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D E C I S I O N
of 21 February 2006

Case Number: T 0190/04 - 3.2.01

Application Number: 93911252.0

Publication Number: 0593742

IPC: F16B 37/08, B23P 11/02

Language of the proceedings: EN

Title of invention:
Method of and device for mechanical tensioning of bolts, studs and the like

Patentee:
Junkers, John K.

Opponent:
ITH GmbH

Headword:
-

Relevant legal provisions:
EPC Art. 54(2)

Keyword:
"Novelty (no) - all requests"

Decisions cited:
G 0010/91

Catchword:
-

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Case Number: T 0190/04 - 3.2.01

D E C I S I O N
of the Technical Board of Appeal 3.2.01
of 21 February 2006

Appellant: (Proprietor of the patent)
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Decision under appeal: **Decision of the Opposition Division of the European Patent Office posted 22 December 2003 revoking European patent No. 0593742 pursuant to Article 102(1) EPC.**

Composition of the Board:

Chairman: S. Crane
Members: J. Osborne
S. Hoffmann

Summary of Facts and Submissions

I. The appeal is directed against the decision posted 22 December 2003 revoking European patent No. 0 593 742.

II. The opposition division found that the subject-matter of method and product claims according to a main and first and second auxiliary requests was not new or did not involve an inventive step with respect to *inter alia*:

E1: DE-C-1 902 413 claiming priority of 19 January 1968 SE 698-68.

III. In reply to the grounds of appeal the respondent referred to *inter alia*:

E5: US-A-3 565 472 also claiming priority of 19 January 1968 SE 698-68.

IV. In a communication pursuant to Article 11(1) RPBA the board indicated its provisional opinion that E5 was highly relevant.

V. At oral proceedings held 21 February 2006 the appellant requested that the decision under appeal be set aside and that the patent be maintained in amended form on the basis of a main request or in the alternative on the basis of first and second auxiliary requests, all comprising claims 1 to 12, or in the further alternative according to a third auxiliary request comprising only claims 1 to 4 of the second auxiliary request.

VI. Claim 1 according to the main request reads as follows:

"1. A method of elongating and relaxing a stud (1) having an axis and arranged in an object (2), the method comprising the steps of connecting the stud (1) with a first inner part (4) of a tensioning device which is movable only in an axial direction of the stud so as to pull the stud (1) in the axial direction to elongate the stud (1) and thereby to tension it in the object (2) or to reduce the pull on the stud and thereby to relax the stud (1); and moving the first part (4) only in the axial direction by connecting the first part (4) with a second outer part (3) of the tensioning device which is rotatable about said axis; engaging a disc-shaped friction element (5) with the first part (4) so that the first part (4) has a higher frictional resistance to motion than the second part (3) and so that the second part (3) is not firmly engaged with the friction element (5) but instead is freely turnable relative to the friction element (5) while freely abutting against the latter (5); and applying a force to the parts (3, 4) of the tensioning device whereby the second part (3) is rotated and the first part (4) is moved only in the axial direction to move the stud (1) in the axial direction so as to elongate the stud (1) and apply to the object (2) a clamping force so that the two parts (3, 4), the stud (1) and the friction element (5) cannot rotate or move axially relative to an object (2) surface and vice versa, and a unitary structure is produced with all components which are immovably clamped with one another, characterised in that a holding force is applied by a tool to the first inner part (4) via first engaging means (13) at an end portion of the first part spaced from the

friction element (5) and simultaneously an opposite equal active force is applied by said tool to the second part (3) via second engaging means (8) on the second part so that when the outer part (3) is rotated its surface (10) abuts against the surface (19) of the friction element (5) and is thereby prevented from further axial movement while the inner part (4) is moved only in an axial direction due solely to the co-operation between the outer and inner parts and the friction element (5)."

Claim 1 according to the first auxiliary is identical to that according to the main request.

Claim 1 according to the second auxiliary request essentially differs from that according to the main request by the additional feature that the location of the second engaging means on the second part are "at the end portion of the second part facing away from the object".

VII. The respondent's submissions on formal admissibility of the claims 1 were essentially as follows:

There is no basis in the application as originally filed for the feature of an "active" force. Although no objection was raised in this respect during opposition, the claim has now been amended and the objection is sufficiently serious that the board must consider it. The original disclosure was of various ways of applying force to the parts and there was no disclosure either of the presently claimed combination of a holding force together with opposite and equal forces or that it was "solely" the presently claimed co-operation of the

parts which would achieve movement of the inner part only in the axial direction. Moreover, the repetition in the beginning of the characterising portions of features contained in the respective preambles leads to a lack of clarity.

VIII. The appellant's arguments in respect of formal admissibility may be summarised as follows:

The term "active" was present in claim 1 as granted. No objection in accordance with Article 100(c) EPC was raised during opposition and the amendment of the claims does not render this term now open to objection. The term "solely" was not contained in the application as originally filed but there was a clear implicit disclosure to the skilled person that it is only the co-operation between the outer and inner parts and the friction element which causes the inner part to move only in the axial direction. It is clear from the total disclosure of the application as originally filed that the application of equal and opposite forces is a special case of the application of a holding force, not an alternative. The first four lines of the characterising portions do not merely repeat features already mentioned in the preamble but introduce additional features.

IX. In respect of novelty the appellant submitted essentially:

E5 discloses three possibilities for preventing rotation of the inner part. In the embodiments of figures 2 to 4 a counter-holding tool is applied to the washer so there is no reliance on frictional forces

generated by the washer. In the event that the object is not static and the counter-torque is too great this will move the object. If, on the other hand, the object is static no counter-torque should be applied to the washer. In this case the washer may be held stationary with respect to the object in which case only a single tool is necessary but for application only to the second part, or there need be no washer at all, as in figure 5. There is no recognition in E5 of any function of the washer in providing frictional forces and when a freely rotatable washer is provided operation of the device relies on the use of a counter-holding tool. Moreover, whereas engagement means in the end of the first part are present only in the embodiment of figures 3a, 3b, the washer is disc-shaped only in the embodiment of figures 4a, 4b; these two embodiments cannot be combined when considering novelty. In any case the engagement means in the end of the first part are only foreseen in an alternative construction where there is no washer provided at all. When in E5 it indicates how to avoid inducing torsional stress in a bolt in a static object the only understandable teaching relates to the use of a hydraulic tensioner. It follows that the subject-matter of claim 1 according to the main request is novel with respect to the disclosure of E5.

The additional feature in claim 1 according to the second auxiliary request requires engagement at the end portion of the second part and provides the benefit that no space is necessary between adjacent assemblies to permit the tool to be applied to the nut. Consideration of novelty with respect to E5 must be restricted to the embodiment of figures 3a, 3b having

engagement means in the end face of the first part. The hexagonal flats on the nut according to E5 do not extend to the end face because a chamfer is provided.

X. The respondent's rebuttal of the submissions on novelty may be summarised as follows:

As regards the subject-matter of claim 1 according to the main request, all features are known in combination from E5. In particular, E5 discloses in figures 3a and 4a two possibilities of "engaging the disc-shaped friction element with the first part". As regards the requirement in claim 1 "so that the first part has a higher … resistance" it is not specified how this is achieved. However, since the embodiments of figures 3a, 3b, 4a, 4b comprise the same features as are present in the single embodiment in the patent specification it is implicit that the same result would be achieved. Moreover, when in E5 column 3, lines 48 to 52 it is stated that the tool may be connected to the washer it is implicit that in the case of the embodiment according to figure 3b the connection would be indirect through the recesses on the end face of the first part.

As regards the additional feature of claim 1 according to the second auxiliary request, E5 already gives two examples of engaging means in end faces.

Reasons for the Decision

1. The patent relates to the tensioning of threaded elements such as studs protruding from the surface of an object. The use of a conventional nut to stretch a

stud suffers from the disadvantage that friction in the threads creates torsional stress in the stud. In the device according to the patent a stud protruding from a face of an object is isolated from the friction arising from rotation of the nut ("second part" or "outer part") by the presence of an additional ("first" or "inner") part located between the nut and the stud. This first part is prevented from rotation by engagement with a disc-shaped ("friction") element clamped between the nut and the object. The operation of the device with equal and opposite forces by a single tool avoids the need for an external abutment for the tool.

Formal objections

2. The respondent raised formal objections to the respective independent claims 1 according to all requests.

2.1 All claims 1 contain features relating to the application of an "active" force to the second part and the respondent argues that this term finds no basis in the application as originally filed. This term was in both independent claims as granted but no objection was raised in accordance with Article 100(c) EPC during the opposition procedure. In accordance with opinion G 10/91 (OJ EPO 1993, 420) a ground for opposition may not be introduced at the appeal stage without the consent of the patent proprietor, which was not given in the present case. Without that consent the board has the power to consider only objections which arise from amendments made subsequent to grant of the patent.

2.2 The claims 1 have been amended to specify that the first part is moved only in an axial direction due "solely" to the co-operation between the first and second parts and the friction element. In the description as originally filed at page 6, lines 24 to 34 it is stated that "due to inventive cooperation of the [inner and outer] parts 3, 4 and the friction element … the inner part 4 moves only in the axial direction … ". Neither in the cited passage nor elsewhere in the description is there any reference to any additional influence restricting the inner part to only axial movement. The board is satisfied that the skilled person when reading the original application as a whole would be in no doubt that this movement does result "solely" from the co-operation between the outer and inner parts and the friction element.

2.3 Page 6, lines 24 to 34 of the description as originally filed is highly relevant also in respect of the teaching to the skilled person of the presently claimed combination of "equal and opposite" forces, one of which is a holding force. When considered in isolation the wording in the cited passage "by applying a force to one part, by holding one part and turning another part, by applying a turning force to both parts in opposite directions with equal forces" may appear to define at least two ways of applying a force to the inner part. However, each of these phrases relates to an identical construction of the tensioning device operating in the same way to impart only axial movement to the inner part. Since the inner part is subject only to axial movement it is implicit that a turning force applied to it is by definition a holding torque. The introduction of the feature that the forces are equal

and opposite is then merely a restriction in comparison with the subject-matter of the claim as granted.

2.4 The board also takes the view that the presence of some subject-matter in both the preamble and the characterising portion of the claims does not result in a lack of clarity since it does not leave the reader in any doubt about which features are being claimed.

2.5 It follows from the foregoing that the formal objections raised by the respondent are not valid.

Prior art

3. E5 is acknowledged in the description of the contested patent and is a US family member of E1 which the opposition division found to destroy novelty of the subject-matter of the independent product claim 7 as granted. The content of the two documents is largely identical but E5 contains in column 3 lines 36 to 58 additional teaching which is relevant to the subject-matter of claims 1 according to the appellant's various requests. For this reason the board decided not to disregard E5 subsequent to its introduction into the proceedings in the respondent's reply to the statement of grounds of appeal.

Novelty- main request

4. The appellant does not challenge the respondent's argument that E5 relates to a device for tensioning a stud in an object and which comprises a sleeve forming an inner part for threaded engagement on the stud, a nut forming an outer part for threaded engagement on

the inner part and a washer which is non-rotatably connected with the inner part and located between the outer part and the object. The appellant also does not disagree that the action of the device according to E5 is to cause the inner part to move only in an axial direction. However, the opinions of the two parties diverge as regards the disclosure of E5 in respect of the method of operation of the device and which particular combination of features is disclosed.

4.1 E5 discloses three embodiments in figures 2, 3a, 3b, figures 4a, 4b and figure 5 respectively. The first and second embodiments differ essentially in the means of connection between the sleeve and the washer. Figure 3b additionally illustrates an alternative, indirect means of engagement between a tool and the washer in the form of recesses in the end face of the sleeve directed away from the object. The board cannot accept the contention of the appellant that the reference to the engagement recesses in the sleeve at column 2, lines 55 to 58, i.e. "Of course, instead of the washer, the sleeve 18 can be provided with recesses 22a for engagement ...", should be understood as meaning that the washer is dispensed with completely. The phrase "instead of the washer" has to be seen in the context of the statement at column 2, lines 34 and 35, that the washer "has recesses 22 for engagement with a counter holding tool". Since the washer is clearly an essential component of the embodiment of figures 3a and 3b it is wholly implausible that such a radical departure in the constructional concept as would be represented by omitting it would be dealt with in the summary fashion contended by the appellant. The essential function of the connection between the sleeve and the washer is to

prevent relative rotation whilst allowing the sleeve to move axially. This is achieved according to figure 3a by an axially deformable annular web and according to figure 4a by splines. The appellant argues that only in the figure 4a embodiment is the washer disc-shaped and that a combination of the engagement recesses in the end face of the sleeve and the disc-shaped washer is not disclosed. The board disagrees. Even though in the embodiment of figure 3a the sleeve and the washer are formed as one piece including the web, the washer itself nevertheless is the same shape as in figure 4a and is in the form of a disc.

4.2 The disclosure of E5 generally refers to the use of two tools, a counter-holding tool for application either directly or, in the case of the engagement recesses, indirectly to the washer and a further tool such as a dynamometric wrench for turning the nut. It is explained that the application of an excessive counter-holding force in the use of these tools with an object which is rotatable will merely induce rotation of the object. If, on the other hand, the object is unable to rotate excess torque applied by the counter-holding tool would cause the sleeve to rotate and apply torque stress to the stud. According to E5, in order to avoid this "the counter-holding torque has to be equal to the torque applied to the nut". A new paragraph then begins with the statement that this "can be accomplished by a tool, which is connected between the nut and the washer …". The third and final sentence of the paragraph states "by these arrangements, the nut can be tightened without the usage of any specially arranged counter-holding tool." In the opinion of the board this is a clear disclosure to the skilled person of the

simultaneous application of equal and opposite torques by a single tool. The appellant's view, that the wording "these arrangements" refers only to the immediately preceding, second sentence which proposes that the washer be fixed relative to the stationary object finds no logical support since the absence of the need for a specially arranged counter-holding tool would apply equally in the "arrangement" having a single tool operating on both the nut and the sleeve. Moreover, whilst the additional explanations in the second sentence of the paragraph regarding the forces exerted by a single tool operating on both the nut and the sleeve may not be easily understandable, the concept of using the single tool is sufficiently straightforward that the skilled person would not be hindered from putting it into effect. Indeed, the appellant does not dispute that power tools suitable for the purpose are well known.

4.3 The appellant argues that E5 contains no disclosure that the washer is a friction element within the meaning of the present claims. Although E5 does not concern itself with the theory behind the operation of the device it is implicit that a frictional force will be generated between the washer and the object when clamped against it by the nut and that the washer therefore will provide additional frictional drag to the sleeve. Indeed, the present patent specification contains no indication of any special features which render the friction element more capable of fulfilling its function than the washer of E5. Since the device according to the present patent and that according to E5 have corresponding constituent parts used in the same way it is implicit that the two devices will

function in the same way. This approach applies equally to the appellant's contention that E5 is incorrect in stating that the counter-holding torque has to be equal to the torque applied to the nut in order to avoid the risk of applying torque to a stud in a static object. As set out above, the patent specification contains no indication of any difference between the device of E5 and that presently claimed which would support the notion that equal and opposite torques are applicable to operation of the presently claimed device but not the prior art. Moreover, the appellant supplied no such explanation to the board.

4.4 The board concludes from the above that E5 does disclose a method as defined in claim 1 which therefore lacks novelty. The main request therefore fails.

Novelty - first auxiliary request

5. Claim 1 of this request is identical to that of the main request. This request therefore also fails.

Novelty - second auxiliary request

6. Claim 1 according to this request contains the additional feature that the location of the second engaging means on the second part are "at the end portion of the second part facing away from the object".

6.1 The nut of E5 comprises hexagonal flats which extend between one face directed towards the object and the other face directed away from the object. These therefore form engaging means "at the end portion of the second part facing away from the object". The

appellant argues that this is not the case because the flats are separated from the end face by a chamfer. However, the wording of the claim which specifies that the engaging means are "at an end portion" does not require that they extend fully to the end face. Indeed, in the embodiment in the patent the "engaging means" are splines which extend away from the end face and which, in practice, would also be separated from the end face by a chamfer.

6.2 It follows from the above that the additional feature in claim 1 according to this request fails to establish novelty of the subject-matter. This request also therefore must fail.

Novelty - third auxiliary request

7. Since claim 1 according to this request is identical to that according to the second auxiliary request the two requests must suffer the same fate.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

A. Vottner S. Crane