular rotary member having a female screw (8) in meshing engagement with said male screws (7) and mounted in said main body (1) so as to be permitted for only rotation, the rotary member consisting of a plurality of divided segments (65) which are put together by means of a hoop (70),

- a grip (68) securely connected to said rotary member to cooperate therewith,

- bearing balls (21) supporting the rear side of the rotary member against the main body (1)

characterised in that

- the bearing balls (21) are interposed between the rear side of the segments (65) of that rotary member and the front side of a support ring (72) at least rotatably secured to an intermediate

portion of that main body (1),

- a further grip (17) is integrally connected to the rear end portion (25) of the main body (1) so as not to be rotatable relative to said main body,

- the annular ring formed by the segments (65) has at its forward surface a plurality of sectoral recesses (66),

- the grip (68) is formed with sectoral projections (69) which are fitted in the recesses (66), and is axially held on the rotary member by locking means (71), and

- for clamping or releasing a tool the second grip (17) is to be gripped by one hand and the first grip (68) is to be gripped by the other hand for relative rotation of both grips in one direction or in the direction reverse thereto.

VI. The appellant requested that the decision under appeal be set aside and that the patent be maintained on the following basis:

- claims 1 and 2 and the description (pages 1 to 5) as filed at the oral proceedings, and

- Figures as granted (1 to 7 and 13 to 20)

VII. The arguments developed in support of the request can be summarised as follows:

The chuck according to D11 was not really suitable for

hand operation and moreover its concept required a massive construction. This essentially resulted from the fact that the sleeve was supported by the bearing balls so that the transfer path for the force acting on chuck gripping jaws depended upon a sound connection of the segmented ring and the sleeve, thus leading to a relatively thick sleeve and thereby limiting the minimum size of the chuck.

The chuck in accordance with the patent was adapted to improve hand operation and at the same time the size and weight of the chuck could be reduced while retaining its stability. The characterising features of claim 1, in particular the provision of the bearing balls between the segmented ring and support ring mounted to the main body not only allowed a direct force transmission path, but at the same time the diameter of the chuck could be reduced: because the hoop was relieved from axial forces it could be made thinner. A light weight grip was connected to the hoop and was held by the sectoral recesses of the segmented ring and the looking means. Although D1 and D9 disclosed the use of the sleeve as a grip and D1 also showed the ball bearing in the claimed position, these documents failed to give any suggestion to the other constructional adaptations for solving the underlying problem of the patent in suit. The subject-matter of the amended claim 1 was therefore inventive.

Reasons for the Decision

1. The appeal is admissible.

2. *Amendments*

2.1 In addition to the features of claim 1 as granted, new claim 1 contains the following amendments:

- the last feature of claim 1 as granted (the rotary member consisting of a plurality of divided segments (65) which are put together by means of a hoop (70) is transferred to the preamble of present claim 1,

- the feature: "bearing balls (21)" of the preamble of claim 1 is completed by the following new feature:

  (a) "supporting the rear side of the rotary member against the main body (1)",

and the characterising portion is completed by the following three new features:

  (b) "the annular ring formed by the segments (65) has at its forward surface a plurality of sectoral recesses (66)",

  (c) the grip (68) is formed with sectoral projections (69) which are fitted in the recesses (66), and is axially held on the rotary member by locking means (71)," and

  (d) "for clamping or releasing a tool the second grip (17) is to be gripped by one hand and the first grip (68) is to be gripped by the other hand for relative rotation of both

grips in one direction or in the direction reverse thereto".

The transfer of the last feature of claim 1 as granted to the preamble of claim 1 does not change the scope of the protection.

The features (a), (b), (c) and (d) relate to subject-matter disclosed in relation to the granted third and fourth embodiments set out in column 7, lines 16 to 36 and in Figures 13 to 20 of the patent as granted, respectively the sixth and seventh embodiments disclosed on page 17, line 20 to page 18, line 15 of the application as originally filed.

It has now been made clear that the rotary member consists of the divided segments and the hoop and that the annular ring formed by the segments has a plurality of sectoral recesses. The sectoral projections formed on the grip are fitted in the sectoral recesses and the grip is held against axial movement on the rotary member by locking means. These features also imply that clamping or releasing a tool in the chuck is achieved by gripping the grip by a hand and the further grip by the second hand for relative rotation of the grips.

The subject-matter of claim 2 corresponds to that of claim 2 of the patent as granted with corresponding adaptations required by the new text of claim 1.

In view of these assessments no objections arise in respect of the requirements of Article 123(2) and (3) EPC against the present set of claims.

2.2 As follows from the above explanations, the changes made to claim 1 permit to clamp and to release a tool in the way corresponding to feature (d). The claimed chuck now includes all features for a clear definition of its structure. Therefore, the amended claim 1 meets the requirements of clarity according to Article 84 EPC.

2.3 The description has been amended to make clear that the invention only relates to the specific embodiments according to Figures 13 to 20 and does also not give rise to objections in respect of the requirements of Article 123(2) or (3) EPC.

3. *Novelty*

Having examined the available prior-art documents, the Board is satisfied that none of them discloses a chuck for tools comprising all the features specified in claim 1. More particularly, there is no disclosure of annular ring formed by segments having a plurality of sectoral recesses fitted with sectoral projections forming a grip axially held on the annular rotary member by locking means.

The subject-matter of claim 1 is therefore novel within the meaning of Article 54 EPC.

4. *Inventive step*

4.1 Document D11 disclosing all the features of the preamble of claim 1 is considered the most suitable starting point for the assessment of inventive step. In this citation a sleeve ring is rotated in order to move

the jaws for clamping or releasing the tool inserted in the chuck.

The sleeve ring is force-fit around the outer surface of the divided segments, thus forming one unit. The bearing balls are placed between the (upper surface of the) sleeve ring and the front side of a stepped portion of the main body. Rotation of the sleeve ring together with the divided segments relative to the main body is carried out by use of a tool such as steel bar inserted in holes on the circumference of the sleeve ring and by use of a spanner fitted on a nut-shaped polygon provided on the rearward part of the main body.

4.2 A drawback of this kind of chuck is that the jaw closing forces during clamping the tool lead to axial forces to be taken up by the sleeve ring, the latter transmitting the axial forces to the bearing balls. This concept leads to large interference-shearing forces between the sleeve ring and the divided segments, which in turn requires a more heavy construction and thus larger diameter of the chuck.

4.3 Consequently, starting from this prior art document, the technical problem to be solved by the present invention is to provide a chuck for tools to be operated without any mechanical means only by directly being gripped with both hands being of light-weighted and compact construction as well as being stable and long-lasting (see page 2, first paragraph of the description).

4.4 The Board is satisfied that the solution given by the features of the characterising part of claim 1 (see

above section V.) solves the problem effectively.

More particularly, the axial forces working on the ring segments are applied through the bearing balls directly to the support ring supported by the intermediate portion of the main body. The connection of the grip by recesses and projections transmits the torques applied on the grip, the grip itself being axially held on the rotary member by locking means. The balls are confined in the gap defined by the rear surface of the divided segments, the forward surface of the support ring and the inner surface of the hoop. Such a construction allows a smaller diameter of the chuck with consequential reduction in its weight.

4.5 Since the other available prior art documents are not more relevant than the documents D1, D9 and D11 considered by the Opposition Division, the main issue arising in the present case is whether the subject-matter of claim 1 is inventive over the teachings of these three prior art documents.

4.6 According to Figure 3 of D1 a rotatable nut displaces the jaws of the chuck and a sleeve is fastened to the outer surface of the nut. The bearing balls are confined between the rearward surface of the nut, the sleeve and a ring.

However, this sleeve constitutes the single grip of the chuck, so that, in the absence of a further grip, clamping cannot properly and easily be carried out. The only possibility to clamp or release the tool would be to grip the forward parts. As mentioned page 1, lines 103 to 106 an ordinary spanner or other tool can

be employed if desired for turning the sleeve.

The skilled person who wishes to solve the problem underlying the subject-matter of claim 1 under consideration would normally not consult documents like D1 which are provided with only one grip. Moreover, no disclosure or suggestion to a separate grip mounted on the rotating member and having a positive connection with recesses in the segmented ring thereof can be derived from D1.

4.7 In D9 a chuck is shown comprising two grips 6 and 18 for clamping and releasing the tool. However, it concerns another type of chuck not having a segmented ring for moving the jaws.

The different structure for moving the jaws results in other drawbacks. For example, the threaded stud for moving the jaw carrier is located axially and limits the possibility of inserting different kinds of tools. For these reasons, the skilled person has also no reason to consult D9 when looking for a solution of the stated problem related to another type of chuck.

4.8 Therefore, the state of the art as illustrated by D1 and D9 fails to provide the skilled person with a lead to employing the characterising features to a chuck known from D11.

Moreover, even if the skilled person had thought of combining the chucks according to Figure 3 of D1 or Figure 2 of D9 with the chuck of D11, he would not arrive at the subject-matter of claim 1, since there would still be no disclosure or suggestion for the

fixation of the grip by means of sectoral projections formed in the grip and sectoral recesses formed in the divided segments of the rotary member. Such connection, based on projections and recesses, allows in the present case a simple reliable fixation of the grip to the rotating member which leads to a reduced size of the chuck.

Therefore, the Board is convinced that also in this respect, improving the chuck known from D11 according to the teaching of claim 1, does not follow plainly and logically from the prior art illustrated by D11, D9 and D1.

5. Summarising, in the Board's judgment, the proposed solution to the technical problem underlying the patent in suit defined in the independent claim 1 is inventive and therefore this claim as well as its dependent claim 2 relating to a particular embodiment of the invention in accordance with Rule 29(3) EPC, can form the basis for maintenance of the patent (Article 52(1) EPC).

The description and drawings are in agreement with the actual wording and scope of the current claims. Hence these documents are also suitable for maintenance of the patent in amended form.

Thus taking into account the amendments made by the appellant, the patent and the invention to which it relates meet the requirements of the EPC and the patent as amended is maintained in this form (Article 102(3) EPC).

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 followings documents:

   - claim 1 and 2 and description (pages 1 to 5) as filed at the oral proceedings,

   - Figures as granted (Figures 1 to 7 and 13 to 20).

The Registrar: The Chairman:

M. Patin P. Alting van Geusau